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# Transcript of Yan Yao, Ph.D.

**Date:** August 8, 2024

**Case:** Samsung Electronics Co., LTD -v- RJ Technology, LLC (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

Transcript of Yan Yao, Ph.D.  
Conducted on August 8, 2024

1 (1 to 4)

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| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>22 | 1<br><br>UNITED STATES PATENT AND TRADEMARK OFFICE<br><br>BEFORE THE PATENT TRIAL AND APPEAL BOARD<br><br>SAMSUNG ELECTRONICS CO., LTD.,<br><br>Petitioner<br><br>V.<br><br>RJ TECHNOLOGY LLC,<br><br>Patent Owner.<br><br>Case IPR2023-01183<br><br>Patent No. 7,749,641<br><br>VIDEOTAPED DEPOSITION OF<br><br>YAN YAO, PHD<br><br>THURSDAY, AUGUST 8, 2024<br><br>9:49 A.M. CT<br><br>JOB NO.: 548258<br><br>PAGES: 1 - 282<br><br>REPORTED BY: Mark Tod Kislingbury, CSR RDR CRR                                                                                      | 3<br><br>A P P E A R A N C E S<br><br>ON BEHALF OF THE PETITIONER:<br><br>JEFFREY COLIN, ESQUIRE<br>GREENBERG TRAURIG, LLP<br>ONE VANDERBILT AVENUE<br>NEW YORK, NEW YORK 10017<br>212-801-6494<br><br>ON BEHALF OF THE PATENT OWNER:<br><br>GEORGE STAMATOPOULOS<br>KOBRE & KIM<br>800 THIRD AVENUE<br>NEW YORK, NEW YORK 10022<br>646-658-4972<br><br>-AND-<br><br>ROBERT ZHOU, ESQUIRE (VIA ZOOM)<br>KOBRE & KIM<br>HKRI CENTRE ONE, HKRI TAIKOO HUI<br>288 SHIMEN YI ROAD, 43RD FLOOR<br>SHANGHAI, 200041<br>PEOPLE'S REPUBLIC OF CHINA (PRC)<br>86 21 3210 2174<br><br>ALSO PRESENT:<br><br>ZACH THETFORD, VIDEOGRAPHER                                                   |
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>22 | 2<br><br>DEPOSITION OF YAN YAO, PHD<br><br><br><br><br><br><br><br><br><br><br><br><br>ORAL AND VIDEOTAPED DEPOSITION OF YAN<br>YAO, PHD, produced as a witness at the instance of<br>the Petitioner, and duly sworn, was taken in the<br>above-styled and numbered cause on August 8, 2024,<br>from 9:49 a.m. to 7:10 p.m., before Mark Tod<br>Kislingbury, Texas CSR No. 2298, Certified<br>Realtime Reporter, Registered Diplomate Reporter,<br>at the offices of Greenberg Traurig, LLP, 1000<br>Louisiana Street, Suite 6700, Houston, Texas,<br>pursuant to Notice. | 4<br><br>T A B L E O F C O N T E N T S<br><br>PAGE<br>STYLE AND NUMBER..... 1<br>APPEARANCES..... 3<br><br>WITNESS: YAN YAO, PHD<br>EXAMINATION BY MR. COLIN..... 7<br>EXAMINATION BY MR. STAMATOPOULOS..... 267<br>FURTHER EXAMINATION BY MR. COLIN..... 279<br><br>CERTIFICATE OF REPORTER..... 281<br><br>EXHIBITS<br>(ATTACHED TO TRANSCRIPT)<br>NUMBER DESCRIPTION PAGE<br>EXHIBIT 1036 DECLARATION OF DR. YAN YAO IN<br>SUPPORT OF PLAINTIFF RJ<br>TECHNOLOGY LLC'S RESPONSIVE<br>CLAIM CONSTRUCTION BRIEF..... 38<br>EXHIBIT 1037 COMPARISON OF YAO PARAGRAPHS<br>ON CHARGE CUT-OFF VOLTAGE..... --<br>EXHIBIT 1038 RJ TECH OPENING CLAIM<br>CONSTRUCTION BRIEF..... 64 |

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Transcript of Yan Yao, Ph.D.  
Conducted on August 8, 2024

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| <p>1 EXHIBITS<br/>2 (ATTACHED TO TRANSCRIPT)<br/>3 NUMBER DESCRIPTION PAGE<br/>4 EXHIBIT 1039 EXHIBIT 3, CERTIFICATE OF<br/>5 TRANSLATION..... 86<br/>6 EXHIBIT 1040 KAJIYAMA 2001..... 157<br/>7 EXHIBIT 2006 DECLARATION OF DR. YAN YAO..... 10<br/>8 EXHIBIT 2022 YAO APPLE DECLARATION..... 12<br/>9<br/>10<br/>11<br/>12<br/>13<br/>14<br/>15<br/>16<br/>17<br/>18<br/>19<br/>20<br/>21<br/>22</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>1 THE VIDEOGRAPHER: All right.<br/>2 Our court reporter today is Mark Kislingbury<br/>3 representing Planet Depos. Would our reporter<br/>4 please swear in the witness.<br/>5 YAN YAO, PHD<br/>6 of lawful age, being first duly sworn, deposes and<br/>7 says in reply to the questions propounded as<br/>8 follows:<br/>9 EXAMINATION<br/>10 BY MR. COLIN:<br/>11 Q. Good morning, Dr. Yao.<br/>12 A. <b>Good morning.</b><br/>13 Q. Have you ever been deposed before?<br/>14 A. <b>No.</b><br/>15 Q. Okay. So just to explain what's going to<br/>16 happen today, I'm going to ask you a series of<br/>17 questions, and I'm going to do my best to ask<br/>18 clear questions. If you answer my question, I'm<br/>19 going to assume that you understood it. Okay?<br/>20 A. <b>Yes.</b><br/>21 Q. So if anything's unclear, just ask me,<br/>22 and I'll try to rephrase it.</p> |
| <p>1 PROCEEDINGS<br/>2 THE VIDEOGRAPHER: Here begins<br/>3 Media Number 1 in the videotaped deposition of<br/>4 Dr. Yan Yao in the matter of Samsung Electronics<br/>5 Company, LTD vs. RG -- RJ Technology, LLC, in the<br/>6 United States Patent and Trademark Office. Case<br/>7 number is IPR2023-01183.<br/>8 Today's date is August 8th, 2024.<br/>9 The time on the video monitor is 9:49 a.m. Central<br/>10 time. The video -- videographer today is Zach<br/>11 Thetford representing Planet Depos. This video<br/>12 deposition is taking place at 1000 Louisiana<br/>13 Street, Suite 6700.<br/>14 Would counsel please voice<br/>15 identify themselves and state whom they represent.<br/>16 MR. COLIN: Jeff Colin from<br/>17 Greenberg Traurig on behalf of petitioner Samsung<br/>18 Electronics Co., Limited.<br/>19 MR. STAMATOPOULOS: George<br/>20 Stamatopoulos with Kobre &amp; Kim representing patent<br/>21 owner RJ Technology. And with me connecting<br/>22 remotely is my colleague Robert Zhou.</p> | <p>1 A. <b>Sure.</b><br/>2 Q. Okay. And because the court reporter<br/>3 here is typing out everything you -- you say, you<br/>4 have to speak rather than just nod your head.<br/>5 A. <b>Yes.</b><br/>6 Q. And please wait until I complete my<br/>7 question before you begin to answer. Okay?<br/>8 A. <b>Sure.</b><br/>9 Q. And that will, again, help the court<br/>10 reporter.<br/>11 Is there any reason why you can't give me<br/>12 your best testimony today?<br/>13 A. <b>No.</b><br/>14 Q. Okay. I'm going to try to take a break<br/>15 about once an hour. If you need a break, just let<br/>16 me know, and we'll try to go into a break shortly<br/>17 unless there's a question pending. Okay?<br/>18 A. <b>Yes.</b><br/>19 Q. You understand that you're under oath<br/>20 today; right?<br/>21 A. <b>Yes.</b><br/>22 Q. What did you do to prepare for today's</p>     |

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| <p style="text-align: right;">9</p> <p>1 deposition?</p> <p>2 <b>A. To prepare for the -- today's deposition,</b></p> <p>3 <b>I reviewed my deposi- -- declaration and the</b></p> <p>4 <b>exhibits in the case and also had a discussion</b></p> <p>5 <b>with the counsel to prepare for the deposition.</b></p> <p>6 Q. Okay. When did you have discussion with</p> <p>7 counsel?</p> <p>8 <b>A. Probably in the last month.</b></p> <p>9 Q. Can you be more specific than that?</p> <p>10 <b>A. Yeah. Yeah, the -- you know, since is my</b></p> <p>11 <b>first time deposition, some -- we had meetings on</b></p> <p>12 <b>Zoom with counsels maybe twice a week in the last</b></p> <p>13 <b>three weeks.</b></p> <p>14 Q. Okay. So you may have met with counsel</p> <p>15 about five or six times over the last three weeks?</p> <p>16 <b>A. That's correct.</b></p> <p>17 Q. Okay. When you met with counsel, how</p> <p>18 long did you meet with counsel?</p> <p>19 <b>A. Roughly one -- one to two hours each</b></p> <p>20 <b>time.</b></p> <p>21 Q. Okay. And which counsel did you meet</p> <p>22 with?</p> | <p style="text-align: right;">11</p> <p>1 declaration are accurate?</p> <p>2 <b>A. Yes.</b></p> <p>3 Q. Okay. Are you aware of any mistakes in</p> <p>4 your declaration?</p> <p>5 <b>A. No.</b></p> <p>6 Q. You are also RJ Technology's expert in</p> <p>7 connection with the RJ Technology vs. Apple</p> <p>8 litigation in the Central District of California;</p> <p>9 correct?</p> <p>10 <b>A. That's correct.</b></p> <p>11 Q. Okay if I call that "the Apple</p> <p>12 litigation"?</p> <p>13 <b>A. Hm-hm.</b></p> <p>14 Q. Okay. Have you performed any work for RJ</p> <p>15 Technology besides work in this inter parte review</p> <p>16 proceeding and the Apple litigation?</p> <p>17 <b>A. No.</b></p> <p>18 Q. Okay. Have you been involved with any of</p> <p>19 the litigation in China with Apple?</p> <p>20 <b>A. No.</b></p> <p>21 Q. Okay. You submitted two claim</p> <p>22 construction declarations in the Apple litigation;</p> |
| <p style="text-align: right;">10</p> <p>1 <b>A. So I have met with George, with Robert,</b></p> <p>2 <b>and with -- yeah -- other counsels. So mainly the</b></p> <p>3 <b>two.</b></p> <p>4 Q. Okay.</p> <p>5 <b>A. Yeah.</b></p> <p>6 Q. And you signed a declaration in this IPR</p> <p>7 proceeding; right?</p> <p>8 <b>A. I believe so.</b></p> <p>9 Q. Okay. And you understand IPR, I'm</p> <p>10 referring to Inter Partes Review; correct?</p> <p>11 <b>A. Yes.</b></p> <p>12 Q. Okay. And your declaration of Dr. Yan</p> <p>13 Yao is already in front of you. It's marked</p> <p>14 Exhibit 2006; correct?</p> <p>15 <b>A. Yes, that's correct.</b></p> <p>16 Q. And on page 111 of your declaration,</p> <p>17 that's your signature; right?</p> <p>18 <b>A. Yes.</b></p> <p>19 Q. You understand that you signed this</p> <p>20 declaration under the penalty of perjury; correct?</p> <p>21 <b>A. Yes.</b></p> <p>22 Q. Do you believe that the contents of your</p>                                                                                                                                         | <p style="text-align: right;">12</p> <p>1 correct?</p> <p>2 <b>A. Two -- Can you repeat the question?</b></p> <p>3 Q. Right. You submitted two claim</p> <p>4 construction declarations in the Apple litigation;</p> <p>5 correct?</p> <p>6 <b>A. I remember one, but I remember -- no, I</b></p> <p>7 <b>don't remember the second one.</b></p> <p>8 Q. Okay.</p> <p>9 MR. COLIN: And so let's mark for</p> <p>10 the record -- this is already marked as Exhibit</p> <p>11 2022.</p> <p>12 (Exhibit 2022 marked)</p> <p>13 Q. (BY MR. COLIN) This is your June 23rd,</p> <p>14 2023, declaration for the Apple litigation;</p> <p>15 correct?</p> <p>16 <b>A. Yes.</b></p> <p>17 Q. And that's your signature on page 25 of</p> <p>18 it?</p> <p>19 <b>A. That's correct.</b></p> <p>20 Q. And you signed it under the penalty of</p> <p>21 perjury?</p> <p>22 <b>A. That's correct.</b></p>                                                            |

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| <p>13</p> <p>1 Q. Are you aware of any mistakes in this<br/>2 declaration?</p> <p>3 <b>A. No.</b></p> <p>4 Q. And you believe this declaration is<br/>5 accurate? And by "this declaration," I mean your<br/>6 Exhibit 2022.</p> <p>7 <b>A. Yes.</b></p> <p>8 MR. COLIN: Let's mark as a new<br/>9 exhibit the 1036, your declaration dated July<br/>10 14th, 2013.</p> <p>11 (Exhibit 1036 marked)</p> <p>12 THE WITNESS: Thank you.</p> <p>13 Q. (BY MR. COLIN) And does this refresh<br/>14 your recollection that you also submitted a second<br/>15 declaration in the Apple litigation on July 14th,<br/>16 2023?</p> <p>17 <b>A. Yes.</b></p> <p>18 Q. And that's your signature on page 12?</p> <p>19 <b>A. That's correct.</b></p> <p>20 Q. Okay. And you signed that declaration<br/>21 under the penalty of perjury; correct?</p> <p>22 <b>A. Yes.</b></p>                                                                                                                                | <p>15</p> <p>1 <b>So when you use a current -- constant current, you</b><br/>2 <b>can do so at a very slow rate. For example, take</b><br/>3 <b>20 hours or 50 hours to charge, then at the end of</b><br/>4 <b>charge you can reach equivalent state that would</b><br/>5 <b>considered fully charged.</b></p> <p>6 Q. Dr. Yao, you did not answer my question.<br/>7 Do you agree with me that constant current<br/>8 charging can be used to implement the charge<br/>9 cut-off voltage; correct?</p> <p>10 MR. STAMATOPOULOS: Same<br/>11 objection.</p> <p>12 <b>A. As I mentioned, depends. If you charge</b><br/>13 <b>very slowly, take 50 hours, hundred hours to</b><br/>14 <b>charge, you could reach the potentially charge</b><br/>15 <b>cut-off voltage. But you do it at relative medium</b><br/>16 <b>rate or faster rate, you are not able to reach the</b><br/>17 <b>charge cut-off voltage.</b></p> <p>18 Q. So, Dr. Yao, it's your testimony today<br/>19 that you don't know -- well, let me strike that.</p> <p>20 It's your testimony today that constant<br/>21 current can be used to implement the charge<br/>22 cut-off voltage depending on the specific</p> |
| <p>14</p> <p>1 Q. Are you aware of any mistakes in your<br/>2 July 14th, 2023, declaration?</p> <p>3 <b>A. No.</b></p> <p>4 Q. Okay. And you believe your July 14th,<br/>5 2023, declaration is accurate?</p> <p>6 <b>A. Yes.</b></p> <p>7 Q. Dr. Yao, you agree with me that lithium<br/>8 ion batteries can be charged by several different<br/>9 charging algorithms; correct?</p> <p>10 <b>A. Yes.</b></p> <p>11 Q. And you agree that constant current<br/>12 charging can be used to implement the charge<br/>13 cut-off voltage; correct?</p> <p>14 <b>A. Can you repeat?</b></p> <p>15 Q. You agree with me that the constant<br/>16 current charging can be used to implement the<br/>17 charge cut-off voltage of the claims; correct?</p> <p>18 MR. STAMATOPOULOS: Object to<br/>19 form.</p> <p>20 <b>A. Typically we use a constant current and a</b><br/>21 <b>constant voltage to reach the equilibrium of the</b><br/>22 <b>batteries when it reaches a fully charged state.</b></p> | <p>16</p> <p>1 conditions used? Is that accurate?</p> <p>2 MR. STAMATOPOULOS: Objection.</p> <p>3 <b>A. Can you point to my declaration where I</b><br/>4 <b>render my opinion on this?</b></p> <p>5 Q. (BY MR. COLIN) You provided opinions on<br/>6 claim construction in this case; correct? You<br/>7 have three claim construction declarations in<br/>8 front of you; right?</p> <p>9 <b>A. I have two, yes, claim construction</b><br/>10 <b>conclusion in front of me.</b></p> <p>11 Q. You don't have opinions on claim<br/>12 construction in your IPR declaration? You have a<br/>13 whole section on claim construction; right?</p> <p>14 <b>A. Right.</b></p> <p>15 Q. All right. So in three different places<br/>16 you provide opinions on claim construction<br/>17 concerning charge cut-off voltage; correct?</p> <p>18 <b>A. Yes.</b></p> <p>19 Q. When you use constant current, constant<br/>20 volting charging, you agree with me that constant<br/>21 current charging is applied until the battery<br/>22 reaches its charge cut-off voltage; correct?</p>                                                                                                     |

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| <p>17</p> <p>1 MR. STAMATOPOULOS: Object to<br/>2 form.<br/>3 <b>A. Can you repeat the question?</b><br/>4 Q. (BY MR. COLIN) Sure. When you use<br/>5 constant current, constant volting charging, you<br/>6 agree with me that constant current charging is<br/>7 applied until the battery reaches its charge<br/>8 cut-off voltage; correct?<br/>9 MR. STAMATOPOULOS: Same<br/>10 objection.<br/>11 MR. COLIN: And just for the<br/>12 court reporter, it's "cut-off," o-f-f.<br/>13 <b>A. So in my declaration, in Exhibit 2022,</b><br/>14 <b>paragraph 32, I basically saying that -- so "the</b><br/>15 <b>battery is charged under a constant current until</b><br/>16 <b>it reaches a maximum configured voltage, at the</b><br/>17 <b>which point it's charged at that voltage until</b><br/>18 <b>charge is complete. The constant current stage</b><br/>19 <b>allows the battery to be fully quickly -- to be</b><br/>20 <b>charged quickly and efficiently. During the</b><br/>21 <b>constant voltage stage, the battery is slowly</b><br/>22 <b>charged to its full capacity, and this constant</b></p> | <p>19</p> <p>1 <b>A. What's your question?</b><br/>2 Q. (BY MR. COLIN) You didn't tell the court<br/>3 that when the battery is fully charged, that's<br/>4 when it meets the charge cut-off voltage; correct?<br/>5 MR. STAMATOPOULOS: Same<br/>6 objection.<br/>7 <b>A. Well, I would assume it's the same thing.</b><br/>8 <b>The charge cut-off voltage, the maximum voltage</b><br/>9 <b>the battery is configured to charge essentially</b><br/>10 <b>has the same meaning.</b><br/>11 Q. (BY MR. COLIN) Well, in paragraph 32 you<br/>12 say constant current voltage is applied until the<br/>13 battery reaches a maximum configured voltage;<br/>14 right?<br/>15 <b>A. Yes.</b><br/>16 Q. Okay. And in paragraph 33 of Exhibit<br/>17 22 -- 2022, about -- starting at line 18, you<br/>18 indicate, "For example, in many laboratory<br/>19 settings batteries, are charged at a constant<br/>20 current without a constant chronically voltage<br/>21 state. Once the battery reaches a predetermined<br/>22 voltage" -- and then in parentheses, "i.e., the</p> |
| <p>18</p> <p>1 <b>voltage state prevents the battery from being</b><br/>2 <b>overcharged, charging to a level higher than the</b><br/>3 <b>charge cut-off voltage."</b><br/>4 Q. Okay. So to be clear, Dr. Yao, in<br/>5 Exhibit 2022, at paragraph 32, you indicate that<br/>6 when you're using constant current, constant<br/>7 voltage charging, constant current charging is<br/>8 applied until the battery reaches a maximum<br/>9 configured voltage at which point it is charged at<br/>10 that voltage until charging is complete; correct?<br/>11 <b>A. Yes.</b><br/>12 Q. And that's what you told the court?<br/>13 <b>A. Yes.</b><br/>14 Q. Okay. So you state constant current is<br/>15 applied until the battery reaches a maximum<br/>16 configured voltage; right?<br/>17 <b>A. Yes.</b><br/>18 Q. You didn't tell the court that when the<br/>19 battery is fully charged, it meets the charge<br/>20 cut-off voltage; correct?<br/>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p>                                                                                                              | <p>20</p> <p>1 charge cut-off voltage" -- "the charging stops";<br/>2 correct?<br/>3 <b>A. That's what -- that's what it says here.</b><br/>4 Q. Right. So you told the court in your<br/>5 declaration that with constant current charging,<br/>6 the battery is charged until a predetermined<br/>7 voltage, i.e., the charge cut-off voltage, and<br/>8 then it stops; correct?<br/>9 <b>A. The charge stops, yes.</b><br/>10 Q. So you agree with me that constant<br/>11 current charging involves charging the battery at<br/>12 a constant current until it reaches the charge<br/>13 cut-off voltage; correct?<br/>14 MR. STAMATOPOULOS: Object to<br/>15 form.<br/>16 <b>A. Yes.</b><br/>17 Q. (BY MR. COLIN) And you rely on the<br/>18 court's claim construction order in your<br/>19 declaration; correct?<br/>20 <b>A. Yes.</b><br/>21 Q. You believe the court's claim<br/>22 construction order is accurate?</p>                                                                                                                                              |

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| <p>21</p> <p>1 <b>A. Yes.</b></p> <p>2 MR. STAMATOPOULOS: Objection.</p> <p>3 The --</p> <p>4 MR. COLIN: He already answered</p> <p>5 the question.</p> <p>6 MR. STAMATOPOULOS: Well, my</p> <p>7 objection is still on the record, but you haven't</p> <p>8 shown him the order.</p> <p>9 MR. COLIN: Okay. Now a speaking</p> <p>10 objection which is improper. Again, it was after</p> <p>11 he already spoke.</p> <p>12 I'd like to introduce what's</p> <p>13 already premarked as Exhibit 2010 the order</p> <p>14 regarding claim construction from the Apple</p> <p>15 litigation.</p> <p>16 Q. (BY MR. COLIN) And this is the court's</p> <p>17 marked order that you rely on in your IPR</p> <p>18 declaration; correct?</p> <p>19 <b>A. Yes.</b></p> <p>20 Q. If you turn to page 9 of 32. I'll just</p> <p>21 indicate to you the page is marked on the bottom</p> <p>22 right-hand corner, for ease of reference.</p>                                                                            | <p>23</p> <p>1 Q. (BY MR. COLIN) I'm asking you, Dr. Yao.</p> <p>2 It's your opinion in this IPR proceeding, you tell</p> <p>3 the board that constant current charging does not</p> <p>4 charge the battery until it reaches the charge</p> <p>5 cut-off voltage; correct?</p> <p>6 MR. STAMATOPOULOS: Same</p> <p>7 objection.</p> <p>8 Q. (BY MR. COLIN) I'm not sure what you're</p> <p>9 looking for, but it might be in paragraphs 117 to</p> <p>10 119.</p> <p>11 <b>A. 117?</b></p> <p>12 Q. Possibly. Again, I'm just trying to --</p> <p>13 <b>A. Okay.</b></p> <p>14 Q. -- help you. I think that might be what</p> <p>15 you're looking for. Or I'll just rephrase the</p> <p>16 question. Those paragraphs might help you.</p> <p>17 I'm asking you, Dr. Yao, it's your</p> <p>18 opinion in this IPR proceeding, you tell the board</p> <p>19 that constant current charging does not charge the</p> <p>20 beater until it reaches the charge cut-off</p> <p>21 voltage; correct?</p> <p>22 MR. STAMATOPOULOS: Object to</p>                                                                                                                                                                                                                                                          |
| <p>22</p> <p>1 <b>A. Hm-hm.</b></p> <p>2 Q. It's an IPR policy. Are you there, page</p> <p>3 9?</p> <p>4 <b>A. Yes.</b></p> <p>5 Q. Okay. So about five lines from the top,</p> <p>6 the court's order indicates the CC algorithm --</p> <p>7 and CC is constant current; right?</p> <p>8 <b>A. Hm-hm.</b></p> <p>9 Q. Okay. So "the constant current algorithm</p> <p>10 describes a method in which the battery is charged</p> <p>11 at a constant current until it reaches the charge</p> <p>12 cut-off voltage." Do you see that?</p> <p>13 <b>A. Yes.</b></p> <p>14 Q. Do you agree with the court's statement?</p> <p>15 <b>A. Yes.</b></p> <p>16 Q. But in this IPR proceeding, you opine to</p> <p>17 the board that constant current charging does not</p> <p>18 charge the battery until it reaches the charge</p> <p>19 cut-off voltage; correct?</p> <p>20 MR. STAMATOPOULOS: Objection.</p> <p>21 <b>A. Can you point to the location where I say</b></p> <p>22 <b>it in my declaration?</b></p> | <p>24</p> <p>1 form.</p> <p>2 <b>A. So in my declaration, paragraph 92, here</b></p> <p>3 <b>I state, "Charge cut-off voltage is the maximum</b></p> <p>4 <b>voltage to which the battery is configured to be</b></p> <p>5 <b>charged." It's a battery property. So that's the</b></p> <p>6 <b>definition for charge cut-off voltage here. So</b></p> <p>7 <b>the battery is in equilibrium state.</b></p> <p>8 <b>And also in paragraph 86 I state, "When a</b></p> <p>9 <b>battery is being charged, there are two distinct</b></p> <p>10 <b>voltage, potentials, the applied voltage and the</b></p> <p>11 <b>battery voltage, and their relationship, expressed</b></p> <p>12 <b>by the following equation." The equation, you can</b></p> <p>13 <b>see it on paragraph 86.</b></p> <p>14 <b>V applies apply voltage and U is the</b></p> <p>15 <b>battery voltage equilibrium.</b></p> <p>16 <b>So in the case of constant current,</b></p> <p>17 <b>depending on what current you use, at end of</b></p> <p>18 <b>charging, this battery may or may not reach the</b></p> <p>19 <b>battery voltage equilibrium; therefore, it may not</b></p> <p>20 <b>reach the cut-off voltage, as defined here in the</b></p> <p>21 <b>declaration.</b></p> <p>22 Q. (BY MR. COLIN) So let me see if I</p> |

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| <p style="text-align: right;">25</p> <p>1 understand that. In your opinion you're telling<br/>2 the board that constant current charging sometimes<br/>3 will reach the charge cut-off voltage and<br/>4 sometimes will not reach the charge cut-off<br/>5 voltage, depending on conditions?<br/>6 MR. STAMATOPOULOS: Object to<br/>7 form.<br/>8 <b>A. I'm telling the board under current</b><br/>9 <b>condition sometimes it reach equilibrium if you</b><br/>10 <b>charge at pretty slow rate. Some -- you know, if</b><br/>11 <b>you charge at the higher rate or medium rate, it</b><br/>12 <b>will not reach the equilibrium at the end of the</b><br/>13 <b>charge.</b><br/>14 Q. (BY MR. COLIN) Dr. Yao, you told the<br/>15 district court that constant current voltage is<br/>16 applied until the charge cut-off voltage is<br/>17 reached; right? We looked at your declaration,<br/>18 Exhibit 2022, paragraph 33, which has that very<br/>19 language. You're telling me, you're telling the<br/>20 board something else? Is that accurate?<br/>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p>   | <p style="text-align: right;">27</p> <p>1 current, it's applied until the battery reaches a<br/>2 predetermined voltage -- i.e., the charge cut-off<br/>3 voltage -- then the charging stops. Correct?<br/>4 MR. STAMATOPOULOS: Same<br/>5 objection.<br/>6 <b>A. So this statement in the Apple claim</b><br/>7 <b>construction, at that -- I think at that -- within</b><br/>8 <b>this case, both parties assumed this reach -- the</b><br/>9 <b>battery would reach equilibrium state.</b><br/>10 <b>And also, second, this completely</b><br/>11 <b>inconsistent with my declaration because at that</b><br/>12 <b>time the focus mainly on the different algorithm</b><br/>13 <b>or charging. There's no matter of dispute, varied</b><br/>14 <b>voltage or applied voltage.</b><br/>15 <b>So in here, this is at equilibrium that</b><br/>16 <b>once the battery reaches equilibrium state, charge</b><br/>17 <b>cut-off voltage is the same as the maximum</b><br/>18 <b>voltage, predetermined voltage.</b><br/>19 Q. (BY MR. COLIN) Dr. Yao, you did not<br/>20 answer my question. You told the court when<br/>21 you're applying constant current charging, it's<br/>22 applied until the battery reaches a predetermined</p> |
| <p style="text-align: right;">26</p> <p>1 <b>A. What I'm telling the court is consistent</b><br/>2 <b>with what I've written in the declaration.</b><br/>3 Q. (BY MR. COLIN) Where in your report do<br/>4 you talk about equilibrium in -- sorry. Let me<br/>5 start...<br/>6 So going to paragraph 33 of your<br/>7 declaration, Exhibit 2022 -- this is your<br/>8 declaration to the court -- you told the court,<br/>9 "batteries are charged at a constant current<br/>10 without a constant voltage stage. Once the<br/>11 battery reaches a predetermined voltage -- i.e.,<br/>12 the charge cut-off voltage -- the charging stops."<br/>13 That's what you told the court; right?<br/>14 <b>A. Hm-hm.</b><br/>15 MR. STAMATOPOULOS: Object to --<br/>16 Dr. Yao, I'll just ask you to take a second to<br/>17 allow me to lodge the objection so that we don't<br/>18 have the issue of talking past each other. Object<br/>19 to the form.<br/>20 <b>A. Can you repeat the question?</b><br/>21 Q. (BY MR. COLIN) Sure. You told the court<br/>22 in Exhibit 2022 that when you're applying constant</p> | <p style="text-align: right;">28</p> <p>1 voltage -- i.e., the charge cut-off voltage --<br/>2 then the charging stops. Correct? That's what<br/>3 you told the court? Those words are in your<br/>4 declaration.<br/>5 MR. STAMATOPOULOS: Object to the<br/>6 form.<br/>7 <b>A. I think I already answered your question.</b><br/>8 Q. (BY MR. COLIN) You haven't answered my<br/>9 question. Are you refusing to answer my question,<br/>10 Dr. Yao?<br/>11 MR. STAMATOPOULOS: Object to<br/>12 form.<br/>13 <b>A. This is what you just said. Once the</b><br/>14 <b>battery reach the predetermined voltage, the</b><br/>15 <b>charge cut-off voltage, the charging stops.</b><br/>16 <b>That's what I have in the claim construction.</b><br/>17 Q. (BY MR. COLIN) Correct.<br/>18 <b>A. That's correct.</b><br/>19 Q. You didn't tell the court sometimes<br/>20 constant current voltage is applied to reach the<br/>21 charge cut-off voltage and sometimes, depending on<br/>22 the conditions, it doesn't reach the charge</p>                                                                                                                                                                                                 |

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| <p style="text-align: right;">29</p> <p>1 cut-off voltage; right? You didn't tell that to<br/>2 the court?<br/>3 MR. STAMATOPOULOS: Object to<br/>4 form.<br/>5 <b>A. As I have stated, this is not a dispute</b><br/>6 <b>of matter during the Apple claim construction.</b><br/>7 <b>The focus at that time is on all presents of</b><br/>8 <b>charging -- constant voltage charging, constant</b><br/>9 <b>current charging, constant current, constant</b><br/>10 <b>voltage charging.</b><br/>11 <b>Although I do not specifically say, but I</b><br/>12 <b>think both parties understand that the charging</b><br/>13 <b>stops once the battery -- both parties -- both</b><br/>14 <b>parties understand that this referring to the</b><br/>15 <b>equilibrium state of the charging.</b><br/>16 Q. (BY MR. COLIN) Equilibrium state is<br/>17 nowhere in your declaration. It's nowhere in the<br/>18 court's claim construction, either; correct?<br/>19 MR. STAMATOPOULOS: Object to<br/>20 form.<br/>21 <b>A. Yeah. General matter is, you know,</b><br/>22 <b>didn't have that in the claim construction.</b></p> | <p style="text-align: right;">31</p> <p>1 Q. -- constant voltage also could be used to<br/>2 achieve the charge cut-off voltage; correct?<br/>3 That's what you told the court in paragraph 33?<br/>4 MR. STAMATOPOULOS: Object to the<br/>5 form.<br/>6 <b>A. Constant current can also reach charge</b><br/>7 <b>cut-off voltage if do you it slowly. It could.</b><br/>8 <b>Depends on what current you use.</b><br/>9 Q. (BY MR. COLIN) The patent doesn't<br/>10 describe any current to use, correct, the '641<br/>11 patent?<br/>12 MR. STAMATOPOULOS: Objection.<br/>13 <b>A. I don't understand the question.</b><br/>14 Q. (BY MR. COLIN) I said the '641 patent<br/>15 doesn't describe any particular current to use for<br/>16 charging, discharging; correct?<br/>17 MR. STAMATOPOULOS: Objection.<br/>18 <b>A. Can I have the '641 patent?</b><br/>19 Q. (BY MR. COLIN) Sure. And I'm not trying<br/>20 to trick you. I don't think it's in there. So<br/>21 you can look, but I'm not aware of anywhere where<br/>22 it could be. I will provide it to you. It will</p> |
| <p style="text-align: right;">30</p> <p>1 Q. (BY MR. COLIN) Well, you told the court<br/>2 you could reach the maximum voltage to which the<br/>3 battery is configured to be charged using constant<br/>4 current voltage; right?<br/>5 Sorry. Let me rephrase that.<br/>6 Looking at paragraph 33, you told the<br/>7 court in the last sentence -- well, let me say<br/>8 this.<br/>9 You could use constant voltage charging;<br/>10 correct?<br/>11 <b>A. Yes.</b><br/>12 MR. STAMATOPOULOS: Object to<br/>13 form.<br/>14 Q. (BY MR. COLIN) And constant voltage<br/>15 charging, in your opinion, you told the court,<br/>16 could be used until you reached the charge cut-off<br/>17 voltage?<br/>18 MR. STAMATOPOULOS: Object to<br/>19 form.<br/>20 <b>A. Cut-off voltage could.</b><br/>21 Q. And constant current --<br/>22 <b>A. Not always.</b></p>                                                                                                                                                                                                                                                          | <p style="text-align: right;">32</p> <p>1 be Exhibit 1001. Yeah, this is already premarked<br/>2 as Exhibit 1001. It's US Patent Number 7,749,641.<br/>3 And my question was, the '641 patent<br/>4 doesn't describe any particular current to use for<br/>5 charging or discharging; correct?<br/>6 MR. STAMATOPOULOS: Object to<br/>7 form.<br/>8 <b>A. The '641 patent didn't specify which</b><br/>9 <b>charging algorithm is used.</b><br/>10 Q. (BY MR. COLIN) Right. It also<br/>11 doesn't -- the '641 patent is also not specifying<br/>12 a charging algorithm; it doesn't provide any<br/>13 information on the charge or discharge rates.<br/>14 Correct?<br/>15 <b>A. I think so.</b><br/>16 Q. The file history of the '641 patent also<br/>17 doesn't mention any particular charging algorithm;<br/>18 correct?<br/>19 <b>A. I didn't really carefully review the</b><br/>20 <b>patent history; so I didn't really know.</b><br/>21 Q. Okay. And you provide no opinions on the<br/>22 prosecution history of the '641 patent in your</p>                               |

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| <p>33</p> <p>1 declaration; correct?</p> <p>2 <b>A. No, I didn't provide my opinion on that.</b></p> <p>3 Q. Okay. And you provided no opinion on the</p> <p>4 prosecution history of the child application of</p> <p>5 the '641 patent in your declaration; correct?</p> <p>6 <b>A. No, I didn't.</b></p> <p>7 Q. So it's your opinion, what you're telling</p> <p>8 the board, is that -- let me back up.</p> <p>9 When you say "applied voltage" in your</p> <p>10 IPR declaration, are you also using that</p> <p>11 interchangeably with "charging voltage"?</p> <p>12 MR. STAMATOPOULOS: Object to</p> <p>13 form.</p> <p>14 <b>A. Yeah, I -- they're similar. That was the</b></p> <p>15 <b>most time I use "applied voltage" in my</b></p> <p>16 <b>declaration.</b></p> <p>17 Q. (BY MR. COLIN) Is there any difference</p> <p>18 between charging voltage and applied voltage?</p> <p>19 MR. STAMATOPOULOS: Object to</p> <p>20 form.</p> <p>21 <b>A. Applied voltage mainly internal --</b></p> <p>22 <b>indicates internal applied. But charging voltage</b></p>                                                                                                                       | <p>35</p> <p>1 MR. STAMATOPOULOS: Object to</p> <p>2 form.</p> <p>3 <b>A. Again, I want -- can you help me, point</b></p> <p>4 <b>out to the location where I use the "charge</b></p> <p>5 <b>voltage"?</b></p> <p>6 Q. (BY MR. COLIN) Dr. Yao, I'm asking you</p> <p>7 for your opinion. I'm not asking about the</p> <p>8 declaration. If you want to look to anywhere in</p> <p>9 your declaration, you can look.</p> <p>10 <b>A. Yeah.</b></p> <p>11 Q. My question is, is "charge cut-off</p> <p>12 voltage" synonymously used with "charging</p> <p>13 voltage"?</p> <p>14 MR. STAMATOPOULOS: Object to</p> <p>15 form.</p> <p>16 <b>A. In my declaration I have carefully</b></p> <p>17 <b>considered all these concepts; and, you know, I</b></p> <p>18 <b>have written my opinion in the declaration. So it</b></p> <p>19 <b>would be helpful to me if you can tell me where --</b></p> <p>20 <b>which part you're referring to.</b></p> <p>21 Q. (BY MR. COLIN) So sitting here today</p> <p>22 with your declaration's in front of you, you can't</p> |
| <p>34</p> <p>1 <b>sometimes depends on context. Could have some --</b></p> <p>2 <b>it's not very accurate. Could have, you know,</b></p> <p>3 <b>some -- it's very vague, I would say, meaning.</b></p> <p>4 Q. (BY MR. COLIN) I didn't hear that last</p> <p>5 thing you said. Can you just repeat that?</p> <p>6 <b>A. So applied voltage is -- it emphasize</b></p> <p>7 <b>internal applied voltage. The charge voltage is</b></p> <p>8 <b>also, you know, mainly to emphasize the external</b></p> <p>9 <b>applied voltage.</b></p> <p>10 Q. Right. So you don't indicate any</p> <p>11 difference in your declaration between applied</p> <p>12 voltage and charging voltage. You use these</p> <p>13 interchangeably; correct?</p> <p>14 MR. STAMATOPOULOS: Object to</p> <p>15 form.</p> <p>16 <b>A. I don't really remember where I used the</b></p> <p>17 <b>charge voltage. Can you -- in the declaration.</b></p> <p>18 <b>Can you point me to the location where I use</b></p> <p>19 <b>"charge voltage"?</b></p> <p>20 Q. (BY MR. COLIN) Let me ask you this. Is</p> <p>21 it your opinion that "charge cut-off voltage" is</p> <p>22 synonymously used with "charging voltage"?</p> | <p>36</p> <p>1 answer my question of whether "charge cut-off</p> <p>2 voltage" is synonymously used with "charging</p> <p>3 voltage"?</p> <p>4 MR. STAMATOPOULOS: Objection.</p> <p>5 Form.</p> <p>6 <b>A. Can you repeat?</b></p> <p>7 Q. (BY MR. COLIN) I'm just trying to get</p> <p>8 your opinion. Is it your opinion that charge</p> <p>9 cut-off voltage and charging voltage are two</p> <p>10 different things or they're the same thing? I'm</p> <p>11 asking your opinion on charge cut-off voltage. So</p> <p>12 I'll ask it one more time.</p> <p>13 Is it your opinion that "charge cut-off</p> <p>14 voltage" is synonymously used with "charging</p> <p>15 voltage"?</p> <p>16 MR. STAMATOPOULOS: Object to</p> <p>17 form.</p> <p>18 <b>A. Charge cut-off voltage is a varied</b></p> <p>19 <b>property. It's different from applied voltage,</b></p> <p>20 <b>which is similar applied. But charging voltage,</b></p> <p>21 <b>could you define what the charging voltage, in</b></p> <p>22 <b>context?</b></p>                                |

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| <p style="text-align: right;">37</p> <p>1 Q. (BY MR. COLIN) You're the expert in this<br/>2 proceeding, Dr. Yao. Can you define for me<br/>3 "charging voltage" in the context of the '641<br/>4 patent?<br/>5 MR. STAMATOPOULOS: Object to<br/>6 form and the scope.<br/>7 <b>A. Okay. I will review my declaration</b><br/>8 <b>carefully.</b><br/>9 Q. (BY MR. COLIN) Maybe I could try to help<br/>10 you a little bit, Dr. Yao. How about you turn to<br/>11 Exhibit 2022, which is your Apple IP -- your Apple<br/>12 claim construction declaration, paragraph 18.<br/>13 Okay. So paragraph 18, Exhibit 2022, you<br/>14 say, "As the '641 patent describes, increasing the<br/>15 charging voltage applied to a lithium battery can<br/>16 increase its capacity." Do you see that?<br/>17 <b>A. Yes.</b><br/>18 Q. Okay. So it's your opinion, you told the<br/>19 court that the '641 patent describes increasing<br/>20 the charging voltage applied to a battery;<br/>21 correct?<br/>22 <b>A. Yes. Here the -- this is charging</b></p>                                             | <p style="text-align: right;">39</p> <p>1 Okay?<br/>2 And, as we just discussed a minute ago in<br/>3 paragraph 18 of Exhibit 2022, you use the term<br/>4 "charging voltage applied" when discussing what<br/>5 the '641 patent teaches; right?<br/>6 MR. STAMATOPOULOS: Object to<br/>7 form.<br/>8 <b>A. You're not -- are you asking a question?</b><br/>9 Q. (BY MR. COLIN) Yeah. My question is, in<br/>10 paragraph 18 of Exhibit 2022, you used the term<br/>11 "charging voltage applied to a battery" when<br/>12 discussing what the '641 patent describes;<br/>13 correct?<br/>14 <b>A. Yes.</b><br/>15 Q. Okay. And in your IPR declaration,<br/>16 Exhibit 2006 at paragraph 49, you copy this same<br/>17 paragraph from your other declaration. Right?<br/>18 Except for the fact that you replaced "charging<br/>19 voltage applied" with "charge cut-off voltage";<br/>20 right?<br/>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p>                                 |
| <p style="text-align: right;">38</p> <p>1 <b>voltage applied to battery is essentially applied</b><br/>2 <b>voltage I have in the IPR. So, as I mentioned,</b><br/>3 <b>this anode battery property is different from the</b><br/>4 <b>charge cut-off voltage.</b><br/>5 Q. Okay. So your opinion in this paragraph<br/>6 18, what you're saying here, that the '641 patent<br/>7 describes increasing the charging voltage applied<br/>8 to a battery, that's an applied voltage, and<br/>9 that's different than a charge cut-off voltage;<br/>10 correct?<br/>11 MR. STAMATOPOULOS: Object to<br/>12 form.<br/>13 <b>A. Yes.</b><br/>14 MR. COLIN: I'd like to mark as<br/>15 Exhibit 1037; so this will be a new exhibit.<br/>16 (Exhibit 1036 marked)<br/>17 Q. (BY MR. COLIN) So this exhibit has a<br/>18 comparison of paragraph 18 of Exhibit 2022, which<br/>19 you were just looking at, and your IPR<br/>20 declaration, Exhibit 2006, at paragraph 49. And I<br/>21 highlighted the difference -- I added highlighting<br/>22 to note the difference between the two paragraphs.</p> | <p style="text-align: right;">40</p> <p>1 <b>A. Yes.</b><br/>2 Q. (BY MR. COLIN) Okay. So when you told<br/>3 the board this is what the patent describes, you<br/>4 told the board something different than what you<br/>5 told the court?<br/>6 MR. STAMATOPOULOS: Object to<br/>7 form.<br/>8 <b>A. I see in both cases they are fully</b><br/>9 <b>consistent.</b><br/>10 Q. (BY MR. COLIN) Okay. So you're saying<br/>11 charging voltage applied to a battery is<br/>12 consistent with the charge cut-off voltage of a<br/>13 battery?<br/>14 MR. STAMATOPOULOS: Object to<br/>15 form.<br/>16 <b>A. The charging voltage applied to a battery</b><br/>17 <b>the same value as charge cut-off voltage when the</b><br/>18 <b>battery reach equilibrium state.</b><br/>19 Q. (BY MR. COLIN) There's nothing in your<br/>20 declaration to the court saying "when the battery<br/>21 reaches equilibrium state"; correct? That's a new<br/>22 opinion in your IPR declaration?</p> |

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| <p style="text-align: right;">41</p> <p>1     <b>A. Well, at that time, you know, as in</b><br/>2 <b>Apple, as I mentioned, between Apple and, you</b><br/>3 <b>know, claim construction, there's no dispute on</b><br/>4 <b>the applied voltage or battery voltage. And</b><br/>5 <b>this – both sentence, both paragraphs are</b><br/>6 <b>completely wrong – completely correct. We are</b><br/>7 <b>not saying there has to be the same – we have to</b><br/>8 <b>give the same term in both descriptions.</b><br/>9     Q. Okay. So you're using "charging voltage<br/>10 applied" and "charge cut-off voltage" consistently<br/>11 in these two paragraphs; they mean the same thing?<br/>12         MR. STAMATOPOULOS: Object to<br/>13 form.<br/>14     <b>A. They are not – in the – they are</b><br/>15 <b>different. Charge applied voltage, internal</b><br/>16 <b>applied voltage is not a battery property.</b><br/>17     Q. (BY MR. COLIN) Okay. So the --<br/>18     <b>A. Internal voltage is the battery property.</b><br/>19 <b>So they could have same value. They could have</b><br/>20 <b>different value. Depends on the condition. So –</b><br/>21 <b>but both paragraphs are correct.</b><br/>22     Q. (BY MR. COLIN) Okay. So the '641 patent</p> | <p style="text-align: right;">43</p> <p>1 the claim construction for charge cut-off voltage<br/>2 from the district court in the IPR because there's<br/>3 a different dispute?<br/>4         MR. STAMATOPOULOS: Object to<br/>5 form.<br/>6     <b>A. The declaration, the IPR is fully</b><br/>7 <b>consistent with the claim construction to the</b><br/>8 <b>court.</b><br/>9     Q. (BY MR. COLIN) Okay. Claims 1 and<br/>10 claims 5 use "charge cut-off voltage" and "charge<br/>11 voltage" interchangeably; correct?<br/>12         MR. STAMATOPOULOS: Object to<br/>13 form.<br/>14     Q. (BY MR. COLIN) Let me rephrase. Claim 1<br/>15 and Claim 5 of the '641 patent use "charge cut-off<br/>16 voltage" and "charge voltage" interchangeably;<br/>17 correct?<br/>18         MR. STAMATOPOULOS: Same<br/>19 objection.<br/>20     <b>A. I'm going to see "charge cut-off voltage"</b><br/>21 <b>in Claim 5. I didn't see "charge voltage."</b><br/>22     Q. (BY MR. COLIN) So in Claim 1, the last</p>                                                                                                                   |
| <p style="text-align: right;">42</p> <p>1 describes increasing the charging voltage applied<br/>2 to increase the capacity; correct?<br/>3         MR. STAMATOPOULOS: Object to<br/>4 form.<br/>5     <b>A. Yes, increase the charging voltage, apply</b><br/>6 <b>to battery can increase its capacity.</b><br/>7     Q. (BY MR. COLIN) Why did you change<br/>8 "charging voltage applied" in your court<br/>9 declaration to "charge cut-off voltage" in your<br/>10 IPR declaration?<br/>11         MR. STAMATOPOULOS: Object to<br/>12 form.<br/>13     <b>A. I think if I explain the reason, in the</b><br/>14 <b>claim construction is focused on the charging</b><br/>15 <b>algorithms. But in the IPR, the focus of dispute</b><br/>16 <b>is on the definition of the charge cut-off</b><br/>17 <b>voltage. I think that's why, to answer the – you</b><br/>18 <b>know, to be more – to – in the IPR, I would like</b><br/>19 <b>to use this term "charge cut-off voltage." That's</b><br/>20 <b>slight difference, but – but in the IPR case,</b><br/>21 <b>it's more related to the dispute of the matter.</b><br/>22     Q. (BY MR. COLIN) So you're not applying</p>                                                                                            | <p style="text-align: right;">44</p> <p>1 limitation reads, "Ratio as calculated by a<br/>2 specific capacity with a charge voltage limited to<br/>3 4.2 volts." Do you see that?<br/>4     <b>A. Hm-hm. Yes.</b><br/>5     Q. And Claim 5 in that same limitation at<br/>6 the end, the capacity ratio limitation, refers to<br/>7 a theoretic capacity with a charge cut-off voltage<br/>8 set at 4.2 volts; right?<br/>9     <b>A. I think that Claim 1 should be a specific</b><br/>10 <b>capacity with a charge cut-off voltage limited to</b><br/>11 <b>4.2 volt. That should be the charge cut-off</b><br/>12 <b>voltage same, too, 4.2 volt.</b><br/>13     Q. You don't opine anywhere in your<br/>14 declaration that "charge voltage" in Claim 1 has<br/>15 any different meaning than "charge cut-off<br/>16 voltage" of Claim 5; right?<br/>17     <b>A. Can you –</b><br/>18     Q. Right. You don't opine anywhere in your<br/>19 declaration that "charge voltage" in Claim 1 has<br/>20 any different meaning than "charge cut-off<br/>21 voltage" of Claim 5; correct?<br/>22         MR. STAMATOPOULOS: Object to</p> |

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| <p style="text-align: right;">45</p> <p>1 form.</p> <p>2 <b>A. I think in my IPR I do say the charge --</b></p> <p>3 <b>the applied voltage is different from the charge</b></p> <p>4 <b>cut-off voltage. And if it's -- you know, the</b></p> <p>5 <b>charging voltage defined here is applied voltage,</b></p> <p>6 <b>then would be different from charge cut-off</b></p> <p>7 <b>voltage.</b></p> <p>8 Q. (BY MR. COLIN) So that's not my</p> <p>9 question, Dr. Yao. My question is, you don't</p> <p>10 opine anywhere in your declaration that "charge</p> <p>11 voltage" in Claim 1 has any different meaning than</p> <p>12 "charge cut-off voltage" of Claim 5; correct?</p> <p>13 MR. STAMATOPOULOS: Object to</p> <p>14 form.</p> <p>15 <b>A. I don't think I used "charge voltage" in</b></p> <p>16 <b>my declaration. The declaration.</b></p> <p>17 Q. (BY MR. COLIN) Right. You don't address</p> <p>18 the language "charge voltage" of Claim 1 anywhere.</p> <p>19 And I'm just stating that for the record. I</p> <p>20 mean --</p> <p>21 MR. STAMATOPOULOS: Object to</p> <p>22 form.</p>     | <p style="text-align: right;">47</p> <p>1 <b>A. I think to answer your question for the</b></p> <p>2 <b>first time, I'm saying this should be understood,</b></p> <p>3 <b>that Claim 1 and "charge voltage" should be</b></p> <p>4 <b>understood as a "charge cut-off voltage."</b></p> <p>5 Q. So you think Claim 1 and Claim 5 are</p> <p>6 using that phrase, "charge voltage" and "charge</p> <p>7 cut-off voltage" in the same way?</p> <p>8 <b>A. Yeah. Different charge voltage or</b></p> <p>9 <b>explain to you, "charge voltage" is different from</b></p> <p>10 <b>"charge cut-off voltage." In this, you know,</b></p> <p>11 <b>Claim 1, I think this "charge voltage" should be</b></p> <p>12 <b>changed to "charge cut-off voltage."</b></p> <p>13 Q. You don't provide that opinion in your</p> <p>14 declaration; correct?</p> <p>15 <b>A. I don't think I'm asked to --</b></p> <p>16 Q. Well, you told the IPR board in paragraph</p> <p>17 60 that Claim 5 is representative of Claim 1;</p> <p>18 correct?</p> <p>19 <b>A. Can you say again?</b></p> <p>20 Q. Yeah. You told the IPR board in</p> <p>21 paragraph 60 of your declaration that Claim 5 is</p> <p>22 representative of Claim 1; correct?</p> |
| <p style="text-align: right;">46</p> <p>1 Q. (BY MR. COLIN) So, I mean, my question</p> <p>2 is just simply, you don't opine anywhere in your</p> <p>3 declaration that "charge voltage" in Claim 1 has</p> <p>4 any different meaning that "charge cut-off</p> <p>5 voltage" in Claim 5; correct?</p> <p>6 MR. STAMATOPOULOS: Same</p> <p>7 objection.</p> <p>8 <b>A. Seems like you ask me to form opinion as</b></p> <p>9 <b>I sit here today? I don't know -- I'm not</b></p> <p>10 <b>prepared to form opinion on this.</b></p> <p>11 Q. (BY MR. COLIN) I'm not asking you to</p> <p>12 form an opinion. I'm asking, you provide no</p> <p>13 opinions, which you seem to be -- we seem to be</p> <p>14 saying the same thing.</p> <p>15 <b>A. Hm-hm.</b></p> <p>16 Q. And I'm not trying to trick you here.</p> <p>17 You just don't provide any opinions in your</p> <p>18 declaration concerning the difference in claim</p> <p>19 language between Claim 1 and Claim 5 with "charge</p> <p>20 voltage" and "charge cut-off voltage"; correct?</p> <p>21 MR. STAMATOPOULOS: Object to</p> <p>22 form.</p> | <p style="text-align: right;">48</p> <p>1 <b>A. Yes. In paragraph 60 I do state, "The</b></p> <p>2 <b>patent includes two independent claims, 1 and 5,</b></p> <p>3 <b>of which Claim 5 is representative."</b></p> <p>4 Q. Claim 5 indicates that the charge cut-off</p> <p>5 voltage is set value; correct?</p> <p>6 MR. STAMATOPOULOS: Object to</p> <p>7 form.</p> <p>8 MR. COLIN: Let me rephrase.</p> <p>9 Q. (BY MR. COLIN) Claim 5 of the '641</p> <p>10 patent indicates that the charge cut-off voltage</p> <p>11 set at 4.2 volts; correct?</p> <p>12 <b>A. Yes.</b></p> <p>13 Q. Okay. So Claim 5 indicates that the</p> <p>14 charge cut-off voltage is a set value; correct?</p> <p>15 MR. STAMATOPOULOS: Object to</p> <p>16 form.</p> <p>17 <b>A. No.</b></p> <p>18 Q. (BY MR. COLIN) So you're saying the</p> <p>19 language, the "charge cut-off voltage set at 4.2</p> <p>20 volts" doesn't indicate that the charge cut-off</p> <p>21 voltage is a set factor?</p> <p>22 <b>A. Charge cut-off voltage is a measured</b></p>                                                                                                                                                                                 |

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| <p style="text-align: right;">49</p> <p>1 property. When internal applied voltage is used<br/>2 to charge a battery, the battery will be charged,<br/>3 set of charge will increase until reaches<br/>4 equilibrium. At that point charge cut-off voltage<br/>5 has same value as the set value of the 4.2 volt –<br/>6 4.2 volt. They have same value but doesn't mean<br/>7 they are same – have same definition.<br/>8 Q. (BY MR. COLIN) Well, it's your opinion<br/>9 that charge cut-off voltage is a measured value;<br/>10 you actually have to measure the battery voltage<br/>11 to see it. Correct?<br/>12 A. Yes.<br/>13 Q. Okay. And you don't provide any opinions<br/>14 in your declaration on the fact that Claim 5<br/>15 indicates that there's a charge cut-off voltage<br/>16 set at 4.2 volts; correct?<br/>17 MR. STAMATOPOULOS: Object to<br/>18 form.<br/>19 A. I don't really understand your question.<br/>20 Q. (BY MR. COLIN) My question is, you don't<br/>21 provide any opinions in your declaration<br/>22 concerning the fact that the claim language</p>                                                                           | <p style="text-align: right;">51</p> <p>1 Traditionally, the charge cut-off voltage for<br/>2 lithium cobalt oxide has been limited to 4.2 volt.<br/>3 It was understood that the voltage higher than 4.2<br/>4 volts, lithium cobalt oxide can undergo<br/>5 irreversible structural change and oxygen loss,<br/>6 which not only degrades the material's capacity<br/>7 and cycling stability, but also pose risks of<br/>8 thermal runaway and battery failure."<br/>9 So that's my opinion related to the Claim<br/>10 5.<br/>11 Q. (BY MR. COLIN) Dr. Yao, that didn't<br/>12 answer my question at all. My question is simply,<br/>13 you don't provide any opinions in your declaration<br/>14 concerning the claim language that indicates the<br/>15 charge cut-off voltage is set at 4.2 volts;<br/>16 correct?<br/>17 MR. STAMATOPOULOS: Object to<br/>18 form.<br/>19 A. I think I answered your question. Maybe<br/>20 you be explain to me why you think it's not – I<br/>21 didn't answer your question.<br/>22 Q. (BY MR. COLIN) Dr. Yao, those paragraphs</p>                                              |
| <p style="text-align: right;">50</p> <p>1 indicates that the charge cut-off voltage set at<br/>2 4.2 volts; correct?<br/>3 MR. STAMATOPOULOS: Object to<br/>4 form.<br/>5 A. I do form an opinion in my declaration on<br/>6 page 20, paragraph 51 and 52. Here – I put here,<br/>7 I put in the declaration, I said, "The charge<br/>8 cut-off voltage is a critical design parameter for<br/>9 lithium battery. I explain the difference between<br/>10 the charge cut-off voltage of a battery – a<br/>11 constructed term in this and other relevant<br/>12 proceedings – and applied voltage during charging<br/>13 in later parts of my declaration. But note the<br/>14 difference here to avoid confusion, as these<br/>15 concepts are different, though related, since both<br/>16 are relevant to charging. At the time of the '641<br/>17 patent, it was conventional to limit the charge<br/>18 cut-off voltage to 4.2 volt or lower.<br/>19 "For example, lithium cobalt oxide has<br/>20 been a well-studied cathode material in lithium<br/>21 batteries primarily due to its high energy density<br/>22 and stable electrochemical performance.</p> | <p style="text-align: right;">52</p> <p>1 you just read verbatim into the report -- into the<br/>2 record here don't cite a single thing in the '641<br/>3 patent or any other support; correct? It's just<br/>4 your statements?<br/>5 A. Yeah, that's my opinion of this.<br/>6 Q. So my question -- and I'm not trying to<br/>7 trick you, again. I don't see it in your<br/>8 declaration. My question is simply, you don't<br/>9 provide any opinions in your declaration<br/>10 concerning the claim language of Claim 5 that<br/>11 indicates that the charge cut-off voltage is set<br/>12 at 4.2 volts; correct?<br/>13 MR. STAMATOPOULOS: Object to<br/>14 form.<br/>15 A. In my IPR position -- sorry -- let me<br/>16 rephrase. In my IPR declaration, I've formed the<br/>17 opinion related to '641 in paragraph 58 to 61.<br/>18 That's the one time -- that's the opinion I have.<br/>19 Q. (BY MR. COLIN) All right. And there's<br/>20 no opinions in paragraph 58 to 61 concerning the<br/>21 fact that the claim language of Claim 5 indicates<br/>22 that the charge cut-off voltage is set at 4.2</p> |

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| <p>53</p> <p>1 volts; correct?</p> <p>2 MR. STAMATOPOULOS: Object to</p> <p>3 form.</p> <p>4 <b>A. Related to Claim 5 in paragraph 59, what</b></p> <p>5 <b>I here say that, "Rather than developing new</b></p> <p>6 <b>battery materials, the inventors improved</b></p> <p>7 <b>utilization of existing cathode materials by</b></p> <p>8 <b>adjusting the anode to cathode ratio to</b></p> <p>9 <b>appropriate range such that the charge cut-off</b></p> <p>10 <b>voltage could safely exceed 4.2 volt without</b></p> <p>11 <b>substantial performance loss."</b></p> <p>12 <b>This may not be directly related to Claim</b></p> <p>13 <b>5, but that's the interpretation I had or my</b></p> <p>14 <b>opinion.</b></p> <p>15 Q. (BY MR. COLIN) Dr. Yao, you're not</p> <p>16 answering my questions. We're going to be here</p> <p>17 all day and I'm going to move the board for</p> <p>18 additional time if you keep refusing to answer my</p> <p>19 questions.</p> <p>20 MR. STAMATOPOULOS: And --</p> <p>21 MR. COLIN: I think this is a</p> <p>22 good time for a break.</p>                                   | <p>55</p> <p>1 record at 11:04 a.m.</p> <p>2 (Recess from 11:04 a.m. to</p> <p>3 11:15 a.m.)</p> <p>4 THE VIDEOGRAPHER: The time is</p> <p>5 11:15 a.m., and we're back on the record.</p> <p>6 Q. (BY MR. COLIN) Dr. Yao, it's your</p> <p>7 opinion the charge cut-off voltage is not a</p> <p>8 maximum charging voltage; correct?</p> <p>9 MR. STAMATOPOULOS: Object to</p> <p>10 form.</p> <p>11 <b>A. Charge cut-off voltage may have the same</b></p> <p>12 <b>value as maximum charge voltage.</b></p> <p>13 Q. (BY MR. COLIN) Dr. Yao, you did not an</p> <p>14 my question. It's your opinion that the charge</p> <p>15 cut-off voltage is not the maximum charging</p> <p>16 voltage; correct? It's a measured value, in your</p> <p>17 opinion?</p> <p>18 MR. STAMATOPOULOS: Object to</p> <p>19 form.</p> <p>20 <b>A. In my opinion, charge cut-off voltage</b></p> <p>21 <b>could be the same as the charging maximum, at</b></p> <p>22 <b>equilibrium state, when the battery reaches</b></p>                                                                                     |
| <p>54</p> <p>1 MR. STAMATOPOULOS: I think</p> <p>2 before we go on a break, let me just put on the</p> <p>3 record, since it sounds like you're done with your</p> <p>4 questioning, to the extent that you're going to</p> <p>5 move the board or seek any other remedy, I'd ask</p> <p>6 that you not mention it to the witness directly.</p> <p>7 You mention it to me outside of the witness's</p> <p>8 presence. You're not going to intimidate the</p> <p>9 witness. Okay? You can ask your questions; I'll</p> <p>10 put my objections; he'll give his answers. If you</p> <p>11 want to move to the board or to anyone else, you</p> <p>12 say it to me, not to the witness.</p> <p>13 MR. COLIN: That was unnecessary</p> <p>14 on the record under your own point. I'm not</p> <p>15 trying to --</p> <p>16 MR. STAMATOPOULOS: Saying you're</p> <p>17 seeking a remedy to the board --</p> <p>18 MR. COLIN: -- intimidate the</p> <p>19 witness -- you're talking over me, which is</p> <p>20 improper. Your position is noted.</p> <p>21 MR. STAMATOPOULOS: Great.</p> <p>22 THE VIDEOGRAPHER: We are off the</p> | <p>56</p> <p>1 <b>equilibrium or is fully charged. So that's what I</b></p> <p>2 <b>put in my IPR claim construction, paragraph 27.</b></p> <p>3 Q. (BY MR. COLIN) So let's turn to that.</p> <p>4 This is Exhibit --</p> <p>5 <b>A. Page 9. Exhibit 2022.</b></p> <p>6 Q. So you state in Exhibit 2022, paragraph</p> <p>7 27, "The '641 patent's use of 'charge cut-off</p> <p>8 voltage' confirms that the charge is being used to</p> <p>9 describe the maximum voltage to which the battery</p> <p>10 is configured to be charged"; correct?</p> <p>11 <b>A. That's correct.</b></p> <p>12 Q. And in the last sentence of paragraph 27,</p> <p>13 you indicate, "In all of these instances the '641</p> <p>14 patent refers to the charge cut-off voltage as the</p> <p>15 charging maximum"; correct?</p> <p>16 <b>A. Correct.</b></p> <p>17 Q. Okay. You don't tell the court that the</p> <p>18 '641 patent refers to the charge cut-off voltage</p> <p>19 as possibly equivalent to the charging maximum;</p> <p>20 correct?</p> <p>21 MR. STAMATOPOULOS: Object to</p> <p>22 form.</p> |

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| <p>57</p> <p>1 <b>A. Can you repeat your question?</b></p> <p>2 Q. (BY MR. COLIN) Right. You told the</p> <p>3 court that the '641 patent, based on -- oh, let me</p> <p>4 state this.</p> <p>5 Paragraph 27 you cite to various places</p> <p>6 in the '641 patent; correct? You cite to it at</p> <p>7 1:46-49, 1:55-63; correct?</p> <p>8 <b>A. Yes.</b></p> <p>9 Q. You cite to this spec in various places?</p> <p>10 <b>A. Yes.</b></p> <p>11 Q. And then you state, "In all these</p> <p>12 instances" -- so '641 patent at 46 to 49 and</p> <p>13 1:55-63, "the '641 patent refers to the charge</p> <p>14 cut-off voltage as the charging maximum"; correct?</p> <p>15 <b>A. That's correct.</b></p> <p>16 Q. In paragraph 26 of that same exhibit,</p> <p>17 2022, you indicate the charge cut-off voltage is</p> <p>18 used synonymously with several other terms in the</p> <p>19 industry; correct?</p> <p>20 MR. STAMATOPOULOS: Object to</p> <p>21 form.</p> <p>22 <b>A. Can you be specific what other term is?</b></p> | <p>59</p> <p>1 <b>A. Yes.</b></p> <p>2 Q. So, Dr. Yao, it's your opinion that</p> <p>3 charge cut-off voltage is not a maximum charging</p> <p>4 voltage; correct?</p> <p>5 MR. STAMATOPOULOS: Object.</p> <p>6 <b>A. Charge cut-off voltage is charging</b></p> <p>7 <b>maximum in '641 patent.</b></p> <p>8 Q. (BY MR. COLIN) Okay. So you agree --</p> <p>9 sorry.</p> <p>10 <b>A. Yeah. As I state at end of paragraph 27,</b></p> <p>11 <b>"'641 patent refers to the charge cut-off voltage</b></p> <p>12 <b>as the charging maximum." It have same value.</b></p> <p>13 <b>The charge cut-off voltage is a battery property.</b></p> <p>14 <b>And so they have same value at equilibrium.</b></p> <p>15 Q. Dr. Yao, you agree that the charge</p> <p>16 cut-off voltage is the maximum charging voltage?</p> <p>17 <b>A. Yes.</b></p> <p>18 Q. In paragraph 29 of Exhibit 2022, you</p> <p>19 refer to the file history of the '641 patent;</p> <p>20 correct?</p> <p>21 <b>A. Yes.</b></p> <p>22 Q. Okay. And you cite specifically to the</p>        |
| <p>58</p> <p>1 Q. (BY MR. COLIN) Well, my question is, you</p> <p>2 say in paragraph 26, "Depending on the context,</p> <p>3 the term 'charge cut-off voltage' is used</p> <p>4 synonymously with several other terms in the</p> <p>5 industry which all refer to the maximum voltage to</p> <p>6 which the battery is configured to be charged";</p> <p>7 correct?</p> <p>8 <b>A. Correct.</b></p> <p>9 Q. And then you say these terms include the</p> <p>10 upper charge limit; correct?</p> <p>11 MR. STAMATOPOULOS: Object to</p> <p>12 form.</p> <p>13 <b>A. Yes.</b></p> <p>14 Q. (BY MR. COLIN) Okay. And charge cut-off</p> <p>15 voltage is synonymous with the "upper voltage</p> <p>16 limit?</p> <p>17 <b>A. Yes.</b></p> <p>18 Q. And charge cut-off voltage is synonymous</p> <p>19 with the cut-off voltage?</p> <p>20 <b>A. Yes.</b></p> <p>21 Q. And it's synonymous with the potential</p> <p>22 limit?</p>                                                                                                          | <p>60</p> <p>1 Notice of Allowability at 2 to 3?</p> <p>2 <b>A. Yeah. Briefly review was, you know, a</b></p> <p>3 <b>long time ago.</b></p> <p>4 MR. COLIN: I'd like to introduce</p> <p>5 what's previously been marked as Exhibit 1003,</p> <p>6 which is the file history of the '641 patent.</p> <p>7 Q. (BY MR. COLIN) And, Dr. Yao, I would</p> <p>8 direct you to I believe it's page 22. Oh, sorry.</p> <p>9 23 to 24.</p> <p>10 So this is the Notice of Allowability you</p> <p>11 referred to in your claim construction declaration</p> <p>12 in paragraph 29?</p> <p>13 <b>A. Yes.</b></p> <p>14 Q. Okay. And at the bottom of page 2 going</p> <p>15 on to page 3, I'll read it. "And there was</p> <p>16 nothing taught by the prior art of record to</p> <p>17 reasonably arrive at the claim configuration.</p> <p>18 Moreover, JP '559 teaches that life cycle property</p> <p>19 of a cell drastically decreases when the charging</p> <p>20 voltage increases beyond 4.2 volts." Do you see</p> <p>21 that?</p> <p>22 <b>A. Yes.</b></p> |

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| <p>61</p> <p>1 Q. Okay. So in this case in the Notice of</p> <p>2 Allowance, the examiner is referring to charging</p> <p>3 voltage above 4.2 volts?</p> <p>4 MR. STAMATOPOULOS: Object to</p> <p>5 form.</p> <p>6 <b>A. Yes.</b></p> <p>7 Q. (BY MR. COLIN) Okay. Dr. Yao, is it</p> <p>8 your opinion that the examiner is using "charge</p> <p>9 cut-off voltage" synonymously with "charging</p> <p>10 voltage"?</p> <p>11 MR. STAMATOPOULOS: Object to</p> <p>12 form. Scope.</p> <p>13 <b>A. Can you repeat?</b></p> <p>14 Q. (BY MR. COLIN) Sure. Dr. Yao, is it</p> <p>15 your opinion that the examiner is using "charge</p> <p>16 cut-off voltage" synonymously with "charging</p> <p>17 voltage" in the Notice of Allowance for the '641</p> <p>18 patent?</p> <p>19 MR. STAMATOPOULOS: Same</p> <p>20 objection.</p> <p>21 <b>A. I don't think I was asked to provide an</b></p> <p>22 <b>opinion on the patent examiner's statement.</b></p>                                                                                                                                                                                                                                     | <p>63</p> <p>1 answer to my question.</p> <p>2 My question is, is it your opinion that</p> <p>3 the examiner is using "charge cut-off voltage"</p> <p>4 synonymously with "charging voltage" in the Notice</p> <p>5 of Allowance for the '641 patent?</p> <p>6 MR. STAMATOPOULOS: Same</p> <p>7 objections.</p> <p>8 <b>A. My opinion is that "charge cut-off</b></p> <p>9 <b>voltage" is not synonymous with "charging</b></p> <p>10 <b>voltage." Because they may have a same value at</b></p> <p>11 <b>equilibrium. But why is it applied voltage, the</b></p> <p>12 <b>charge voltage? The charge cut-off voltage is a</b></p> <p>13 <b>property of the battery.</b></p> <p>14 Q. (BY MR. COLIN) Dr. Yao, you have not</p> <p>15 answered my question again. My question, is it</p> <p>16 your opinion that the examiner is using "charge</p> <p>17 cut-off voltage" synonymously with "charging</p> <p>18 voltage" in the Notice of Allowance for the '641</p> <p>19 patent?</p> <p>20 MR. STAMATOPOULOS: Objection to</p> <p>21 form, scope.</p> <p>22 <b>A. I don't know what the patent examiner is</b></p> |
| <p>62</p> <p>1 Q. (BY MR. COLIN) Well, you cited to page 2</p> <p>2 to 3. You cited to this document in Exhibit 2022</p> <p>3 in your claim construction declaration; correct?</p> <p>4 In paragraph 29, you cited the Notice of</p> <p>5 Allowability at 2 to 3?</p> <p>6 <b>A. That's right.</b></p> <p>7 Q. And I'm asking you, in this document that</p> <p>8 you cited to in support of your claim construction</p> <p>9 position, is it your opinion that the examiner is</p> <p>10 using "charge cut-off voltage" synonymously with</p> <p>11 "charging voltage" in the Notice of Allowance for</p> <p>12 the '641 patent?</p> <p>13 MR. STAMATOPOULOS: Same</p> <p>14 objections.</p> <p>15 <b>A. As I stated in my Apple construction, the</b></p> <p>16 <b>context -- depend on context. The term "charge</b></p> <p>17 <b>cut-off voltage" is used synonymously with several</b></p> <p>18 <b>other term in the industry. For example, the</b></p> <p>19 <b>upper charge limit. I think that the patent</b></p> <p>20 <b>examiner here, they referred to charge voltage as</b></p> <p>21 <b>the upper charging limit.</b></p> <p>22 Q. (BY MR. COLIN) Dr. Yao, that was not an</p> | <p>64</p> <p>1 <b>thinking at the time.</b></p> <p>2 Q. (BY MR. COLIN) So you have no opinion on</p> <p>3 what the patent examiner is doing or whether he's</p> <p>4 using "charge cut-off voltage" synonymously with</p> <p>5 "charging voltage"?</p> <p>6 MR. STAMATOPOULOS: Object to</p> <p>7 form.</p> <p>8 <b>A. Because you are asking what, you know,</b></p> <p>9 <b>the patent examiner is doing, I don't have an</b></p> <p>10 <b>opinion on that.</b></p> <p>11 MR. COLIN: Let's mark as a new</p> <p>12 exhibit -- I think we're on 130 -- 1037. Or is</p> <p>13 this 1038? 1038.</p> <p>14 (Exhibit 1038 marked)</p> <p>15 Q. (BY MR. COLIN) And this is plaintiff RJ</p> <p>16 Technology, LLC's opening claim construction</p> <p>17 brief.</p> <p>18 So turn to page 10 of this document, line</p> <p>19 14.</p> <p>20 So RJ Tech told the court that "The</p> <p>21 examiner understood the term the same way, using</p> <p>22 charge cut-off voltage without reference to a</p>                                                                                                                  |

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| <p>65</p> <p>1 particular charging algorithm and in many ways<br/>2 synonymously with charging voltage." Do you see<br/>3 that?<br/>4 <b>A. Yes.</b><br/>5 Q. Do you disagree with that statement?<br/>6 MR. STAMATOPOULOS: Object to<br/>7 form, scope.<br/>8 <b>A. Can you repeat your question?</b><br/>9 Q. (BY MR. COLIN) Do you disagree with RJ<br/>10 Technology's statement to the court that the<br/>11 examiner understood the term the same way using<br/>12 "charge cut-off" without reference to a particular<br/>13 charging algorithm and in many cases synonymously<br/>14 with "charging voltage"?<br/>15 MR. STAMATOPOULOS: Same<br/>16 objections.<br/>17 <b>A. There's a statement in their statement,</b><br/>18 <b>you know, charge -- charge cut-off voltage in many</b><br/>19 <b>cases is synonymous with charging voltage.</b><br/>20 Q. (BY MR. COLIN) Okay. Further down on<br/>21 lines 26 to 28, RJ Technology told court, "the<br/>22 extrinsic sources confirm that the 4.2 volt limit</p> | <p>67</p> <p>1 MR. STAMATOPOULOS: Object to<br/>2 form.<br/>3 <b>A. As I put in the declaration, those two</b><br/>4 <b>terms are related but are different.</b><br/>5 Q. (BY MR. COLIN) Right. Do you agree --<br/>6 well, sorry. Let me say that again.<br/>7 You state that the charge cut-off voltage<br/>8 of a battery is different from the applied voltage<br/>9 during charging; correct? That's your opinion<br/>10 here?<br/>11 <b>A. Yes.</b><br/>12 Q. Okay. Your opinion for claim<br/>13 construction on the charge cut-off voltage are set<br/>14 forth in paragraphs 83 to 97; correct? Of your<br/>15 IPR declaration.<br/>16 <b>A. Can you repeat?</b><br/>17 Q. Sure. Your opinions for claim<br/>18 construction, your opinions that you provide to<br/>19 the board on claim construction for charge cut-off<br/>20 voltage are in paragraphs 83 to 97 of your IPR<br/>21 declaration; correct?<br/>22 <b>A. Yes.</b></p> |
| <p>66</p> <p>1 was a maximum charging voltage and not a<br/>2 particular algorithm for implementing that<br/>3 voltage"; correct?<br/>4 <b>A. Which one? So which -- which -- which</b><br/>5 <b>page?</b><br/>6 Q. On page 10, lines 26 to 28, RJ Tech told<br/>7 the court that "the extrinsic sources confirm that<br/>8 the 4.2 volt limit was a maximum charging<br/>9 voltage"; correct?<br/>10 MR. STAMATOPOULOS: Same<br/>11 objections.<br/>12 <b>A. Yes.</b><br/>13 Q. (BY MR. COLIN) And let's turn to page --<br/>14 paragraph 51 of your declaration here.<br/>15 In paragraph 51 you state that the charge<br/>16 cut-off voltage is different than the applied<br/>17 voltage; correct? Applied -- let me state that<br/>18 again.<br/>19 In paragraph 51 of your IPR declaration,<br/>20 you state that the charge cut-off voltage of a<br/>21 battery is different from the applied voltage<br/>22 during charging; correct?</p>                                                                           | <p>68</p> <p>1 Q. Okay. You don't cite to any intrinsic<br/>2 evidence to support your opinions in paragraphs 82<br/>3 to 96; correct?<br/>4 MR. STAMATOPOULOS: Object to<br/>5 form.<br/>6 <b>A. This term is used in the industry</b><br/>7 <b>broadly. You are right; I didn't cite any</b><br/>8 <b>intrinsic -- intrinsic evidence.</b><br/>9 Q. Okay. The only intrinsic evidence you<br/>10 cite in your analysis of the construction for<br/>11 charge cut-off voltage is in paragraph 97;<br/>12 correct?<br/>13 MR. STAMATOPOULOS: Object to<br/>14 form.<br/>15 <b>A. 97. In paragraph 97 I said -- '641</b><br/>16 <b>patent?</b><br/>17 Q. (BY MR. COLIN) Right. So that's the<br/>18 only intrinsic evidence cite in your analysis of<br/>19 the claim construction for charge cut-off voltage<br/>20 in your IPR declaration is in paragraph 97; right?<br/>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p>                     |

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| <p>69</p> <p>1 <b>A. Yes.</b></p> <p>2 Q. (BY MR. COLIN) Okay. And in 97 you're</p> <p>3 citing the intrinsic evidence to the patent for an</p> <p>4 argument concerning full-cell voltage; correct?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form.</p> <p>7 <b>A. Yes.</b></p> <p>8 Q. (BY MR. COLIN) Okay. In paragraph 84</p> <p>9 you mention equilibrium potential and maximum</p> <p>10 equilibrium potential; correct?</p> <p>11 <b>A. Which paragraph?</b></p> <p>12 Q. 84.</p> <p>13 <b>A. That's correct.</b></p> <p>14 Q. Okay. As we discussed at length this</p> <p>15 morning, you didn't mention equilibrium potential</p> <p>16 or maximum equilibrium potential in your previous</p> <p>17 claim construction declarations in the Apple</p> <p>18 litigation; correct?</p> <p>19 <b>A. We didn't mention equilibrium, but I</b></p> <p>20 <b>think that's -- that's understood as a hypothesis</b></p> <p>21 <b>between the two parties.</b></p> <p>22 Q. Okay. And you cite nothing in the '641</p>                                    | <p>71</p> <p>1 objections.</p> <p>2 <b>A. I didn't cite anything, yeah, for the</b></p> <p>3 <b>maximum equilibrium potential.</b></p> <p>4 Q. You cite nothing in the patent indicating</p> <p>5 that charging needs to be complete for a battery</p> <p>6 to have a particular charge cut-off voltage;</p> <p>7 correct?</p> <p>8 <b>A. I don't believe I need any reference for</b></p> <p>9 <b>this term of the terminology. It's broadly known</b></p> <p>10 <b>to the community for POSA.</b></p> <p>11 Q. You've mentioned numerous times this</p> <p>12 morning and it's also in paragraph 92 that the</p> <p>13 charge cut-off voltage is a battery property;</p> <p>14 correct?</p> <p>15 <b>A. Can you repeat?</b></p> <p>16 Q. In paragraph 92, you indicate that charge</p> <p>17 cut-off voltage is a battery property; correct?</p> <p>18 <b>A. That's correct.</b></p> <p>19 Q. And you've testified numerous times this</p> <p>20 morning the charge cut-off voltage is a battery</p> <p>21 property; correct?</p> <p>22 <b>A. Yes.</b></p>                                                                          |
| <p>70</p> <p>1 patent discussing equilibrium potential; correct?</p> <p>2 <b>A. Say it again.</b></p> <p>3 Q. You cite no support in the '641 patent</p> <p>4 discussing equilibrium potential; correct?</p> <p>5 <b>A. You mean aside from the IPR declaration,</b></p> <p>6 <b>or what -- what's your -- I didn't understand your</b></p> <p>7 <b>question.</b></p> <p>8 Q. My question is, in paragraph 84 when</p> <p>9 you're talking --</p> <p>10 <b>A. Okay.</b></p> <p>11 Q. -- about equilibrium potential or</p> <p>12 anywhere else in your declaration, you don't cite</p> <p>13 anything in the '641 patent that discusses</p> <p>14 equilibrium potential; correct?</p> <p>15 MR. STAMATOPOULOS: Object to</p> <p>16 form.</p> <p>17 <b>A. I didn't cite because I think of this,</b></p> <p>18 <b>you know, as common knowledge for POSA.</b></p> <p>19 Q. (BY MR. COLIN) And you cite nothing in</p> <p>20 your declaration from the patent discussing</p> <p>21 maximum equilibrium potential; correct?</p> <p>22 MR. STAMATOPOULOS: Same</p> | <p>72</p> <p>1 Q. You don't cite any support in the patent</p> <p>2 or anything else for that opinion; correct?</p> <p>3 MR. STAMATOPOULOS: Object to</p> <p>4 form.</p> <p>5 <b>A. I didn't cite in this page, 44, because I</b></p> <p>6 <b>think that's common knowledge in the community for</b></p> <p>7 <b>POSA.</b></p> <p>8 Q. (BY MR. COLIN) All right. So you don't</p> <p>9 cite any evidence to support your position that</p> <p>10 the charge cut-off voltage is a battery property;</p> <p>11 correct?</p> <p>12 MR. STAMATOPOULOS: Object to</p> <p>13 form.</p> <p>14 <b>A. Although I didn't cite any intrinsic</b></p> <p>15 <b>reference, I do in paragraph 86. I had a</b></p> <p>16 <b>discussion on the difference between the applied</b></p> <p>17 <b>voltage and the battery voltage.</b></p> <p>18 <b>Specifically, paragraph 86 I stated,</b></p> <p>19 <b>"When a battery is being charged, there are two</b></p> <p>20 <b>distinct voltage -- potentials -- the applied</b></p> <p>21 <b>voltage and the battery voltage. Their</b></p> <p>22 <b>relationship can be expressed by the following</b></p> |

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| <p style="text-align: right;">73</p> <p>1 equation: V applied equals U plus eta omega plus<br/>2 eta n-e-g plus eta p-o-s plus eta concentration.<br/>3 V applied is the applied voltage, and U is the<br/>4 battery voltage in equilibrium."<br/>5 MR. COLIN: All right. Dr. Yao,<br/>6 I'm going to move to strike this as all<br/>7 nonresponsive to my question. This is not<br/>8 answering my question.<br/>9 Q. (BY MR. COLIN) My question is simply,<br/>10 you don't cite any evidence -- there's no cites to<br/>11 anything in paragraph 86 -- my question is,<br/>12 there's no cite --<br/>13 A. Yes.<br/>14 Q. -- to any evidence that support your<br/>15 position that charge cut-off voltage is a battery<br/>16 property; correct?<br/>17 MR. STAMATOPOULOS: Object to<br/>18 form.<br/>19 A. I think this is common knowledge as one<br/>20 plus one equals two.<br/>21 MR. COLIN: Dr. Yao, your -- move<br/>22 to strike as nonresponsive.</p>                                    | <p style="text-align: right;">75</p> <p>1 A. The charge cut-off voltage is not applied<br/>2 voltage.<br/>3 Q. (BY MR. COLIN) Okay. You have not<br/>4 identified any distinctions in your declaration<br/>5 between charging voltage and applied voltage;<br/>6 correct?<br/>7 MR. STAMATOPOULOS: Object to<br/>8 form.<br/>9 A. Can you repeat your question?<br/>10 Q. (BY MR. COLIN) You have not identified<br/>11 any distinctions in your declaration between<br/>12 charging voltage and applied voltage; correct?<br/>13 MR. STAMATOPOULOS: Same<br/>14 objection.<br/>15 A. I think in general that's true.<br/>16 Q. (BY MR. COLIN) Okay. Go to the '641<br/>17 patent at column 3, lines 45 to 50. And this is<br/>18 Exhibit 1 -- 1001.<br/>19 A. Which page?<br/>20 Q. Column 3, lines 45 to 50. Are you there?<br/>21 A. Yes.<br/>22 Q. Okay. Do you want to read that to</p>                                             |
| <p style="text-align: right;">74</p> <p>1 Q. (BY MR. COLIN) You don't cite any<br/>2 evidence in your declaration to support your<br/>3 position that the charge cut-off voltage is a<br/>4 battery property; correct?<br/>5 MR. STAMATOPOULOS: Same<br/>6 objection. And we oppose -- to the extent you are<br/>7 moving to strike, we oppose that, just for the<br/>8 record.<br/>9 A. I do not cite because I didn't think it<br/>10 was it needed cite that reference here.<br/>11 Q. (BY MR. COLIN) Okay. In paragraph 92,<br/>12 you indicate that, "In contrast, the applied<br/>13 voltage is supplied by an external charger,<br/>14 variable, and depending upon factors external to<br/>15 the battery, such as what current is being applied<br/>16 to the battery"; correct?<br/>17 A. Yes.<br/>18 Q. Okay. So, again, this goes to your<br/>19 position that the charge cut-off voltage is not a<br/>20 charging voltage; correct?<br/>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p> | <p style="text-align: right;">76</p> <p>1 yourself for a second?<br/>2 A. 41 to 50.<br/>3 Q. 45 to 50. And line 47, the patent, '641<br/>4 patent says, "said charging device" -- so let me<br/>5 restate this.<br/>6 I'll read from 45.<br/>7 "Yet another object of the present<br/>8 invention is to provide a charging device for the<br/>9 secondary lithium ion cell or battery, said<br/>10 charging device controlling a charge cut-off<br/>11 voltage for the single lithium ion cell." Do you<br/>12 see that?<br/>13 A. Yes.<br/>14 Q. So the '641 patent indicates that the<br/>15 charging device controls the charge cut-off<br/>16 voltage; correct?<br/>17 MR. STAMATOPOULOS: Object to<br/>18 form, scope.<br/>19 A. I don't think I discussed form opinion on<br/>20 charging device in my IPR declaration.<br/>21 Q. (BY MR. COLIN) Right. So in your IPR<br/>22 declaration you do -- don't address that portion</p> |

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| <p>77</p> <p>1 that's back at columns 3, lines 45 to 50, which<br/>2 says that the charging device controlling a charge<br/>3 cut-off voltage for the single lithium ion cell;<br/>4 correct?</p> <p>5 <b>A. Yes, I didn't. I didn't form opinion on<br/>6 that.</b></p> <p>7 Q. Okay. But despite the patent indicating<br/>8 that the charging device controls the charge<br/>9 cut-off voltage, it's your testimony to the board<br/>10 that the charge cut-off voltage is a battery<br/>11 property; correct?</p> <p>12 <b>A. Yes, I believe charge cut-off voltage is<br/>13 a battery property. Almost every batteries on the<br/>14 back of the battery says charge cut-off voltage,<br/>15 which number is. That's an important parameter<br/>16 for battery. Yes.</b></p> <p>17 Q. Okay. Go to column 4 of the '641 patent<br/>18 at lines 27 to 37. The patent at line 33<br/>19 indicates "the single lithium ion cell having the<br/>20 adjusted ratios were tested by charging at a<br/>21 charge cut-off voltage at 4.45 volts, 4.6 volts,<br/>22 4.8 volts, 5.0 volts, 5.2 volts, 5.4 volts, 5.6 --</p> | <p>79</p> <p>1 Q. Okay. And so despite the patent<br/>2 indicating that the batteries are charged using<br/>3 various charge cut-off voltages, it's your opinion<br/>4 to the board that charge cut-off voltage is not an<br/>5 applied voltage; correct?</p> <p>6 <b>A. These are different batteries. Same<br/>7 material, same battery chemistry, charge --<br/>8 different charge cut-off voltage would be in<br/>9 different batteries. So it's still consistent<br/>10 with internal -- its battery properties. Yes.<br/>11 That's my opinion.</b></p> <p>12 Q. Dr. Yao, you indicate in paragraphs 94<br/>13 and 95 that a half cell is used to determine<br/>14 electrode capacity; correct?</p> <p>15 <b>A. In my declaration, 94?</b></p> <p>16 Q. Your IPR declaration in 94 to 95. And<br/>17 I'll --</p> <p>18 <b>A. That's correct.</b></p> <p>19 Q. -- repeat my -- I'll repeat my question<br/>20 just so it's clear.</p> <p>21 You indicate in paragraphs 94 to 95 of<br/>22 your IPR declaration that a half cell is used to</p>          |
| <p>78</p> <p>1 5.6 volts, and 5.8 volts." Do you see that?</p> <p>2 <b>A. Yes.</b></p> <p>3 Q. Okay. And you provide no opinions on<br/>4 that portion of the specification in your IPR<br/>5 declaration; correct?</p> <p>6 MR. STAMATOPOULOS: Object to<br/>7 form.</p> <p>8 <b>A. I don't remember I form an opinion on<br/>9 this. Can you point me to -- if I'm wrong?</b></p> <p>10 Q. (BY MR. COLIN) It's not in your<br/>11 declaration, Dr. Yao.</p> <p>12 <b>A. Okay.</b></p> <p>13 Q. I'm just confirming that you provide no<br/>14 opinions -- I just -- I'm looking for an answer<br/>15 because I'm entitled to know your testimony.</p> <p>16 My question is simply, you provide no<br/>17 opinions in that -- on columns 4, lines 34 to 37<br/>18 in your IPR declaration, correct, where the patent<br/>19 indicates that the batteries were charged at a<br/>20 charge cut-off voltage of various voltages;<br/>21 correct? You provide no opinions on that?</p> <p>22 <b>A. Yes.</b></p>                                                                                                           | <p>80</p> <p>1 determine electrode capacity; correct?</p> <p>2 <b>A. In paragraph 95, yes, I state that, you<br/>3 know, half cell are typically used to -- to<br/>4 measure the capacity of either a cathode anode<br/>5 with a reference electrode. Typically it's a<br/>6 lithium metal.</b></p> <p>7 Q. So just to be clear, you indicate in<br/>8 paragraph 95 of your IPR declaration that a half<br/>9 cell is used to determine electrode capacity;<br/>10 correct?</p> <p>11 <b>A. Yes.</b></p> <p>12 Q. You provide no opinion in your<br/>13 declaration that the capacity of an electrode can<br/>14 be determined using a full cell battery; correct?</p> <p>15 <b>A. Can you repeat?</b></p> <p>16 Q. Yeah. You provide no opinion in your IPR<br/>17 declaration that the capacity of an electrode can<br/>18 be determined using a full cell battery; correct?</p> <p>19 MR. STAMATOPOULOS: Object to<br/>20 form.</p> <p>21 <b>A. I don't remember if I said so. Most --<br/>22 typically half cell is being used to determine the</b></p> |

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| <p style="text-align: right;">81</p> <p><b>1 capacity. Full cell is not the best way to</b><br/><b>2 determine the electrode capacity.</b><br/>3 Q. (BY MR. COLIN) Are you aware -- strike<br/>4 that.<br/>5 So sitting here today, you don't recall<br/>6 providing any opinion in your IPR declaration that<br/>7 the capacity of an electrode can be determined<br/>8 using a full cell; correct?<br/><b>9 A. Full cell could be also used in certain</b><br/><b>10 cases -- for example, three electrode</b><br/><b>11 configuration.</b><br/>12 MR. COLIN: Move to strike as<br/>13 nonresponsive.<br/>14 Q. (BY MR. COLIN) Dr. Yao, sitting here<br/>15 today --<br/>16 MR. STAMATOPOULOS: We oppose<br/>17 that, by the way, for the record.<br/>18 MR. COLIN: Hasn't been answered.<br/>19 I have a running "move to strike" because a lot of<br/>20 this stuff is nonresponsive to my questions.<br/>21 Q. (BY MR. COLIN) Sitting here today,<br/>22 Dr. Yao, you don't recall providing any opinion in</p> | <p style="text-align: right;">83</p> <p>1 Q. (BY MR. COLIN) Sitting here today, you<br/>2 don't recall and you cannot find any opinions in<br/>3 your IPR declaration that the capacity of an<br/>4 electrode can be determined using a full cell;<br/>5 correct?<br/><b>6 A. Sitting here --</b><br/>7 MR. STAMATOPOULOS: Same<br/>8 objection. Sorry. Same objection.<br/><b>9 A. Sitting here today, I think you can</b><br/><b>10 determine the capacity using a full cell. Is that</b><br/><b>11 your question? I think that's the question.</b><br/>12 Q. (BY MR. COLIN) That is not my question,<br/>13 Dr. Yao. You're refusing to answer my question.<br/>14 You provide no opinion in your IPR<br/>15 declaration that the capacity of an electrode can<br/>16 be determined using a full cell; correct?<br/>17 MR. STAMATOPOULOS: Object to<br/>18 form.<br/>19 Q. (BY MR. COLIN) If it's in your<br/>20 declaration, show me, because I don't see it. You<br/>21 haven't pointed to anything.<br/>22 MR. STAMATOPOULOS: Object to the</p>                                                                                                                                            |
| <p style="text-align: right;">82</p> <p>1 your IPR declaration that the capacity of an<br/>2 electrode can be determined using a full cell;<br/>3 correct?<br/>4 MR. STAMATOPOULOS: Same<br/>5 objections.<br/><b>6 A. I believe you can also -- you can</b><br/><b>7 determine capacity of electrode using full cell</b><br/><b>8 with a three electrode configuration.</b><br/>9 MR. COLIN: Move to strike as<br/>10 nonresponsive.<br/>11 Q. (BY MR. COLIN) Dr. Yao, you provide no<br/>12 opinions in your IPR declaration that the capacity<br/>13 of an electrode can be determined using a full<br/>14 cell; correct?<br/>15 MR. STAMATOPOULOS: Same<br/>16 objection. Just for the record, we oppose a move<br/>17 to strike. I don't want to have say oppose every<br/>18 time; so I'm just going to put it in the record.<br/>19 MR. COLIN: That will be<br/>20 standing. Understood.<br/><b>21 A. Maybe. Maybe I didn't. I don't</b><br/><b>22 remember.</b></p>                                          | <p style="text-align: right;">84</p> <p>1 form of that last question, if that was a<br/>2 question.<br/>3 Q. (BY MR. COLIN) Dr. Yao, I'll repeat the<br/>4 question. You provide no opinion in your IPR<br/>5 declaration that the capacity of an electrode can<br/>6 be determined using a full cell; correct?<br/>7 MR. STAMATOPOULOS: Same<br/>8 objection.<br/><b>9 A. So in paragraph 98 in my declaration so</b><br/><b>10 relate to the claim on "the ratio calculate as the</b><br/><b>11 product of the capacity of the cathode active</b><br/><b>12 material per mass unit and the amount of cathode</b><br/><b>13 active material in the same mass unit divided by</b><br/><b>14 the product of capacity of anode active material</b><br/><b>15 per unit mass and the amount of active -- anode</b><br/><b>16 active material in the same mass unit, when the</b><br/><b>17 charge cut-off is 4.2 volts."</b><br/><b>18 I think that -- that's one way to</b><br/><b>19 determine the capacity in the full cell.</b><br/>20 Q. (BY MR. COLIN) So it's your testimony<br/>21 here today that the electrode capacity and the<br/>22 capacity ratio limitation is determined using a</p> |

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| <p>85</p> <p>1 full-cell voltage?</p> <p>2 <b>A. The charge cut-off voltage referenced</b></p> <p>3 <b>here is a full-cell voltage, yes.</b></p> <p>4 Q. Let's go to paragraph 8 of your second</p> <p>5 Apple IPR declaration.</p> <p>6 <b>A. Which exhibit?</b></p> <p>7 Q. So that Exhibit 130 -- 1036, paragraph 8.</p> <p>8 Okay. And in paragraph 8 of Exhibit</p> <p>9 1036, you cite to a statement made by the</p> <p>10 inventors in the prosecution history of the</p> <p>11 Chinese patent; correct?</p> <p>12 <b>A. Yes.</b></p> <p>13 Q. At the end of that paragraph you state,</p> <p>14 "That is consistent with my reading of the claims</p> <p>15 in the '641 patent"; correct?</p> <p>16 MR. STAMATOPOULOS: Object to</p> <p>17 form.</p> <p>18 <b>A. That's what I state here. This is</b></p> <p>19 <b>consistent with my reading of the claims. Yes.</b></p> <p>20 MR. COLIN: So let's mark as the</p> <p>21 next exhibit -- this is Exhibit 3 -- sorry --</p> <p>22 would be 1038 -- no, sorry -- 1039.</p> | <p>87</p> <p>1 positive to negative ratio equals the product of</p> <p>2 the amount of active material in the positive</p> <p>3 electrode of a lithium ion battery and its</p> <p>4 specific capacity," parentheses, "gram capacity,</p> <p>5 i.e., capacity per unit amount of active</p> <p>6 material," close parens, "when the charging</p> <p>7 potential relative to lithium metal is 4.2 volts."</p> <p>8 And it goes on to indicate for the</p> <p>9 negative electrode, again, "when the charging</p> <p>10 potential relative to lithium metal is 4.2 volts."</p> <p>11 Do you see that?</p> <p>12 MR. STAMATOPOULOS: Object to</p> <p>13 form.</p> <p>14 <b>A. Yes. Can I read this sentence?</b></p> <p>15 Q. (BY MR. COLIN) Okay. So the Chinese</p> <p>16 inventors, the statement -- sorry. Let me re- --</p> <p>17 fix that.</p> <p>18 So the inventors, during the prosecution</p> <p>19 history of the Chinese patent, indicated that the</p> <p>20 ratio of positive to negative electrode ratio is</p> <p>21 calculated with a charging potential relative to</p> <p>22 lithium metal at 4.2 volts; correct?</p> |
| <p>86</p> <p>1 (Exhibit 1039 marked)</p> <p>2 MR. COLIN: It's Exhibit 3,</p> <p>3 Chinese patent application, Statement of Argument</p> <p>4 for Application Number 01141615.7, which is cited</p> <p>5 in paragraph 8 of Dr. Yao's declaration,</p> <p>6 Exhibit 1036.</p> <p>7 Q. (BY MR. COLIN) So, Dr. Yao, turn to the</p> <p>8 page marked at the bottom 3578, underscore, Apple.</p> <p>9 Are you there?</p> <p>10 <b>A. Yes.</b></p> <p>11 Q. At section 2.1. Do you see that?</p> <p>12 <b>A. That's right.</b></p> <p>13 Q. Okay. And so you understand that this is</p> <p>14 a statement from the patent inventors; correct?</p> <p>15 As indicated in your claim construction</p> <p>16 declaration, this is a statement by the Chinese</p> <p>17 inventors?</p> <p>18 <b>A. Yes.</b></p> <p>19 Q. Okay. And in section 2.1 they state,</p> <p>20 "The positive and negative electrode ratio</p> <p>21 mentioned in Claims 1 and 2 can easily be</p> <p>22 calculated as follows." They said, "The said</p>            | <p>88</p> <p>1 MR. STAMATOPOULOS: Object to</p> <p>2 form.</p> <p>3 <b>A. Can you repeat your question?</b></p> <p>4 Q. (BY MR. COLIN) Sure.</p> <p>5 <b>A. Better question.</b></p> <p>6 Q. The inventors during prosecution history</p> <p>7 of the Chinese patent that's related to the '641</p> <p>8 patent indicated that the ratio of positive to</p> <p>9 negative electrode is calculated with a charging</p> <p>10 potential relative to lithium metal at 4.2 volts;</p> <p>11 correct?</p> <p>12 <b>A. Yes.</b></p> <p>13 Q. Okay. And in your claim construction</p> <p>14 declaration to the court, referring to this</p> <p>15 document, you state in paragraph 8 in the Chinese</p> <p>16 patent prosecution history, "The inventors</p> <p>17 explained to the examiner in China that to</p> <p>18 calculate the claimed ratio, the capacity at a</p> <p>19 charge cut-off voltage at 4.2 volts should be</p> <p>20 used"; correct? That's in your declaration?</p> <p>21 <b>A. Yes.</b></p> <p>22 Q. Okay. And you told the court that "the</p>                                                                      |

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| <p>89</p> <p>1 statement by -- made during the Chinese patent<br/>2 prosecution is consistent with my reading of the<br/>3 claims in the '641 patent"; correct?<br/>4 MR. STAMATOPOULOS: Object to --<br/>5 object to form. You can answer.<br/>6 <b>A. Yes.</b><br/>7 MR. COLIN: Let's take a break.<br/>8 THE VIDEOGRAPHER: Off the record<br/>9 at 12:16 p.m.<br/>10 (Lunch recess from 12:16 p.m. to<br/>11 1:02 p.m.)<br/>12 THE VIDEOGRAPHER: The time is<br/>13 1:02 p.m., and we're back on the record.<br/>14 Q. (BY MR. COLIN) Good afternoon, Dr. Yao.<br/>15 <b>A. Good afternoon.</b><br/>16 Q. Did you discuss any of the substance of<br/>17 your testimony during the break today?<br/>18 <b>A. No, I didn't.</b><br/>19 Q. Okay. So turning back to your IPR<br/>20 declaration in paragraph 97 -- wait till you get<br/>21 there. Okay.<br/>22 So in the second sentence of paragraph</p>                                                                  | <p>91</p> <p>1 <b>A. Yes.</b><br/>2 Q. (BY MR. COLIN) Okay. And when you look<br/>3 at -- you understand if I say "the capacity ratio<br/>4 limitation," you understand that that's the next<br/>5 limitation in the claims?<br/>6 <b>A. So --</b><br/>7 Q. And rather than saying the whole<br/>8 limitation, which is, you know, the ratio of<br/>9 positive electrode materials. So if I refer to<br/>10 the next limitation in Claim 5 is "the capacity<br/>11 ratio limitation," you understand what I'm<br/>12 referring to?<br/>13 <b>A. So were you referring to the Claim 5 --</b><br/>14 Q. Yeah, yeah.<br/>15 <b>A. -- or the claim construction we have?</b><br/>16 Q. No, no, no. Just -- I'm just -- if I say<br/>17 "the capacity ratio limitation," you understand<br/>18 I'm referring to the limitation that reads: the<br/>19 ratio of positive electrode material to negative<br/>20 electrode material of the secondary lithium ion<br/>21 cell or battery is from 1 to 1.0 to 1 to 2.5 as<br/>22 calculated by a theoretic capacity with a charge</p> |
| <p>90</p> <p>1 97, you indicate that the claims refer to the<br/>2 charge cut-off voltage of a secondary lithium ion<br/>3 battery; correct?<br/>4 <b>A. Yes.</b><br/>5 Q. Okay. So if we turn to the '641 patent,<br/>6 which is Exhibit 1001, could you turn to Claim 5,<br/>7 please.<br/>8 <b>A. Yes.</b><br/>9 Q. Okay. And so for the -- you know, what<br/>10 we've been referring to on all morning, right, is<br/>11 the charge cut-off voltage limitation; right? The<br/>12 claim read, "The secondary lithium ion cell or<br/>13 battery has a charge cut-off voltage of great than<br/>14 4.2 volts but less than 5.8 volts; correct?<br/>15 <b>A. Yes.</b><br/>16 Q. Okay. So that's what you were referring<br/>17 to when you say the claims refer to charge cut-off<br/>18 voltage of the secondary lithium ion cell or<br/>19 battery because it's directly right in that<br/>20 limitation; correct?<br/>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p> | <p>92</p> <p>1 cut-off voltage set up 4.2 volts.<br/>2 <b>A. Okay.</b><br/>3 Q. You understand that portion of the claim<br/>4 if we say charge cut-off -- sorry -- "capacity<br/>5 ratio limitation"?<br/>6 <b>A. Yes.</b><br/>7 Q. Okay. So if we're just talking about the<br/>8 capacity ratio limitation, that last portion of<br/>9 the claim, it says the charge cut-off voltage set<br/>10 at 4.2 volts; correct? It doesn't say "of the<br/>11 lithium -- secondary lithium ion cell or battery<br/>12 in that limitation"; right?<br/>13 MR. STAMATOPOULOS: Object to<br/>14 form.<br/>15 <b>A. I didn't understand the question. Yeah.</b><br/>16 Q. (BY MR. COLIN) Okay. I'm just saying,<br/>17 when it says "charge cut-off voltage set at 4.2<br/>18 volts," it doesn't say "charge cut-off voltage set<br/>19 at 4.2 volts for the secondary lithium ion cell or<br/>20 battery"; right? That's not written in the claim<br/>21 language?<br/>22 MR. STAMATOPOULOS: Object to</p>                                                                           |

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| <p>93</p> <p>1 form.</p> <p>2 <b>A. You're correct.</b></p> <p>3 Q. (BY MR. COLIN) Okay. So in paragraph 97</p> <p>4 you go on to say, "the specification explains that</p> <p>5 as the lithium cobalt oxide that is used as a</p> <p>6 positive electrode material in most commercial</p> <p>7 lithium ion batteries, the charge cut-off voltage</p> <p>8 is limited to below 4.2 volts," then you have</p> <p>9 ellipses. And then it says, "although many</p> <p>10 documents indicate that the charge cut-off voltage</p> <p>11 can be over 4.2 volts for a test cell using</p> <p>12 metallic lithium as counter electrode," and you</p> <p>13 cite to the patent at columns 1:64 to 2:3; right?</p> <p>14 <b>A. Yes.</b></p> <p>15 Q. Okay. So at the top of column 2 in lines</p> <p>16 1 to 3, the patent specification refers to "the</p> <p>17 charge cut-off voltage can be over 4.2 for a test</p> <p>18 cell using metallic lithium as a counter</p> <p>19 electrode"; correct?</p> <p>20 <b>A. Were you referring to the claim or --</b></p> <p>21 Q. No, column 2, lines 1 to 3.</p> <p>22 <b>A. Okay.</b></p> | <p>95</p> <p>1 uses the phrase "charge cut-off voltage" in</p> <p>2 connection with a half cell; correct? In lines --</p> <p>3 column 2, lines 1 to 3.</p> <p>4 <b>A. I think, you know, the Claim 1 of 5 and</b></p> <p>5 <b>the claims -- one -- yeah -- mention -- in Claim</b></p> <p>6 <b>5, mention two charge -- charge cut-off voltage.</b></p> <p>7 <b>In the first place one say charge cut-off voltage</b></p> <p>8 <b>greater than 4.2 volt but less than 5.8 volt.</b></p> <p>9 <b>This is referring to full cell because that's</b></p> <p>10 <b>where the charge cut-off voltage is.</b></p> <p>11 <b>And -- and then later, the end of this</b></p> <p>12 <b>Claim 5 where it says that theoretic capacity with</b></p> <p>13 <b>a charge cut-off voltage at 4.2 volt. So that's</b></p> <p>14 <b>essentially, you know, it's theoretic capacity</b></p> <p>15 <b>calculation. I think this relates with the --</b></p> <p>16 <b>with the half cell, was the reference, lithium</b></p> <p>17 <b>metal.</b></p> <p>18 Q. Okay. So just to break it down, it's</p> <p>19 your understanding that for the charge cut-off</p> <p>20 limitation, which is between, you know, 4.2 volts</p> <p>21 to 5.8 volts, that's for a full-cell voltage;</p> <p>22 correct?</p> |
| <p>94</p> <p>1 Q. My question simply is that the patent</p> <p>2 specification is referring to a "charge cut-off</p> <p>3 voltage can be over 4.2 volts for a test cell</p> <p>4 using metallic lithium as a counter electrode";</p> <p>5 correct?</p> <p>6 <b>A. Which one are you referring to?</b></p> <p>7 Q. Column 2, lines 1 to 3, the part that you</p> <p>8 cite in paragraph 97.</p> <p>9 <b>A. Oh.</b></p> <p>10 Q. Column 2. So it's --</p> <p>11 <b>A. Column 2.</b></p> <p>12 Q. No. You're already -- right. Top right</p> <p>13 of the page.</p> <p>14 My question is simply, the patent</p> <p>15 specification refers to a charge cut-off voltage</p> <p>16 can be over 4.2 volts using a -- for a test cell</p> <p>17 using metallic lithium as a counter electrode;</p> <p>18 correct?</p> <p>19 <b>A. Yes, you can use a metallic lithium as a</b></p> <p>20 <b>counter electrode in some of the cells, half</b></p> <p>21 <b>cells.</b></p> <p>22 Q. Right. And specifically the '641 patent</p>                                                                                                        | <p>96</p> <p>1 <b>A. Yes.</b></p> <p>2 Q. Okay. And so for the capacity ratio</p> <p>3 limitation, when you're talking about electrode</p> <p>4 capacity, it's your opinion that that's referring</p> <p>5 to a half cell capacity relative to a reference</p> <p>6 electrode; correct?</p> <p>7 MR. STAMATOPOULOS: Object to</p> <p>8 form.</p> <p>9 <b>A. Yes.</b></p> <p>10 Q. (BY MR. COLIN) In paragraph 51 of your</p> <p>11 IPR declaration, you indicate -- wait for you to</p> <p>12 get there -- in the last sentence, "at the time of</p> <p>13 the '641 patent, it was conventional to limit the</p> <p>14 charge cut-off voltage to 4.2 volts or lower";</p> <p>15 correct?</p> <p>16 <b>A. Yes.</b></p> <p>17 Q. You don't cite anything in that paragraph</p> <p>18 to support that opinion?</p> <p>19 <b>A. I didn't because I think that's -- to the</b></p> <p>20 <b>POSA that's a known fact, known entity.</b></p> <p>21 Q. Are you aware that the patent office</p> <p>22 rejected that argument during the prosecution</p>                                                                                                                                                                                                                                  |

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| <p style="text-align: right;">97</p> <p>1 history of the child application of the '641<br/>2 patent after it reviewed the Guyomard reference<br/>3 that is cited in the petition?<br/>4 <b>A. I – I may have read those, you know, for<br/>5 certain history, but I didn't, you know, pay<br/>6 attention to all the details. So I don't remember<br/>7 the history of the patent history particularly on<br/>8 your question.</b><br/>9 Q. Sure. So I'll introduce what's already<br/>10 been marked as Exhibit 1004, which is the<br/>11 prosecution history of Patent Application Number<br/>12 12/817028. And I'll direct you specifically to<br/>13 page 33. Are you with me? It's labeled page 33<br/>14 of 254 at the bottom right?<br/>15 <b>A. Yes.</b><br/>16 Q. Okay. And if you go to the section<br/>17 that's labeled, "Response to Arguments" kind of in<br/>18 the middle of the page, do you see that?<br/>19 <b>A. Yes.</b><br/>20 Q. Okay. And the second sentence, the<br/>21 patent office says, "In response to applicant's<br/>22 argument that using the cut-off voltage above 4.2</p> | <p style="text-align: right;">99</p> <p>1 Q. (BY MR. COLIN) You've testified today --<br/>2 I'm not trying to trip you up -- that you provided<br/>3 no opinions in your IPR declaration on the<br/>4 prosecution history on the '641 patent or the<br/>5 child application; correct?<br/>6 MR. STAMATOPOULOS: Objection.<br/>7 <b>A. Yeah, I don't -- I don't recall provide<br/>8 opinion on the prosecution history of this.</b><br/>9 Q. (BY MR. COLIN) Right. So my question<br/>10 was simply, you provided no response to the US<br/>11 Patent and Trademark Office's finding that "patent<br/>12 applicant's argument that using the cut-off<br/>13 voltage of 4.2 volts is wholly unforeseen by the<br/>14 art is not true." Correct?<br/>15 MR. STAMATOPOULOS: Objection.<br/>16 <b>A. It seems the reference cited here,<br/>17 WO 93-21665, cannot be used as evidence to --<br/>18 against the cut-off voltage above 4.2 volt because<br/>19 this reference used this manganese oxide as a<br/>20 cathode material. As I state in my deposition in<br/>21 paragraph 206, page 106, that, you know, that I<br/>22 cite a reference here, 1005, because a charge</b></p> |
| <p style="text-align: right;">98</p> <p>1 volts is wholly unforeseen by the art is not<br/>2 true." Do you see that?<br/>3 <b>A. Yes.</b><br/>4 Q. Okay. And the examiner goes on to say,<br/>5 "The reference W0 93/21665 teaches using cut-off<br/>6 voltage above 4."2 volts. Do you see that?<br/>7 <b>A. Yes.</b><br/>8 Q. Okay. And do you understand that the W0<br/>9 93/21665 is the Guyomard reference cited in this<br/>10 petition?<br/>11 MR. STAMATOPOULOS: Object to<br/>12 form.<br/>13 <b>A. Yes.</b><br/>14 Q. (BY MR. COLIN) You provide no opinions<br/>15 in your declaration concerning the patent office<br/>16 assertion that patent applicant's argument that<br/>17 using the cut-off voltage above 4.2 volts is<br/>18 wholly unforeseen by the art is not true.<br/>19 Correct?<br/>20 MR. STAMATOPOULOS: Object to<br/>21 form.<br/>22 <b>A. Can you repeat your question?</b></p>                                                                                                                                                                                                | <p style="text-align: right;">100</p> <p>1 <b>cut-off voltage limit manganese oxide due to its<br/>2 own chemical stability. Beyond this voltage limit<br/>3 the structure of lithium manganese oxide can start<br/>4 to break down. Considering the risk of cathode<br/>5 dissolution, a POSITA did not have motivation to<br/>6 increase the charge cut-off voltage beyond 4.2<br/>7 volt. So I don't think there's a strong, you<br/>8 know, reason to increase the voltage above 4.2<br/>9 volts.</b><br/>10 MR. COLIN: Move to strike as not<br/>11 responsive.<br/>12 Q. (BY MR. COLIN) Dr. Yao, my question was<br/>13 simply, you do not provide any opinions in your<br/>14 declaration responding to the patent examiner's<br/>15 finding that is already known to use cut-off<br/>16 voltages above 4.2 volts; correct?<br/>17 MR. STAMATOPOULOS: Same<br/>18 objection.<br/>19 <b>A. I think it provides an opinion,<br/>20 Guyomard's reference, right, in the paragraph 75<br/>21 to 78 in my declaration. Also -- I also provide,<br/>22 you know, additional opinion in page 105 which I</b></p>                                                                    |

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| <p style="text-align: right;">101</p> <p>1 just didn't read related paragraphs. So I don't<br/>2 know what exactly, you know, opinion you are<br/>3 referring to; but I think I did provide some<br/>4 opinions related to this charge cut-off voltage in<br/>5 this reference.<br/>6 Q. (BY MR. COLIN) So it's your testimony to<br/>7 the board that no one in the art prior to 2001 was<br/>8 charging cathode materials above 4.2 volts?<br/>9 MR. STAMATOPOULOS: Object to<br/>10 form.<br/>11 A. I didn't -- I didn't say that.<br/>12 Q. (BY MR. COLIN) So, Dr. Yao --<br/>13 A. That's not my opinion in that<br/>14 declaration.<br/>15 Q. Right. Because you're well aware that<br/>16 there were laboratories, papers, publications<br/>17 teaching to charge cathode materials above 4.2<br/>18 volts, correct, prior to 2001?<br/>19 MR. STAMATOPOULOS: Object to<br/>20 form.<br/>21 A. I provide an opinion relate to, you know,<br/>22 the charge cut-off voltage for lithium cobalt</p>                                                                                                                                                                                                  | <p style="text-align: right;">103</p> <p>1 stability surfaced."<br/>2 So "Specifically, the dissolution of<br/>3 manganese in the electrolyte during battery<br/>4 operation led to significant issues with cycle<br/>5 life and capacity retention. It was known that<br/>6 attempting to increase the charge cut-off voltage<br/>7 above 4.2 volt caused oxidation of the electrolyte<br/>8 and the spinel without the benefit of additional<br/>9 capacity."<br/>10 So which means, you know, that's no<br/>11 additional capacity above 4.2 volt. Even you<br/>12 charge to 4.3 volt, there's no additional benefit.<br/>13 Therefore, and but only -- it would lead to more<br/>14 capacity decay. There's no really motivation to<br/>15 increase the voltage above 4.2 volt for spinel<br/>16 material system.<br/>17 Therefore, I think, you know, that's my<br/>18 opinion relate to what you are asking.<br/>19 Q. So it's your opinion that Guyomard does<br/>20 not teach a charge cut-off voltage above 4.2<br/>21 volts?<br/>22 MR. STAMATOPOULOS: Object to the</p> |
| <p style="text-align: right;">102</p> <p>1 oxide in paragraph 52 whereas charge cut-off<br/>2 voltage for lithium cobalt oxide has been limited<br/>3 to 4.2 volts as it was understood that at voltage<br/>4 higher than 4.2 volt lithium cobalt oxide can<br/>5 undergo irreversible structure change and oxygen<br/>6 loss, which not only degrades the material's<br/>7 capacity and cycling stability, but also poses<br/>8 risks of thermal runaway and battery failure.<br/>9 You can apply voltage higher than 4.2<br/>10 volt, but that would lead to the consequence such<br/>11 as structure change and oxygen loss and thermal<br/>12 runaway. It's not desired for higher -- voltage<br/>13 higher than 4.2 volt.<br/>14 So also I apply my opinion in paragraph<br/>15 54 for spinel lithium manganese oxide. So this is<br/>16 a different structure compared to lithium cobalt<br/>17 oxide in paragraph 54.<br/>18 As I state here, "Because of its low cost<br/>19 and environmental friendliness, lithium manganese<br/>20 oxide seemed to be a promising cathode material.<br/>21 However, over time, enthusiasm waned as the<br/>22 changes related to the material's surface --</p> | <p style="text-align: right;">104</p> <p>1 form of the question.<br/>2 A. Do you have reference out of this<br/>3 Guyomard's claim -- patent? 1008.<br/>4 Q. (BY MR. COLIN) I give you what's<br/>5 previously been marked as Exhibit 1008, which is<br/>6 the Guyomard reference. But let me direct you to<br/>7 your own IPR declaration on paragraph 77. Are you<br/>8 there?<br/>9 A. Yes.<br/>10 Q. Okay. So paragraph 77, third sentence,<br/>11 you say, the charge and discharge of these test<br/>12 cells were performed, quote, at 25 degrees C and<br/>13 55 degrees C and at charging cut-off voltages of<br/>14 4.9 volts and 4.5 volts respectively, close<br/>15 quotes, quoting Guyomard at page 8, lines 32 to<br/>16 37; correct?<br/>17 A. Yes, correct.<br/>18 Q. So looking at your own declaration,<br/>19 looking at Guyomard, is it your opinion that<br/>20 Guyomard does not teach charge cut-off voltages<br/>21 over 4.2 volts?<br/>22 MR. STAMATOPOULOS: Object to</p>                                                                               |

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| <p>105</p> <p>1 form.</p> <p>2 <b>A. I think that, you know, the patent, '641</b></p> <p>3 <b>patent teaches cut-off voltage higher than 4.2</b></p> <p>4 <b>volt without significant decrease of battery</b></p> <p>5 <b>performance. In the Guyomard patent, they do</b></p> <p>6 <b>teach charge cut-off voltage above 4.2 volt; but</b></p> <p>7 <b>the capacity loss compared with the fixed cycle,</b></p> <p>8 <b>as indicated my paragraph 78 of my declaration, is</b></p> <p>9 <b>not considered good performance. So this is</b></p> <p>10 <b>different from '641 patent.</b></p> <p>11 Q. So you agree with me that Guyomard</p> <p>12 discloses the charge cut-off voltage over 4.2</p> <p>13 volts; correct?</p> <p>14 MR. STAMATOPOULOS: Object to</p> <p>15 form. And scope.</p> <p>16 <b>A. In my declaration, paragraph 78, I do</b></p> <p>17 <b>state Guyomard did not disclose any detail about</b></p> <p>18 <b>the performance of the battery or state of the</b></p> <p>19 <b>cathode using such test conditions. Indeed,</b></p> <p>20 <b>Guyomard only disclosed the charge cut-off voltage</b></p> <p>21 <b>but does not specify the details like charging and</b></p> <p>22 <b>the charging conditions such as the current.</b></p> | <p>107</p> <p>1 cite page 9, lines 3 to 8; correct?</p> <p>2 <b>A. That's correct.</b></p> <p>3 Q. Okay. So you're telling the board that</p> <p>4 by providing the capacity loss after 500 cycles of</p> <p>5 only about 10 percent or less does not tell you</p> <p>6 anything about the performance of the cathode in</p> <p>7 Guyomard?</p> <p>8 <b>A. Well, our typical method of battery</b></p> <p>9 <b>capacity retention is compared to the first</b></p> <p>10 <b>discharge cycle, not compared to the fifth cycle.</b></p> <p>11 <b>Therefore, because we -- there's not enough</b></p> <p>12 <b>information to know how does the cell capacity of</b></p> <p>13 <b>the fifth -- 500th cycle compare to the first</b></p> <p>14 <b>cycle. Maybe it's going to decrease significantly</b></p> <p>15 <b>to the first five cycles.</b></p> <p>16 Q. The first several cycles of the battery</p> <p>17 are the formation cycles; correct?</p> <p>18 MR. STAMATOPOULOS: Object to</p> <p>19 form.</p> <p>20 <b>A. Formation cycle of a battery typically</b></p> <p>21 <b>can be complete in one or two cycles. From my</b></p> <p>22 <b>understanding, typically -- well, doesn't last</b></p> |
| <p>106</p> <p>1 <b>Therefore, I -- but, therefore, that's --</b></p> <p>2 <b>you know, that's my opinion, that Guyomard does</b></p> <p>3 <b>not disclose, you know, details of charge cut-off</b></p> <p>4 <b>voltage above 4.2 volt.</b></p> <p>5 Q. (BY MR. COLIN) Okay. So just to get</p> <p>6 that clear, it's your opinion that Guyomard does</p> <p>7 not disclose a charge cut-off voltage above 4.2</p> <p>8 volts?</p> <p>9 MR. STAMATOPOULOS: Object to</p> <p>10 form and scope.</p> <p>11 <b>A. You are right. I think I, no, didn't</b></p> <p>12 <b>discuss the charge cut-off voltage of the battery</b></p> <p>13 <b>above 4.2 volts.</b></p> <p>14 Q. (BY MR. COLIN) Okay. In paragraph 77</p> <p>15 you cite a portion of Guyomard which indicates</p> <p>16 "there was no significant loss of cell capacity</p> <p>17 verifying the high voltage stability of the</p> <p>18 electrolyte. The ability of the electrolyte to</p> <p>19 extend the cycle life was batteries was amply</p> <p>20 demonstrated by the remarkable fact that the cell</p> <p>21 capacities after 500 cycles was only about 10</p> <p>22 percent less than after five cycles." And you</p>                                                                         | <p>108</p> <p>1 <b>five cycles.</b></p> <p>2 Q. (BY MR. COLIN) Commercial batteries are</p> <p>3 cycled several times before being sold to</p> <p>4 customers; correct?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form.</p> <p>7 <b>A. Yeah. Commercial batteries goes through</b></p> <p>8 <b>a formation cycle. And, you know, typically one</b></p> <p>9 <b>or two cycles of slow rate. And factories are</b></p> <p>10 <b>trying to minimize the time to reduce the cost for</b></p> <p>11 <b>the formation process. So I don't think five</b></p> <p>12 <b>cycles can be considered the formation process.</b></p> <p>13 Q. (BY MR. COLIN) You provide no opinion in</p> <p>14 your declaration concerning whether cycling should</p> <p>15 be measured preformation or postformation with</p> <p>16 respect to the claims; correct?</p> <p>17 <b>A. I think that's correct.</b></p> <p>18 Q. Manufacturers report the capacity of</p> <p>19 batteries as the postformation capacity; correct?</p> <p>20 MR. STAMATOPOULOS: Object to</p> <p>21 form.</p> <p>22 <b>A. I think that's correct.</b></p>                                                                                       |

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| <p style="text-align: right;">109</p> <p>1 Q. (BY MR. COLIN) And you don't provide any<br/>2 opinion in your declaration that the capacity of<br/>3 the first cycle is required to determine whether a<br/>4 reference teaches the capacity loss percentage of<br/>5 the dependent claims; correct?<br/>6 MR. STAMATOPOULOS: Object to<br/>7 form.<br/>8 <b>A. That's correct.</b><br/>9 Q. (BY MR. COLIN) You criticize Guyomard in<br/>10 paragraph 78 for not specifying the details of<br/>11 charging and discharging conditions such as<br/>12 current; correct?<br/>13 <b>A. That's correct.</b><br/>14 Q. But the patent, the '641 patent also does<br/>15 not disclose the details of the charging or<br/>16 discharging conditions for any of the examples;<br/>17 correct?<br/>18 MR. STAMATOPOULOS: Object to<br/>19 form.<br/>20 <b>A. Well, I have an opinion on Guyomard</b><br/>21 <b>patent. I was not asked to form opinion on '641</b><br/>22 <b>patent.</b></p> | <p style="text-align: right;">111</p> <p>1 <b>A. You are correct.</b><br/>2 Q. (BY MR. COLIN) And the '641 patent does<br/>3 not provide any details concerning the cathode<br/>4 after 400 cycles other than the cycling capacity<br/>5 loss; correct?<br/>6 MR. STAMATOPOULOS: Object to<br/>7 form. Scope.<br/>8 <b>A. I would assume they are comparing the</b><br/>9 <b>first, you know, cycle after formation. They did</b><br/>10 <b>the measure the first – fifth cycle. So this is,</b><br/>11 <b>you know, different from the Guyomard patent.</b><br/>12 Q. (BY MR. COLIN) You provide no opinions<br/>13 on whether cycling in the patent suit was from the<br/>14 very first cycle or after formation; correct?<br/>15 That's not in your declaration?<br/>16 MR. STAMATOPOULOS: Object to<br/>17 form.<br/>18 <b>A. So in my Apple claim construction, page</b><br/>19 <b>203, paragraph 30 – 74, I do provide – you know,</b><br/>20 <b>I state the battery manufacturer determines how</b><br/>21 <b>much of the battery's initial capacity is retained</b><br/>22 <b>and the success for charge cycles using basic</b></p>                                |
| <p style="text-align: right;">110</p> <p>1 Q. (BY MR. COLIN) Well, I'm asking you<br/>2 sitting here today, I mean, you criticized<br/>3 Guyomard for not specifying charge and discharge<br/>4 conditions such as the current; but there's no<br/>5 more details in the patent in suit on those<br/>6 conditions. Correct?<br/>7 MR. STAMATOPOULOS: Object to<br/>8 form.<br/>9 <b>A. Can you clarify? What do you mean, "in</b><br/>10 <b>suit"?</b><br/>11 Q. (BY MR. COLIN) The '641 patent does not<br/>12 specify the charge or discharge conditions for<br/>13 cycling; correct?<br/>14 MR. STAMATOPOULOS: Object to<br/>15 form.<br/>16 <b>A. I think so.</b><br/>17 Q. (BY MR. COLIN) Just to be clear, you're<br/>18 agreeing with me that the '641 patent does not<br/>19 specify the charge or discharge conditions for<br/>20 cycling; correct?<br/>21 MR. STAMATOPOULOS: Objection.<br/>22 Form.</p>                                                                  | <p style="text-align: right;">112</p> <p>1 <b>math, as can be seen in the ratio below. The</b><br/>2 <b>remaining capacity divided by initial capacity.</b><br/>3 <b>So I assume, the – you know, the</b><br/>4 <b>comparison should be compared to initial capacity.</b><br/>5 <b>So that's why opinion –</b><br/>6 Q. (BY MR. COLIN) Okay. So just to be<br/>7 clear, in your Apple declaration, Exhibit 2022, in<br/>8 paragraph 74, it's your opinion that initial<br/>9 capacity should be determined from the first<br/>10 cycle?<br/>11 <b>A. That's correct.</b><br/>12 Q. Okay. And in your IPR declaration you<br/>13 don't provide the board with any opinions on<br/>14 whether the initial capacity should be measured<br/>15 from the first cycle or after formation; correct?<br/>16 <b>A. I have the same opinion as what we have</b><br/>17 <b>in the claim construction.</b><br/>18 Q. I understand what you're telling me<br/>19 today. I understand that. I'm just saying, in<br/>20 your IPR declaration to the board, you didn't<br/>21 provide any opinions on whether initial capacity<br/>22 should be measured from the first cycle or after</p> |

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| <p>113</p> <p>1 formation; correct?</p> <p>2 MR. STAMATOPOULOS: Object to</p> <p>3 form.</p> <p>4 <b>A. No, I was not asked to form opinion on</b></p> <p>5 <b>that.</b></p> <p>6 Q. (BY MR. COLIN) Okay. You provide no</p> <p>7 opinions in your IPR declaration concerning the</p> <p>8 board's institution decision; correct?</p> <p>9 MR. STAMATOPOULOS: Object to</p> <p>10 form.</p> <p>11 <b>A. Can you repeat again?</b></p> <p>12 Q. (BY MR. COLIN) Yeah. I'm just trying to</p> <p>13 clarify. You provided no opinions -- and I have</p> <p>14 not seen any in your declaration. So I'm not --</p> <p>15 again, I'm not trying to trick you. I'm just</p> <p>16 making sure, trying to get --</p> <p>17 <b>A. Okay.</b></p> <p>18 Q. -- a clear record -- you provided no</p> <p>19 response in your IPR declaration concerning the</p> <p>20 board's findings in the institution decision for</p> <p>21 the IPR proceedings; correct?</p> <p>22 MR. STAMATOPOULOS: Object --</p>                                                    | <p>115</p> <p>1 that.</p> <p>2 My question was simply, are you aware</p> <p>3 that the board rejected RJ Technology's argument</p> <p>4 that the prior art cautioned against raising the</p> <p>5 cut-off voltage in the institution decision?</p> <p>6 MR. STAMATOPOULOS: Object to</p> <p>7 form.</p> <p>8 Q. (BY MR. COLIN) I could direct you to</p> <p>9 page 20 if you're trying to find the statement.</p> <p>10 In the first paragraph on the top the</p> <p>11 board indicated "on this record we are not</p> <p>12 persuaded that Uemura or the prior art as a whole</p> <p>13 teaches against using a charge cut-off voltage of</p> <p>14 4.3 volts anymore"; correct? Do you see that?</p> <p>15 <b>A. Yes, I do.</b></p> <p>16 Q. And you provided no opinions responding</p> <p>17 specifically to the board's finding in the</p> <p>18 institution decision; correct?</p> <p>19 MR. STAMATOPOULOS: Object.</p> <p>20 <b>A. To answer your question, you are correct</b></p> <p>21 <b>I didn't provide opinion on the institution</b></p> <p>22 <b>decision; but I do provide my opinion related to</b></p>     |
| <p>114</p> <p>1 <b>A. Yes.</b></p> <p>2 MR. STAMATOPOULOS: -- to form.</p> <p>3 Q. (BY MR. COLIN) Are you aware that the</p> <p>4 board rejected RJ Technology's argument that the</p> <p>5 prior art cautioned against raising the charge</p> <p>6 cut-off voltage in the institution decision?</p> <p>7 MR. STAMATOPOULOS: Object to</p> <p>8 form.</p> <p>9 <b>A. Which exhibit do you refer to?</b></p> <p>10 Q. (BY MR. COLIN) Would you like me to give</p> <p>11 it to you?</p> <p>12 <b>A. Is that in the exhibits? Yeah.</b></p> <p>13 Q. Not yet.</p> <p>14 <b>A. Yeah.</b></p> <p>15 Q. I can introduce it. This is already</p> <p>16 marked by paper number 10, which is the board's</p> <p>17 institution decision. And you already testified</p> <p>18 before you provided no opinions on your</p> <p>19 institution decision in your declaration.</p> <p>20 And my question was simply, are you aware</p> <p>21 that the board rejected RJ Technology's argument</p> <p>22 that the charge cut-off voltage -- let me rephrase</p> | <p>116</p> <p>1 <b>the topic you mention in the paragraph 117 and the</b></p> <p>2 <b>-- to 119 of my declaration, related the same</b></p> <p>3 <b>measure.</b></p> <p>4 Q. (BY MR. COLIN) Okay. So in the Apple</p> <p>5 litigation RJ Technology did not include the word</p> <p>6 "theoretic" or "theoretical" in its proposed</p> <p>7 construction; correct?</p> <p>8 MR. STAMATOPOULOS: Object to</p> <p>9 form.</p> <p>10 MR. COLIN: Let me rephrase that.</p> <p>11 Q. (BY MR. COLIN) In the Apple litigation,</p> <p>12 RJ Technology did not include the word "theoretic"</p> <p>13 or "theoretical" in its proposed construction of</p> <p>14 the capacity ratio limitation; correct?</p> <p>15 MR. STAMATOPOULOS: Same</p> <p>16 objection.</p> <p>17 <b>A. In the Apple claim construction, Exhibit</b></p> <p>18 <b>2022, you're correct that it didn't provide</b></p> <p>19 <b>theoretical, but I think the understanding is that</b></p> <p>20 <b>here the meaning is theoretical capacity. This is</b></p> <p>21 <b>referred to in the paragraph 41 which I state I</b></p> <p>22 <b>agree that --</b></p> |

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| <p>117</p> <p>1 Q. (BY MR. COLIN) Dr. Yao, you keep<br/>2 answering your own questions rather than the one I<br/>3 asked. Please respond to the questions. Your<br/>4 counsel could ask all your opinions on everything<br/>5 else.<br/>6 <b>A. Hm-hm.</b><br/>7 Q. But please respond to the questions.<br/>8 MR. STAMATOPOULOS: Please don't<br/>9 interrupt the witness.<br/>10 MR. COLIN: The witness is<br/>11 providing nonresponsive answers all day long,<br/>12 largely refusing to answer my questions.<br/>13 MR. STAMATOPOULOS: That is your<br/>14 view. Please don't interrupt the witness. You<br/>15 can move to strike at an appropriate time if you<br/>16 want.<br/>17 MR. COLIN: He's wasting the time<br/>18 on the record. He's been doing it all day. We<br/>19 may need to seek extra time if this keeps going.<br/>20 MR. STAMATOPOULOS: You are<br/>21 welcome to call the board and seek extra time.<br/>22 We're going to oppose that request.</p> | <p>119</p> <p>1 correct?<br/>2 <b>A. I think I already answered earlier. This<br/>3 is just not -- no, sir, I didn't in the claim<br/>4 litigation.</b><br/>5 Q. And you agreed with RJ Technology's<br/>6 proposed construction for the capacity ratio<br/>7 limitation in the Apple litigation; correct?<br/>8 MR. STAMATOPOULOS: Object to<br/>9 form.<br/>10 <b>A. I think there should have been a<br/>11 theoretical capacity there. I think that's what<br/>12 was adopted in the Samsung IPR declaration.</b><br/>13 Q. (BY MR. COLIN) Dr. Yao, the court<br/>14 construed the capacity ratio limitation without<br/>15 the word "theoretic" or "theoretical" in it;<br/>16 correct?<br/>17 <b>A. You are right, there is no "theoretical"<br/>18 in the claim construction. But from all the<br/>19 paragraphs forwarding in this claim construction,<br/>20 I think it was referring to theoretic capacity<br/>21 instead of just capacity. There are several<br/>22 places to support this claim because in paragraph</b></p>                |
| <p>118</p> <p>1 MR. COLIN: I understand.<br/>2 MR. STAMATOPOULOS: In the<br/>3 meantime, let him answer his -- provide his<br/>4 answer --<br/>5 MR. COLIN: He already answered<br/>6 the question.<br/>7 MR. STAMATOPOULOS: Have you<br/>8 finished your answer, Doctor?<br/>9 MR. COLIN: You're not asking him<br/>10 questions, Counsel.<br/>11 MR. STAMATOPOULOS: You're not<br/>12 going to interrupt him. You're not going to<br/>13 interrupt him, Jeff. He's entitled to finish his<br/>14 answers. You're entitled to object to those<br/>15 answers.<br/>16 MR. COLIN: Counsel, you're now<br/>17 wasting my time as well.<br/>18 MR. STAMATOPOULOS: All right.<br/>19 Q. (BY MR. COLIN) Dr. Yao, RJ Technology<br/>20 did not include the word "theoretic" or<br/>21 "theoretical" in its proposed construction for the<br/>22 capacity ratio limitation in the Apple litigation;</p>                                                                               | <p>120</p> <p>1 <b>41 it says -- specific says just, you know, the<br/>2 battery's theoretic capacity.</b><br/>3 <b>Also, in the end of the paragraph 45, a<br/>4 POSA would understand this is as a theoretic<br/>5 capacity of the material at the stated voltage.<br/>6 If it's not referring to theoretic capacity,<br/>7 there's no way for a POSA to calculate a capacity<br/>8 at that voltage. It's obvious it should refer to<br/>9 theoretical capacity. That's my opinion.</b><br/>10 Q. (BY MR. COLIN) Dr. Yao, if you could<br/>11 turn to the court's claim construction order which<br/>12 is already marked as Exhibit 2010. You have it in<br/>13 front of you.<br/>14 <b>A. Yes.</b><br/>15 Q. If you turn to the next-to-last page of<br/>16 the decision, it's page 31 of 32. Are you there?<br/>17 <b>A. Yes.</b><br/>18 Q. Okay. This page, you agree with me, has<br/>19 the Central District of California's claim<br/>20 construction for the capacity ratio limitation in<br/>21 the term number 2?<br/>22 <b>A. Yes.</b></p> |

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| <p>121</p> <p>1 Q. And the district court construed the</p> <p>2 claim as the ratio calculated as the product of</p> <p>3 the capacity of the cathode active material per</p> <p>4 mass unit and the amount of cathode active</p> <p>5 material in the same mass unit divided by the</p> <p>6 product of the capacity of the anode active</p> <p>7 material per mass unit and amount of the anode</p> <p>8 active material in the same mass unit when the</p> <p>9 charge cut-off voltage is 4.2; correct?</p> <p>10 <b>A. Yes.</b></p> <p>11 Q. Okay. The court's construction for the</p> <p>12 capacity ratio limitation does not include the</p> <p>13 word "theoretic" or "theoretical"; correct?</p> <p>14 <b>A. Yes.</b></p> <p>15 Q. In your opinion to the board and the</p> <p>16 claim construction you apply in the IPR, you</p> <p>17 require capacity to be theoretic capacity;</p> <p>18 correct?</p> <p>19 <b>A. Yes.</b></p> <p>20 Q. In paragraphs 98 to 114, you provide your</p> <p>21 opinions on claim construction for this term in</p> <p>22 the IPR; correct?</p> | <p>123</p> <p>1 is not a capacity under the claim construction for</p> <p>2 the capacity ratio limitation?</p> <p>3 <b>A. That's correct. Because measured</b></p> <p>4 <b>capacity depends on many testing conditions. It's</b></p> <p>5 <b>very hard for – you know, for the POSA to design</b></p> <p>6 <b>a battery.</b></p> <p>7 Q. Okay. An actual capacity or measured</p> <p>8 capacity is the same understanding; right?</p> <p>9 MR. STAMATOPOULOS: Object to</p> <p>10 form.</p> <p>11 <b>A. Say it again?</b></p> <p>12 Q. (BY MR. COLIN) So in your opinion, an</p> <p>13 actual capacity is not the capacity under the</p> <p>14 claim construction; correct?</p> <p>15 MR. STAMATOPOULOS: Object to</p> <p>16 form.</p> <p>17 <b>A. No. I think the claim is referring to</b></p> <p>18 <b>theoretical capacity.</b></p> <p>19 Q. (BY MR. COLIN) Okay. So if you turn to</p> <p>20 column 1, lines 42 to 44 of the '641 patent.</p> <p>21 <b>A. Which column?</b></p> <p>22 Q. Column 1, lines 40 to 44.</p>                                                                                                                                 |
| <p>122</p> <p>1 <b>A. Which paragraph?</b></p> <p>2 Q. 98 to 114 of your declaration for the</p> <p>3 IPR.</p> <p>4 <b>A. Yes. That's correct.</b></p> <p>5 Q. So in this section, you cite to the</p> <p>6 patent only twice; correct? In paragraph 100 and</p> <p>7 paragraph 110?</p> <p>8 <b>A. That's correct.</b></p> <p>9 Q. Okay. In paragraph 100 you cite to</p> <p>10 column 8, lines 50 to 55, which is the portion of</p> <p>11 the specification that refers to the negative</p> <p>12 electrode; correct?</p> <p>13 <b>A. That's correct.</b></p> <p>14 Q. Okay. And in paragraph 110 you cite to</p> <p>15 the language of Claim 5?</p> <p>16 <b>A. That's correct.</b></p> <p>17 Q. Okay. You don't cite to any other</p> <p>18 intrinsic evidence in support of your proposed</p> <p>19 claim construction in your IPR declaration;</p> <p>20 correct?</p> <p>21 <b>A. That's correct.</b></p> <p>22 Q. So in your opinion, a measured capacity</p>                                                                                                                      | <p>124</p> <p>1 <b>A. Okay.</b></p> <p>2 Q. Okay. And you see where the patent says,</p> <p>3 "For lithium cobalt oxides as a positive electrode</p> <p>4 material with secondary lithium ion cell has a</p> <p>5 theoretical capacity of 248 milliamp-hours per</p> <p>6 gram or the actually used capacity of it is merely</p> <p>7 about 140 milliamp-hours per gram -- i.e., about</p> <p>8 half of said theoretic capacity -- is not</p> <p>9 utilized." Do you see that?</p> <p>10 <b>A. Yes.</b></p> <p>11 Q. Okay. So it's your opinion that if you</p> <p>12 refer to actually used capacity for a material,</p> <p>13 that doesn't fall under the claim construction for</p> <p>14 the capacity ratio limitation; correct?</p> <p>15 MR. STAMATOPOULOS: Object to</p> <p>16 form.</p> <p>17 <b>A. I do not see the connection of this place</b></p> <p>18 <b>with the claim file. But you are right. I think</b></p> <p>19 <b>the theoretical capacity in Claim 5.</b></p> <p>20 Q. (BY MR. COLIN) Okay. And in the bottom</p> <p>21 of column 1 in the '641 patent around lines 65 to</p> <p>22 67, the patent indicates "the charge cut-off</p> |

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| <p style="text-align: right;">125</p> <p>1 voltage is limited to below 4.2 volts, and the<br/>2 actual capacity is 120 to 140 milliamp-hours per<br/>3 gram -- i.e., if you have 50 percent of the<br/>4 theoretic capacity is not -- is not the<br/>5 capacity."<br/>6 So, again, when the patent specification<br/>7 is talking about actual capacity, that's not a<br/>8 theoretic capacity at 4.2 volts; correct?<br/>9 MR. STAMATOPOULOS: Object to<br/>10 form.<br/>11 <b>A. The capacity, it needs to be better</b><br/>12 <b>defined. That's what I put in my opinion in</b><br/>13 <b>paragraph 104. So basically I have three distinct</b><br/>14 <b>types of capacity for an electrode: Theoretical</b><br/>15 <b>maximum capacity, theoretical capacity at 4.2</b><br/>16 <b>volt, and the practical specific capacity.</b><br/>17 So what you're referring here I think is<br/>18 that talking about in the top actual capacity<br/>19 that's for in the category of practical specific<br/>20 capacity, it's experimental matter. So that's not<br/>21 the theoretical capacity or not the theoretical<br/>22 maximum capacity.</p> | <p style="text-align: right;">127</p> <p>1 My question is simply, you don't cite<br/>2 anywhere in the '641 patent where it provides an<br/>3 example or a teaching of how to determine the<br/>4 theoretic capacity of 4.2 volts for any material;<br/>5 correct?<br/>6 MR. STAMATOPOULOS: Object to<br/>7 form.<br/>8 <b>A. I didn't cite any in the '641 patent,</b><br/>9 <b>that's correct.</b><br/>10 Q. (BY MR. COLIN) In your opinion, a design<br/>11 capacity is not a capacity under the claim<br/>12 construction?<br/>13 MR. STAMATOPOULOS: Object to<br/>14 form.<br/>15 <b>A. Can you point me to where I have this in</b><br/>16 <b>my declaration, regarding design capacity?</b><br/>17 Q. (BY MR. COLIN) Well, Abe refers to<br/>18 design capacity; correct?<br/>19 <b>A. Yes.</b><br/>20 Q. Okay. And it's your opinion that the<br/>21 design capacity of Abe is not the claim capacity;<br/>22 correct?</p>                                                                                                                                                                                                                    |
| <p style="text-align: right;">126</p> <p>1 Q. (BY MR. COLIN) Okay. You cite nothing<br/>2 in the '641 patent as providing an example of a<br/>3 material with a theoretic capacity of 4.2 volts in<br/>4 your declaration; correct?<br/>5 MR. STAMATOPOULOS: Object to<br/>6 form.<br/>7 <b>A. Can you repeat?</b><br/>8 Q. (BY MR. COLIN) Right. You don't cite<br/>9 anywhere in the '641 patent where it provides an<br/>10 example of how to determine a theoretic capacity<br/>11 of 4.2 volts for any material; correct?<br/>12 MR. STAMATOPOULOS: Object to<br/>13 form.<br/>14 <b>A. I think I, you know, talk about provide</b><br/>15 <b>opinion on my -- on the specific parity of 4.2</b><br/>16 <b>volts for lithium cobalt oxide is about 177 medium</b><br/>17 <b>power -- 170 -- 177 medium power per gram. That's</b><br/>18 <b>in the paragraph 0009 on my deposition.</b><br/>19 Q. (BY MR. COLIN) Right. But I'm asking<br/>20 you a specific question. That's not my question.<br/>21 I understand you have your opinions on how you<br/>22 calculate a theoretic capacity of 4.2 volts.</p>                                 | <p style="text-align: right;">128</p> <p>1 <b>A. You are correct. In paragraph 202, I</b><br/>2 <b>said because Abe's design capacity is determined</b><br/>3 <b>is lower voltage than the voltage used to</b><br/>4 <b>determine the capacity of the cathode depending on</b><br/>5 <b>the cathode material, Abe's design capacity is</b><br/>6 <b>likely lower than the theoretical capacity of the</b><br/>7 <b>claim material at the 4.2 volt, which is Claim 5.</b><br/>8 Q. All right. That's a little bit different<br/>9 than my question, though, sir. I'm just asking,<br/>10 it's your opinion that design capacity of Abe,<br/>11 which is determined by actually measuring values<br/>12 using a three electrode cell, does not provide you<br/>13 with theoretic capacity of 4.2 volts; correct?<br/>14 MR. STAMATOPOULOS: Object to<br/>15 form.<br/>16 <b>A. You are right.</b><br/>17 Q. (BY MR. COLIN) Okay. If you turn back<br/>18 to your Apple claim construction declaration, the<br/>19 first one, Exhibit 2022. Please turn to paragraph<br/>20 47.<br/>21 <b>A. Yes.</b><br/>22 Q. Okay. So you told the district court</p> |

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| <p>129</p> <p>1 that the '641 patent defines theoretic capacity of<br/>2 the positive electrode to mean, and in quotes,<br/>3 "the capacities of the positive electrode," dot<br/>4 dot dot, "calculated with the charge cut-off<br/>5 voltage set at 4.2 volts"; correct?<br/>6 <b>A. Yes.</b><br/>7 Q. Okay. And you cite the '641 patent at<br/>8 column 4, lines 5 to 9?<br/>9 <b>A. Yes.</b><br/>10 Q. Okay. And you state, "the specification<br/>11 here does not say it is the theoretical maximum<br/>12 but the capacity at 4.2 volts"?<br/>13 <b>A. Yes.</b><br/>14 Q. Okay. So if we turn back to the patent<br/>15 in suit, at column 4, lines 5 to 9 -- let me<br/>16 strike that.<br/>17 You don't provide -- let me start over.<br/>18 You don't tell the board anywhere in your<br/>19 IPR declaration that the patent defines the term<br/>20 "theoretical capacity;" correct?<br/>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p>                                                                                                                                         | <p>131</p> <p>1 <b>A. Is there any difference? Just two -- I</b><br/>2 <b>didn't see the difference. Can you repeat the</b><br/>3 <b>question?</b><br/>4 Q. You didn't tell the district court that<br/>5 the '641 patent defines the term "theoretic<br/>6 capacity" to include the word "theoretic";<br/>7 correct?<br/>8 MR. STAMATOPOULOS: Object to<br/>9 form.<br/>10 <b>A. From the context we can understand the</b><br/>11 <b>capacity should refer to theoretic capacity. Yes.</b><br/>12 <b>It's not -- we didn't have that word in the claim</b><br/>13 <b>construction, but from the context of the claim</b><br/>14 <b>construction, we understand that it's theoretic</b><br/>15 <b>capacity.</b><br/>16 Q. You specifically argued to the court that<br/>17 "theoretic" should not be included in the<br/>18 construction; correct?<br/>19 <b>A. No. That's not correct.</b><br/>20 Q. All right. Turn to your second Apple<br/>21 declaration, which we marked earlier in this<br/>22 deposition as Exhibit 1036, in paragraph 9.</p> |
| <p>130</p> <p>1 <b>A. No, I didn't.</b><br/>2 Q. (BY MR. COLIN) Okay.<br/>3 <b>A. I assume it's common knowledge in the</b><br/>4 <b>field for POSA. The -- you know, calculate, how</b><br/>5 <b>you calculate the definition of this capacity are</b><br/>6 <b>known to the POSA in the -- at that time.</b><br/>7 Q. So you told the district court that the<br/>8 patent defines theoretical capacity to mean the<br/>9 capacity calculated with the charge cut-off<br/>10 voltage set at 4.25 -- 4.2 volts; correct?<br/>11 <b>A. Can you say again?</b><br/>12 Q. You told the district court that the<br/>13 patent defines theoretic capacity of the positive<br/>14 electrode to mean the capacity of the positive<br/>15 electrode calculated with the charge cut-off<br/>16 voltage set at 4.2 volts; correct?<br/>17 <b>A. Yes.</b><br/>18 Q. You didn't tell the court that the patent<br/>19 defines theoretic capacity to mean the theoretic<br/>20 capacity of the positive electrode calculated with<br/>21 the charge cut-off voltage set at 4.2 volts;<br/>22 correct?</p> | <p>132</p> <p>1 So you told the court, "Dr. Horn state<br/>2 that he disagrees that theoretic capacity should<br/>3 be construed as capacity"; correct?<br/>4 <b>A. Yes.</b><br/>5 Q. So Apple wanted the term "theoretic" in<br/>6 the construction; correct?<br/>7 MR. STAMATOPOULOS: Object to<br/>8 form.<br/>9 <b>A. Yes. And I have no objection on that.</b><br/>10 Q. (BY MR. COLIN) Well, here you told the<br/>11 court, "But the '641 patent says the opposite,<br/>12 that theoretical capacities of positive electrode<br/>13 and negative electrode means the capacities" --<br/>14 and "the capacities" is bold italicized -- "of the<br/>15 positive electrode and the negative electrode<br/>16 calculated with a charge cut-off voltage set at<br/>17 4.2 volts"; correct?<br/>18 <b>A. Yes.</b><br/>19 Q. So you argued in that sentence that the<br/>20 '641 patent specifically says "theoretic" should<br/>21 not be included in the construction; correct?<br/>22 MR. STAMATOPOULOS: Object to</p>                              |

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| <p>133</p> <p>1 form.</p> <p>2 <b>A. That's not – that's wrong. As – as I</b></p> <p>3 <b>said, need to be calculate with the charge cut-off</b></p> <p>4 <b>voltage at 4.2 – set at 4.2 volt. If it's not</b></p> <p>5 <b>theoretic capacity, I wouldn't – cannot imagine</b></p> <p>6 <b>how you can calculate. So, therefore, this is</b></p> <p>7 <b>referring to theoretic capacity.</b></p> <p>8 Q. So is it your opinion that if this is not</p> <p>9 limited to theoretic capacity, that a person of</p> <p>10 ordinary skill would not understand how to</p> <p>11 calculate --</p> <p>12 <b>A. A POSA – POSA at that time would</b></p> <p>13 <b>understand, in order to calculate the capacity</b></p> <p>14 <b>only electrode, you would use the theoretic</b></p> <p>15 <b>capacity and the mass of the actual material to do</b></p> <p>16 <b>the calculation.</b></p> <p>17 Q. The portion of the patent spec which you</p> <p>18 said defines theoretic capacity does not include</p> <p>19 the word "theoretic"; correct?</p> <p>20 MR. STAMATOPOULOS: Object to</p> <p>21 form.</p> <p>22 <b>A. Can you repeat the question?</b></p> | <p>135</p> <p>1 Q. (BY MR. COLIN) In paragraph 103 of your</p> <p>2 IPR declaration, you indicate that inactive</p> <p>3 materials do not participate in intercalation and</p> <p>4 de-intercalation; correct?</p> <p>5 <b>A. Which paragraph?</b></p> <p>6 Q. Paragraph 103.</p> <p>7 <b>A. That's correct.</b></p> <p>8 Q. So you agree with me that inactive</p> <p>9 components do not have capacity; correct?</p> <p>10 <b>A. They do not contribute to reversible</b></p> <p>11 <b>capacity; that's correct</b></p> <p>12 Q. Is it your opinion that inactive</p> <p>13 components contribute to irreversible capacity?</p> <p>14 MR. STAMATOPOULOS: Object to</p> <p>15 form.</p> <p>16 <b>A. Yes.</b></p> <p>17 Q. (BY MR. COLIN) By definition, if you're</p> <p>18 saying an inactive component contributes to</p> <p>19 irreversible capacity, isn't that then</p> <p>20 participating in intercalation and</p> <p>21 de-intercalation?</p> <p>22 MR. STAMATOPOULOS: Object to</p>                                                                                     |
| <p>134</p> <p>1 Q. (BY MR. COLIN) When you told the court</p> <p>2 in paragraph 9 that the patent says the opposite,</p> <p>3 you told the court that "theoretical capacities"</p> <p>4 of the positive electrode and negative electrode</p> <p>5 means "the capacities"; correct?</p> <p>6 MR. STAMATOPOULOS: Object to</p> <p>7 form.</p> <p>8 <b>A. "The capacity" here is a general term.</b></p> <p>9 <b>It didn't distinguish. But I think it's referring</b></p> <p>10 <b>to theoretic capacity.</b></p> <p>11 Q. (BY MR. COLIN) Theoretic capacity is a</p> <p>12 type of capacity; correct?</p> <p>13 <b>A. Yes.</b></p> <p>14 Q. Practical specific capacity is a type of</p> <p>15 capacity?</p> <p>16 <b>A. That's correct.</b></p> <p>17 Q. But in your analysis, a practical</p> <p>18 specific capacity does not meet the court's claim</p> <p>19 construction; correct?</p> <p>20 MR. STAMATOPOULOS: Object to</p> <p>21 form.</p> <p>22 <b>A. You are correct.</b></p>                                                                                                                                                                | <p>136</p> <p>1 form.</p> <p>2 <b>A. Yeah. Inactive material does not</b></p> <p>3 <b>participate in intercalation and de-intercalation.</b></p> <p>4 <b>At least not in the reversible fashion.</b></p> <p>5 Q. (BY MR. COLIN) So it's your opinion that</p> <p>6 inactive components contribute to irreversible</p> <p>7 capacity?</p> <p>8 <b>A. Inactive – inactive material does not</b></p> <p>9 <b>contribute to reversible capacity.</b></p> <p>10 Q. That's not my question, sir. My question</p> <p>11 is, it's your opinion or you're telling the board</p> <p>12 is that inactive materials will react with lithium</p> <p>13 and contribute to irreversible capacity?</p> <p>14 MR. STAMATOPOULOS: Object to</p> <p>15 form.</p> <p>16 <b>A. Are you saying irreversible capacity?</b></p> <p>17 <b>Yes.</b></p> <p>18 Q. (BY MR. COLIN) You don't cite any</p> <p>19 reference, any literature, anything to support</p> <p>20 that opinion; correct?</p> <p>21 <b>A. That's what I teach in my class. That's</b></p> <p>22 <b>common knowledge to the POSA.</b></p> |

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| <p>137</p> <p>1 Q. If you turn to your first Apple IPR<br/>2 declaration. It's in Exhibit 2022 at paragraph<br/>3 53.<br/>4 A. Yes.<br/>5 Q. You previously stated that there are<br/>6 active components and inactive components;<br/>7 correct?<br/>8 A. I see I have active components here in<br/>9 the paragraph 53. Where do I say inactive<br/>10 components?<br/>11 Q. "Inert" means inactive; correct?<br/>12 A. Say it again.<br/>13 Q. "Inert" means inactive?<br/>14 MR. STAMATOPOULOS: Object to<br/>15 form.<br/>16 A. Inert, as in here, include inactive, but<br/>17 not only -- yeah, inert components include<br/>18 inactive components.<br/>19 Q. (BY MR. COLIN) Okay. And you stated<br/>20 "inert components perform necessary nonreaction<br/>21 functions"; correct?<br/>22 A. That's correct.</p>                                                                                       | <p>139</p> <p>1 the lithium ions that material extracted from the<br/>2 cathode, X equals .5, and so the theoretic<br/>3 capacity of 4.2 volts," which is the claim of<br/>4 Claim 5 of the '641 patent for lithium cobalt<br/>5 oxide 137 milliamp-hours. So X is .5 for -- when<br/>6 the theoretic capacity of 4.2 volts, which is in<br/>7 Claim 5.<br/>8 Q. (BY MR. COLIN) Dr. Yao, that didn't<br/>9 answer my question at all. I said show me at all<br/>10 where in your declaration you cite the '641 patent<br/>11 as demonstrating an X value.<br/>12 A. I think that's referring the same thing<br/>13 here. In paragraph 109, lithium cobalt oxide 4.2<br/>14 volt is X.5. It's the same thing we're referring<br/>15 to in the '641 patent.<br/>16 Q. Doctor --<br/>17 A. We didn't cite. We didn't cite. But,<br/>18 you know, that's -- we didn't have to cite, I<br/>19 think.<br/>20 Q. You cannot cite anything in the '641<br/>21 patent that describes an X value; correct?<br/>22 A. So in the '641 patent, column 1, the</p>                                                  |
| <p>138</p> <p>1 Q. In paragraph 105 of your declaration for<br/>2 the IPR, you refer to an X value, correct? "X" in<br/>3 quotations.<br/>4 A. That's correct.<br/>5 Q. Okay. And you call that a lithium<br/>6 extraction coefficient?<br/>7 A. To be more accurate, is the number of<br/>8 lithium ions extracted from lithium cobalt per<br/>9 formula unit, of lithium cobalt --<br/>10 Q. Okay. Do you call the X number anything<br/>11 else, or if I just say X value, that's how you<br/>12 refer to it?<br/>13 A. Yes.<br/>14 Q. Okay. So the '641 patent does not refer<br/>15 to any X value; correct?<br/>16 A. That's not correct.<br/>17 Q. Show me in your declaration where you<br/>18 point out the '641 patent showing an X value.<br/>19 MR. STAMATOPOULOS: Object to<br/>20 form.<br/>21 A. So in paragraph 109, I said, "Lithium<br/>22 cobalt oxide 4.2 volts, it's known that half of</p> | <p>140</p> <p>1 bottom, I think the sentence lines 66-67. So they<br/>2 refer to the -- to lithium cobalt oxide that is<br/>3 used as positive electrode material in the most<br/>4 commercial lithium ion batteries, the charge<br/>5 cut-off voltage limited to below 4.2 volts and the<br/>6 actual capacity 120 to 140 milliamp-hour per gram,<br/>7 i.e., about 50 percent of theoretic capacity.<br/>8 So from here the description is about,<br/>9 you know, 120 to 140. I think that's referring to<br/>10 137 milliamp-hour one, which described in<br/>11 paragraph 109 of my declaration. And the 50<br/>12 percent actually indicated X equals .5 as the X<br/>13 value here.<br/>14 Q. Dr. Yao, you testified earlier today that<br/>15 that same portion of the spec is referring to an<br/>16 actual capacity of 120 to 140 milliamp-hours per<br/>17 gram, not a theoretic capacity of 4.2 volts;<br/>18 correct?<br/>19 A. Yes.<br/>20 Q. Okay. Dr. Yao, how did it become well<br/>21 known that half of the lithium atoms are extracted<br/>22 from the cathode at 4.2 volts?</p> |

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| <p>141</p> <p>1 MR. STAMATOPOULOS: Object to</p> <p>2 form.</p> <p>3 <b>A. I think people perform experiments,</b></p> <p>4 <b>charge the battery to 4.2 volts lithium cobalt</b></p> <p>5 <b>oxide, and they can measure how much missing</b></p> <p>6 <b>retaining the cathode actual material. Then from</b></p> <p>7 <b>experimental they discovered this charge cut-off</b></p> <p>8 <b>voltage at 4.2 volt is about 50 percent lithium</b></p> <p>9 <b>extracted and 50 percent lithium remaining in the</b></p> <p>10 <b>cathode material.</b></p> <p>11 Q. (BY MR. COLIN) Okay. So experiments</p> <p>12 need to be performed to derive an X factor;</p> <p>13 correct?</p> <p>14 MR. STAMATOPOULOS: Object to</p> <p>15 form.</p> <p>16 <b>A. People reporting in the literature, and</b></p> <p>17 <b>it's become accepted knowledge in the field. You</b></p> <p>18 <b>don't need to repeat every time. It's become</b></p> <p>19 <b>knowledge. Yeah.</b></p> <p>20 Q. (BY MR. COLIN) Okay. X is not</p> <p>21 determined based on some calculation; correct?</p> <p>22 It's based on people in the field performing</p> | <p>143</p> <p>1 MR. COLIN: Sure.</p> <p>2 MR. STAMATOPOULOS: -- whenever</p> <p>3 you feel --</p> <p>4 MR. COLIN: Let's go off the</p> <p>5 record.</p> <p>6 THE VIDEOGRAPHER: Off the record</p> <p>7 at 2:28 p.m.</p> <p>8 (Recess from 2:28 p.m. to 2:40 p.m.)</p> <p>9 THE VIDEOGRAPHER: The time is</p> <p>10 2:40 p.m., and we're back on the record.</p> <p>11 Q. (BY MR. COLIN) Dr. Yao, you received</p> <p>12 your bachelor's degree in 2000?</p> <p>13 <b>A. That's correct.</b></p> <p>14 Q. Okay. And you completed your master's</p> <p>15 degree in 2003?</p> <p>16 <b>A. Correct.</b></p> <p>17 Q. Okay. When did you start working with</p> <p>18 lithium ion batteries?</p> <p>19 <b>A. I started working on lithium ion</b></p> <p>20 <b>batteries in 2010 at Stanford University.</b></p> <p>21 Q. Okay. So in paragraph 6 of your</p> <p>22 declaration, when you say "more than 13 years I've</p>                                                                                                                                                                                                  |
| <p>142</p> <p>1 experiments?</p> <p>2 MR. STAMATOPOULOS: Object to</p> <p>3 form.</p> <p>4 <b>A. Yes.</b></p> <p>5 Q. (BY MR. COLIN) Okay. And you can't tell</p> <p>6 me an X value for an unknown material; correct?</p> <p>7 If you develop a new cathode material, brand-new</p> <p>8 material, you can't just tell me an X factor</p> <p>9 without doing the experiments; correct?</p> <p>10 <b>A. You are correct.</b></p> <p>11 Q. And for -- if you create a material that</p> <p>12 is doped, you can't figure out an X factor without</p> <p>13 doing the experiments; correct?</p> <p>14 MR. STAMATOPOULOS: Object to</p> <p>15 form.</p> <p>16 <b>A. You need do experiment. But some people</b></p> <p>17 <b>write down the experiment, you can rely on their</b></p> <p>18 <b>data to predict.</b></p> <p>19 MR. STAMATOPOULOS: Not to</p> <p>20 interrupt you, Jeff, but we've been going for</p> <p>21 about an hour and a half. I don't know if it's a</p> <p>22 good time for a break, but --</p>                                                                                                                 | <p>144</p> <p>1 conducted research on lithium ion batteries and</p> <p>2 then taught students about lithium ion batteries</p> <p>3 for over a decade," that work started in 2010?</p> <p>4 <b>A. I started as assistant professor was</b></p> <p>5 <b>2012. But I started working on lithium batteries</b></p> <p>6 <b>starting 2010.</b></p> <p>7 Q. Okay. So you were not a person of</p> <p>8 ordinary skill in the art as of September 2001;</p> <p>9 correct?</p> <p>10 <b>A. I think I more than a person -- POSA.</b></p> <p>11 Q. I think my -- my question is a little bit</p> <p>12 different than that, Dr. Yao. You were not a</p> <p>13 person of ordinary skill in the art in September</p> <p>14 2001; correct? At that time you did not have</p> <p>15 qualifications of a POSITA?</p> <p>16 <b>A. That's correct.</b></p> <p>17 Q. Okay. If you turn to paragraph 64 of</p> <p>18 your declaration.</p> <p>19 <b>A. Yes.</b></p> <p>20 Q. In paragraph 64, you note that Uemura</p> <p>21 teaches that lithium cobalt oxide is unstable</p> <p>22 under an environment where a battery is operated,</p> |

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| <p>145</p> <p>1 citing Uemura at paragraph 6; correct?</p> <p>2 <b>A. Correct.</b></p> <p>3 Q. You provide no analysis in your</p> <p>4 declaration concerning the fact that if Uemura</p> <p>5 only taught a charge cut-off voltage of 4.2 volts</p> <p>6 or less, how lithium cobalt oxide is unstable</p> <p>7 under that environment; correct?</p> <p>8 <b>A. Can you repeat the question?</b></p> <p>9 Q. Sure. You provide no analysis in your</p> <p>10 declaration concerning the fact that if Uemura</p> <p>11 only taught a charge cut-off voltage of 4.2 volts</p> <p>12 or less, how lithium cobalt oxide is unstable in</p> <p>13 that environment; correct?</p> <p>14 MR. STAMATOPOULOS: Object to</p> <p>15 form.</p> <p>16 <b>A. I think Uemura has many type and</b></p> <p>17 <b>different type of cathode material called layer</b></p> <p>18 <b>lithium manganese oxide. But your question is on</b></p> <p>19 <b>lithium cobalt oxide?</b></p> <p>20 Q. (BY MR. COLIN) Right. My question is:</p> <p>21 You cite Uemura as teaching that lithium cobalt</p> <p>22 oxide is unstable under an environment where the</p>                                                                                | <p>147</p> <p>1 unstable under Uemura's conditions; correct?</p> <p>2 MR. STAMATOPOULOS: Object to</p> <p>3 form.</p> <p>4 <b>A. In -- on page 27 of the declaration on</b></p> <p>5 <b>the -- on the paragraph 64, I didn't provide my</b></p> <p>6 <b>opinion on lithium cobalt oxide. What I here</b></p> <p>7 <b>described as Uemura working on to improve lithium</b></p> <p>8 <b>cobalt oxide based material layered structure that</b></p> <p>9 <b>has much higher capacity than the conventional</b></p> <p>10 <b>lithium cobalt oxide based material.</b></p> <p>11 Q. (BY MR. COLIN) Dr. Yao, you cite the</p> <p>12 paragraph in Uemura where he says he uses lithium</p> <p>13 manganese oxide instead of lithium cobalt oxide</p> <p>14 because lithium cobalt oxide is unstable under the</p> <p>15 environment where the battery is operated;</p> <p>16 correct?</p> <p>17 <b>A. Yes. Lithium cobalt oxide is not stable</b></p> <p>18 <b>above 4.2 volt.</b></p> <p>19 Q. And that's why Uemura uses lithium</p> <p>20 manganese oxide; correct?</p> <p>21 <b>A. That's the motivation.</b></p> <p>22 MR. STAMATOPOULOS: Object -- I'm</p> |
| <p>146</p> <p>1 battery is operated, but you provide no analysis</p> <p>2 in your declaration concerning the fact that if</p> <p>3 Uemura only taught a charge cut-off voltage of 4.2</p> <p>4 volts or less, about how lithium cobalt oxide is</p> <p>5 unstable in that environment.</p> <p>6 MR. STAMATOPOULOS: Object to</p> <p>7 form.</p> <p>8 <b>A. Yeah. Your question is very complicated.</b></p> <p>9 <b>I think, you know, we already, not in this</b></p> <p>10 <b>location, but in other location in my declaration</b></p> <p>11 <b>I have talk about, you know, charging 4.2 volt for</b></p> <p>12 <b>lithium cobalt oxide can cause, you know, negative</b></p> <p>13 <b>consequence to the cathode material.</b></p> <p>14 Q. (BY MR. COLIN) I understand that. But</p> <p>15 it's your opinion that Uemura teaches -- does not</p> <p>16 teach a charge cut-off voltage above 4.2 volts;</p> <p>17 correct?</p> <p>18 <b>A. Is my -- you are correct.</b></p> <p>19 Q. All right. So my question is, if Uemura</p> <p>20 does not teach a charge cut-off voltage above 4.2</p> <p>21 volts, you provide no analysis in your declaration</p> <p>22 concerning the fact that lithium cobalt oxide is</p> | <p>148</p> <p>1 sorry, but I need to --</p> <p>2 MR. COLIN: He already answered,</p> <p>3 Counsel.</p> <p>4 MR. STAMATOPOULOS: Okay. That's</p> <p>5 your view --</p> <p>6 MR. COLIN: It's not a view.</p> <p>7 He's already done answering, Counsel.</p> <p>8 MR. STAMATOPOULOS: I'll make my</p> <p>9 objection for the record --</p> <p>10 MR. COLIN: It's not for the</p> <p>11 record because it's already after his answer.</p> <p>12 MR. STAMATOPOULOS: All right.</p> <p>13 Okay.</p> <p>14 MR. COLIN: If you don't like</p> <p>15 what he says, you can't just object.</p> <p>16 MR. STAMATOPOULOS: I have no</p> <p>17 problem with what he said. I just want to make</p> <p>18 sure that I have the time to put in my objections.</p> <p>19 If you don't mind giving me a second before</p> <p>20 starting your answer, can put in my objections.</p> <p>21 In any event, we don't disagree --</p> <p>22 MR. COLIN: We don't need</p>                                                                                                                                                                                                           |

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| <p>149</p> <p>1 speaking objections, Counsel. This is entirely<br/>2 improper.</p> <p>3 MR. STAMATOPOULOS: Okay.</p> <p>4 MR. COLIN: You're using up my<br/>5 time. You're using up the record. You could have<br/>6 a one-word objection before he responds. He<br/>7 already responded.</p> <p>8 MR. STAMATOPOULOS: Please --</p> <p>9 Q. (BY MR. COLIN) Dr. Yao, in paragraph 65<br/>10 of your declaration, you cite to Kajiyama;<br/>11 correct?</p> <p>12 Let me be more specific. In footnote 15<br/>13 to paragraph 65 of your declaration you cite to<br/>14 Kajiyama; correct?</p> <p>15 <b>A. That's correct.</b></p> <p>16 MR. COLIN: So let's introduce<br/>17 what's already been marked as Exhibit 2017, which<br/>18 is the Kajiyama reference cited in footnote 15.</p> <p>19 Q. (BY MR. COLIN) Dr. Yao, in the abstract,<br/>20 Kajiyama indicates that layered lithium cobalt<br/>21 manganese oxide showed a potential of 4.5 volts<br/>22 relative to lithium; correct?</p> | <p>151</p> <p>1 temperature at voltage range between 3.5 and 5.2<br/>2 volts; correct?</p> <p>3 MR. STAMATOPOULOS: Object to<br/>4 form.</p> <p>5 <b>A. That's what it say in this paper.</b></p> <p>6 Q. (BY MR. COLIN) Okay. So this paper that<br/>7 you cite in your IPR declaration discloses<br/>8 charging lithium cobalt manganese oxide in a<br/>9 voltage range between 3.5 and 5.2 volts; correct?</p> <p>10 MR. STAMATOPOULOS: Object to<br/>11 form.</p> <p>12 <b>A. Yeah. This is what it says. But this<br/>13 5.2 volts is not the charge cut-off voltage that's<br/>14 defined in the claim of '641 patent.</b></p> <p>15 Q. (BY MR. COLIN) So it's your position<br/>16 that Kajiyama's disclosure of charging and<br/>17 discharging at a constant current of 0.1 milliamps<br/>18 between a voltage range from 3.5 to 5.2 volts<br/>19 doesn't disclose a charge cut-off limitation above<br/>20 4.2 volts?</p> <p>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p>                                                                            |
| <p>150</p> <p>1 MR. STAMATOPOULOS: Object to<br/>2 form.</p> <p>3 <b>A. That's correct.</b></p> <p>4 Q. (BY MR. COLIN) And Kajiyama goes on in<br/>5 the abstract to note that the electrode potential<br/>6 of lithium cobalt manganese oxide is higher than<br/>7 the potential for lithium cobalt oxide and lithium<br/>8 manganese oxide; correct?</p> <p>9 MR. STAMATOPOULOS: Object to<br/>10 form.</p> <p>11 <b>A. That's correct.</b></p> <p>12 Q. (BY MR. COLIN) And Kajiyama furthers<br/>13 goes on in that same sentence to say "and lower<br/>14 than the 5.0 volt of spinel-type lithium cobalt<br/>15 manganese oxide; correct?</p> <p>16 MR. STAMATOPOULOS: Object to<br/>17 form.</p> <p>18 <b>A. That's correct.</b></p> <p>19 Q. (BY MR. COLIN) And if you go to the last<br/>20 sentence of section 2.2 in Kajiyama, Kajiyama<br/>21 teaches that the cell was charged and discharged<br/>22 at a constant current of 0.1 milliamps at room</p>                              | <p>152</p> <p>1 <b>A. Correct. It didn't disclose. This<br/>2 apply -- this apply voltage, 5.2 volts. Is not<br/>3 clear what the battery's voltage or the charge<br/>4 cut-off voltage at equilibrium is not clear. So<br/>5 that's why it's different.</b></p> <p>6 Q. (BY MR. COLIN) So your testimony to the<br/>7 board is the reference that discloses charging a<br/>8 material up to 5.2 volts doesn't disclose a charge<br/>9 cut-off voltage above 4.2 volts?</p> <p>10 MR. STAMATOPOULOS: Object to<br/>11 form.</p> <p>12 <b>A. You can apply any charge -- charge<br/>13 voltage as high as 5.2 volt. What you need to<br/>14 show is that at equivalent equilibrium what's the<br/>15 voltage -- what's the better voltage, which, as<br/>16 you note from this discussion, is not clear.</b></p> <p>17 Q. (BY MR. COLIN) So in your opinion,<br/>18 Kajiyama does not teach that it was well known to<br/>19 charge compounds containing manganese to voltages<br/>20 well above 4.5 volts?</p> <p>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p> |

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| <p>153</p> <p>1 <b>A. Can you repeat your question?</b></p> <p>2 Q. (BY MR. COLIN) In your opinion, Kajiyama</p> <p>3 does not teach that it was well known to charge</p> <p>4 compounds containing manganese, such as lithium</p> <p>5 cobalt manganese oxide, to voltages well above 4.5</p> <p>6 volts?</p> <p>7 MR. STAMATOPOULOS: Same</p> <p>8 objection.</p> <p>9 <b>A. I don't think I was asked to form opinion</b></p> <p>10 <b>on this, you know, reference. You know, I have</b></p> <p>11 <b>spent my time on other reference. So this was not</b></p> <p>12 <b>the reference I was asked to consider these</b></p> <p>13 <b>questions. So...</b></p> <p>14 Q. (BY MR. COLIN) So, Dr. Yao, sitting here</p> <p>15 today you have no opinion on whether a reference</p> <p>16 that teaches charging lithium cobalt manganese</p> <p>17 oxide at a constant current of 0.1 milliamps at a</p> <p>18 voltage range between 3.5 and 5.2 volts meets the</p> <p>19 4.2 volt charge cut-off limitation of the patent?</p> <p>20 MR. STAMATOPOULOS: Object to</p> <p>21 form.</p> <p>22 <b>A. As I sit here today, I -- I don't think I</b></p>                                                                                                                       | <p>155</p> <p>1 and 5.2 volts?</p> <p>2 MR. STAMATOPOULOS: Object to</p> <p>3 form.</p> <p>4 <b>A. Yes, I do cite this reference 15 in my</b></p> <p>5 <b>declaration. That's mainly to state that in the</b></p> <p>6 <b>1990s we are research groups have attempt to</b></p> <p>7 <b>synthesize lithium manganese oxide but have</b></p> <p>8 <b>failed. It's not used to support the voltage,</b></p> <p>9 <b>cut-off voltage point.</b></p> <p>10 MR. COLIN: Dr. Yao, that was</p> <p>11 completely nonresponsive to my question. I move</p> <p>12 to strike again. And I'll ask you the same</p> <p>13 question.</p> <p>14 Q. (BY MR. COLIN) Sitting here today,</p> <p>15 looking at Kajiyama, a reference which you rely on</p> <p>16 in your declaration -- this is not the first time</p> <p>17 you've seen it -- you can't tell me whether it</p> <p>18 discloses a charge cut-off voltage above 4.2 volts</p> <p>19 when it indicates that a cell containing lithium</p> <p>20 cobalt manganese oxide was charged in a voltage</p> <p>21 range at a constant current of 0.1 milliamps in a</p> <p>22 range between 3.5 and 5.2 volts?</p> |
| <p>154</p> <p>1 <b>can form an opinion on this question because, you</b></p> <p>2 <b>know, there's many factors need to be considered.</b></p> <p>3 <b>For example, the full-cell voltage is what is --</b></p> <p>4 <b>what a C-rate of this .1 milliamp. And that -- I</b></p> <p>5 <b>need more information and time to read and</b></p> <p>6 <b>understand this.</b></p> <p>7 Q. (BY MR. COLIN) So are you telling me</p> <p>8 without a C-rate, you can't determine a charge</p> <p>9 cut-off voltage being above 4.2 volts?</p> <p>10 MR. STAMATOPOULOS: Object to</p> <p>11 form.</p> <p>12 <b>A. Yeah, we need to know the C-rate, we need</b></p> <p>13 <b>to know the anode material, we need to know the --</b></p> <p>14 <b>you know, the ratio between, you know, anode and</b></p> <p>15 <b>the cathode. I think with that -- those</b></p> <p>16 <b>information, I can answer your question.</b></p> <p>17 Q. (BY MR. COLIN) So sitting here today,</p> <p>18 looking at Kajiyama, a reference you rely on in</p> <p>19 your declaration, you can't tell me whether it</p> <p>20 discloses a charge cut-off voltage above 4.2 volts</p> <p>21 when it indicates that the cell was charged in a</p> <p>22 voltage range at a constant current between 3.5</p> | <p>156</p> <p>1 MR. STAMATOPOULOS: Object to</p> <p>2 form.</p> <p>3 <b>A. As I sit here today, I'm not ready to</b></p> <p>4 <b>offer opinion on this because many information is</b></p> <p>5 <b>not complete. The C-rate, the anode material, and</b></p> <p>6 <b>the charging protocols is not presented here.</b></p> <p>7 Q. (BY MR. COLIN) So you're telling me you</p> <p>8 can't determine whether a reference teaches the</p> <p>9 charge cut-off voltage if it doesn't provide the</p> <p>10 C-rate, the anode material, and the other</p> <p>11 information you just included in your response?</p> <p>12 MR. STAMATOPOULOS: Object to</p> <p>13 form.</p> <p>14 <b>A. Yeah, that's correct.</b></p> <p>15 Q. (BY MR. COLIN) The Kajiyama reference</p> <p>16 you cite cites to another Kajiyama reference cited</p> <p>17 in reference number 9 at the back of it; correct?</p> <p>18 <b>A. I did not understand your question.</b></p> <p>19 Q. Well, I will state it to you. Kajiyama,</p> <p>20 the reference we're looking at today right here in</p> <p>21 front of you --</p> <p>22 <b>A. Okay.</b></p>                           |

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| <p>157</p> <p>1 Q. -- so Exhibit 2017, cites to another</p> <p>2 Kajiyama reference as footnote number 9; correct?</p> <p>3 Footnote number 9.</p> <p>4 <b>A. Okay.</b></p> <p>5 Q. Can you see that there in front of you,</p> <p>6 that it cites to another Kajiyama reference from</p> <p>7 2001?</p> <p>8 <b>A. Yes.</b></p> <p>9 Q. Okay.</p> <p>10 <b>A. Is on the reference side.</b></p> <p>11 Q. So it's introduced as the next exhibit,</p> <p>12 Exhibit 1040, the Kajiyama 2001 reference cited in</p> <p>13 the other Kajiyama reference.</p> <p>14 MR. STAMATOPOULOS: What's the</p> <p>15 number of this?</p> <p>16 MR. COLIN: This is 1040.</p> <p>17 (Exhibit 1040 marked)</p> <p>18 Q. (BY MR. COLIN) Dr. Yao, this article by</p> <p>19 Kajiyama is entitled, "Layered Lithium Cobalt</p> <p>20 Manganese Oxide as a High-Voltage Positive</p> <p>21 Electrode Material for Lithium Batteries";</p> <p>22 correct?</p>                                                                                                   | <p>159</p> <p>1 charged and discharged at a constant current of</p> <p>2 0.1 milliamps at room temperature. The applied</p> <p>3 voltage was varied between 3.5 and 5.2 volts." Do</p> <p>4 you see that?</p> <p>5 <b>A. I see that.</b></p> <p>6 Q. Okay. And, again, you could not tell me</p> <p>7 without additional information whether this</p> <p>8 reference would teach the charge cut-off voltage</p> <p>9 limitation of the patent?</p> <p>10 MR. STAMATOPOULOS: Object to</p> <p>11 form, scope.</p> <p>12 <b>A. Yeah, I cannot form an opinion on -- on</b></p> <p>13 <b>the -- on this matter.</b></p> <p>14 Q. (BY MR. COLIN) And if you look at the</p> <p>15 first column of Kajiyama, two paragraphs up from</p> <p>16 the "Experimental," it says, "Recently some</p> <p>17 high-voltage positive electrode materials with</p> <p>18 operating voltages over 4.5 volts versus lithium</p> <p>19 have been investigated"; correct? Do you see</p> <p>20 that?</p> <p>21 MR. STAMATOPOULOS: Object to</p> <p>22 form.</p> |
| <p>158</p> <p>1 <b>A. Yes.</b></p> <p>2 Q. Okay. And this was a manuscript that was</p> <p>3 submitted in July 3rd, 2000, available</p> <p>4 electronically August 2nd, 2001; correct?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form.</p> <p>7 <b>A. Yes, that's correct.</b></p> <p>8 Q. (BY MR. COLIN) In the abstract, Kajiyama</p> <p>9 indicates charging the lithium cobalt manganese</p> <p>10 oxide material at a potential of 4.5 volts</p> <p>11 relative to lithium; correct?</p> <p>12 MR. STAMATOPOULOS: Object to</p> <p>13 form.</p> <p>14 <b>A. Did I cite this in my declaration?</b></p> <p>15 Q. (BY MR. COLIN) It's cited in the</p> <p>16 Kajiyama reference you rely on.</p> <p>17 <b>A. Okay. So is this a reference of the</b></p> <p>18 <b>reference? Yeah, I have not reviewed this</b></p> <p>19 <b>previously. And I would need some time to read</b></p> <p>20 <b>the reference.</b></p> <p>21 Q. If you look at the end the "Experimental"</p> <p>22 section, Kajiyama indicates that "the cell was</p> | <p>160</p> <p>1 <b>A. Which paragraph? I can't find --</b></p> <p>2 Q. (BY MR. COLIN) It's in the first column</p> <p>3 right here.</p> <p>4 <b>A. Okay.</b></p> <p>5 Q. Starting with "Recently."</p> <p>6 <b>A. Hm-hm.</b></p> <p>7 Q. Do you see that?</p> <p>8 <b>A. Yes.</b></p> <p>9 Q. Okay. It refers to "Recently, some</p> <p>10 high-voltage positive electrode materials with</p> <p>11 operating voltages over 4.5 volts relative to</p> <p>12 lithium have been investigated," and it cites</p> <p>13 seven different references; correct? Footnotes 18</p> <p>14 to 24.</p> <p>15 MR. STAMATOPOULOS: Object to</p> <p>16 form.</p> <p>17 <b>A. Yes.</b></p> <p>18 Q. (BY MR. COLIN) Okay. And it goes on to</p> <p>19 state, "Most of the positive electrodes have a</p> <p>20 spinel structure in which manganese ions are</p> <p>21 partially replaced with other transition metal</p> <p>22 ions in the spinel lithium manganese oxide";</p>                                                                             |

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| <p>1 correct?</p> <p>2 <b>A. Correct.</b></p> <p>3 Q. Okay. And it says, "As far as we know,</p> <p>4 high-voltage positive electrode materials having a</p> <p>5 layered structure have not been reported." That's</p> <p>6 one of the things that you rely on the later</p> <p>7 Kajiyama reference for; correct?</p> <p>8 MR. STAMATOPOULOS: Object to</p> <p>9 form.</p> <p>10 <b>A. Yeah, I didn't rely on this reference. I</b></p> <p>11 <b>was relying on, you know, 2017 reference.</b></p> <p>12 Q. (BY MR. COLIN) If you go to the</p> <p>13 conclusion of this reference, in the last sentence</p> <p>14 it says, "The high-potential was promising for a</p> <p>15 new positive electrode material in lithium ion</p> <p>16 batteries"; correct?</p> <p>17 <b>A. Yes.</b></p> <p>18 Q. Okay. But it's your position, where you</p> <p>19 tell the board that it was not known prior to</p> <p>20 September 2001 to charge batteries, cathode</p> <p>21 materials up to more than 2 -- 4.2 volts?</p> <p>22 MR. STAMATOPOULOS: Object to</p>                                                                                                                                                                                                                  | <p>161</p> <p>1 Q. Okay. But Kajiyama, the reference you</p> <p>2 rely on, and this Kajiyama both disclose charging</p> <p>3 doped lithium cobalt manganese oxide materials all</p> <p>4 the way up to 5.2 volts; correct?</p> <p>5 MR. STAMATOPOULOS: Object --</p> <p>6 <b>A. Just mentioned --</b></p> <p>7 MR. STAMATOPOULOS: Object.</p> <p>8 Object to form.</p> <p>9 <b>A. Mention this is a spinel case in the</b></p> <p>10 <b>earlier question. But this reference and the</b></p> <p>11 <b>Kajiyama reference was cited layered manganese</b></p> <p>12 <b>oxide. It's different phase, different cathode</b></p> <p>13 <b>material.</b></p> <p>14 Q. (BY MR. COLIN) Yeah. But you read the</p> <p>15 reference to Kajiyama before where it says</p> <p>16 "Recently some high-voltage positive electrode</p> <p>17 materials with operating voltages over 4.5 volts</p> <p>18 of lithium have been investigated," and then cites</p> <p>19 references 18 to 24. "Most of the positive</p> <p>20 electrodes have a spinel structure in which</p> <p>21 manganese ions are partially replaced with other</p> <p>22 transition metal ions in the spinel."</p>                    |
| <p>162</p> <p>1 form.</p> <p>2 <b>A. So this reference here using this metal</b></p> <p>3 <b>as the reference, the actual. So this is what</b></p> <p>4 <b>was -- you know, in my declaration, what</b></p> <p>5 <b>paragraph -- 192 as -- as said, the POSITA would</b></p> <p>6 <b>understand that the claim cut-off voltage refers</b></p> <p>7 <b>to the full-cell voltage, not to the half-cell</b></p> <p>8 <b>voltage. So in this reference I would not be able</b></p> <p>9 <b>to know the full-cell voltage. That's number one.</b></p> <p>10 <b>Number two is also the C-rate is not</b></p> <p>11 <b>clear. We are referring to cut-off voltage as at</b></p> <p>12 <b>equilibrium. Here only use a constant current,</b></p> <p>13 <b>constant current charging. So we don't know</b></p> <p>14 <b>what's varied voltage at equilibrium. So apply</b></p> <p>15 <b>the voltage can reach 4.5 volt, but there's no way</b></p> <p>16 <b>I can know what's charge cut-off voltage of this</b></p> <p>17 <b>reference.</b></p> <p>18 Q. (BY MR. COLIN) And you tell the board,</p> <p>19 don't you, that a person of ordinary skill would</p> <p>20 not be motivated to charge a spinel cathode above</p> <p>21 4.2 volts; correct?</p> <p>22 <b>A. Yes.</b></p> | <p>163</p> <p>1 In view of these references, it's still</p> <p>2 your opinion to the board that a person of</p> <p>3 ordinary skill would not be motivated to charge a</p> <p>4 spinel electrode above 4.2 volts?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form, scope.</p> <p>7 <b>A. There's a reference in the second page it</b></p> <p>8 <b>said, "XRD pattern of the Figure 1b was obtained</b></p> <p>9 <b>for the layered oxide ion-exchanged with lithium."</b></p> <p>10 <b>So, this -- you know, this indicates this</b></p> <p>11 <b>is a layered oxide. This layer oxide phase, not</b></p> <p>12 <b>spinel phase. So, you know, I -- so, yeah, so I</b></p> <p>13 <b>hope you understand that this is a different phase</b></p> <p>14 <b>compared to the Guyomard patent we discussed</b></p> <p>15 <b>earlier.</b></p> <p>16 Q. (BY MR. COLIN) Okay. So is it your</p> <p>17 opinion based on your own explanation that</p> <p>18 Kajiyama teaches charging lithium cobalt manganese</p> <p>19 oxide with a layered structure all the way up to</p> <p>20 5.2 volts?</p> <p>21 <b>A. No. I already explained earlier why it's</b></p> <p>22 <b>not the case.</b></p> |

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| <p>1 Q. Okay. In paragraph 65 of your IPR<br/>2 declaration, you also cite to an Armstrong<br/>3 reference.<br/>4 <b>A. Yes.</b><br/>5 MR. COLIN: Let's introduce<br/>6 what's already been marked as Exhibit 2009.<br/>7 Q. (BY MR. COLIN) And this is the Armstrong<br/>8 1996 reference cited in your declaration; correct?<br/>9 <b>A. That's correct.</b><br/>10 Q. Okay. And you rely on this reference?<br/>11 <b>A. Yes.</b><br/>12 Q. If you turn to second page of it, Figure<br/>13 3 at the top, "Armstrong cycled a lithium<br/>14 manganese dioxide from 3.4 volts to 4.3 volts<br/>15 relative to lithium"; correct?<br/>16 MR. STAMATOPOULOS: Object to<br/>17 form.<br/>18 <b>A. Yes.</b><br/>19 Q. (BY MR. COLIN) Armstrong used a constant<br/>20 current of 0.5 milliamps per centimeter squared<br/>21 for the testing shown in Figure 3; correct?<br/>22 MR. STAMATOPOULOS: Object to</p>                                                     | <p>165<br/>1 than Uemura's 180 milliamp-hours per gram, and you<br/>2 cite to Figure 2 of Armstrong. Correct?<br/>3 <b>A. That's correct.</b><br/>4 Q. Okay. So going back to Armstrong to talk<br/>5 about this 270 milliamp-hour. So Armstrong<br/>6 indicates that the material has an initial<br/>7 measured capacity of 270 milliamps-hour per gram;<br/>8 correct?<br/>9 <b>A. That's correct.</b><br/>10 Q. And that's an experimentally measured<br/>11 number; correct?<br/>12 MR. STAMATOPOULOS: Object to<br/>13 form.<br/>14 <b>A. Yes.</b><br/>15 Q. (BY MR. COLIN) Okay. And so Armstrong<br/>16 derives the 270 milliamp-hour per gram number by<br/>17 applying a charging current density of 10<br/>18 milliamps per centimeter squared; correct?<br/>19 MR. STAMATOPOULOS: Object to<br/>20 form.<br/>21 <b>A. It says 10 microamp per centimeter</b><br/>22 <b>square, which is several times more than what you</b></p>                                                  |
| <p>166<br/>1 form.<br/>2 Q. (BY MR. COLIN) The value is right in the<br/>3 Figure 3 label.<br/>4 <b>A. Yes.</b><br/>5 Q. In the first full paragraph on page 500<br/>6 of Armstrong -- so it's the second page, just so I<br/>7 can show you this -- this paragraph.<br/>8 MR. STAMATOPOULOS: The ones that<br/>9 starts with "interest"?<br/>10 MR. COLIN: "Interest." Correct.<br/>11 Q. (BY MR. COLIN) So you rely on the fact<br/>12 that Armstrong provides an initial measured<br/>13 capacity of 270 milliamps-hour per gram; correct?<br/>14 MR. STAMATOPOULOS: Object to<br/>15 form.<br/>16 <b>A. Can you point to where I rely on this</b><br/>17 <b>number?</b><br/>18 Q. (BY MR. COLIN) Sure. So paragraph 134.<br/>19 You say at the last sentence, "Because the '641<br/>20 patent requires the use of theoretical capacity of<br/>21 4.2 volts for calculating the claimed ratio, 270<br/>22 milliamp-hours per gram is more appropriate to use</p> | <p>167<br/>1 just mentioned.<br/>2 Q. (BY MR. COLIN) Okay. Thank you for that<br/>3 correction. So, just to be clear, the 270<br/>4 milliamp-hour per gram value of Armstrong is<br/>5 experimentally determined using a 10 microamp per<br/>6 centimeter squared current density?<br/>7 MR. STAMATOPOULOS: Object to<br/>8 form.<br/>9 <b>A. That's correct. Yeah. It's very slow</b><br/>10 <b>charging.</b><br/>11 Q. (BY MR. COLIN) Okay. Then Armstrong<br/>12 goes on to say in the next sentence, "Preliminary<br/>13 measurements at the much higher current density of<br/>14 0.5 milliamps per centimeter squared suggests that<br/>15 a capacity approaching 200 milliamp-hours per gram<br/>16 may be obtained up to a cut-off potential of 4.3<br/>17 volts"; correct?<br/>18 MR. STAMATOPOULOS: Object to<br/>19 form.<br/>20 <b>A. It's what is written in this paper.</b><br/>21 Q. (BY MR. COLIN) Okay. So Armstrong<br/>22 teaches that the reversible capacity of the</p> |

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| <p>169</p> <p>1 lithium manganese oxide approaches 200<br/>2 milliamp-hours per gram when you use a cut-off<br/>3 potential of 4.3 volts?<br/>4 <b>A. That's incorrect. First, it didn't say</b><br/>5 <b>the reversible capacity. It just said the</b><br/>6 <b>capacity approaching 200. In fact, from Figure 3,</b><br/>7 <b>it's clear it's not reversible. The capacity</b><br/>8 <b>decay very fast in the second and later cycles.</b><br/>9 <b>Second -- yeah, second, the cut-off</b><br/>10 <b>voltage potential here of 4.3 volt is half-cell</b><br/>11 <b>voltage is different from the full-cell voltage</b><br/>12 <b>referring to '641.</b><br/>13 Q. (BY MR. COLIN) Okay. So the 270<br/>14 milliamp-hour per gram and the 200 milliamp-hour<br/>15 per gram values were obtained using half cells<br/>16 with cut-off potentials of 4.3 volts?<br/>17 MR. STAMATOPOULOS: Object to<br/>18 form.<br/>19 <b>A. So, you know, as was written the</b><br/>20 <b>footnote, you know, in my declaration, 84. So I</b><br/>21 <b>said that based on Figure 2 of Armstrong, 1996,</b><br/>22 <b>the theoretic battery cell layered lithium oxide</b></p> | <p>171</p> <p>1 I mean is within experimental error of the maximum<br/>2 theoretic capacity; correct?<br/>3 MR. STAMATOPOULOS: Objection.<br/>4 Form.<br/>5 <b>A. The maximum theoretic capacity is 285, as</b><br/>6 <b>you mentioned. Here, you know, I think it's</b><br/>7 <b>close. 270 -- it's around 270 milliamp per</b><br/>8 <b>hour --</b><br/>9 Q. (BY MR. COLIN) And so why did you pick<br/>10 270 milliamp-hours per gram as the theoretic<br/>11 capacity at 4.2 volts of lithium manganese oxide<br/>12 as opposed to 200 milliamp-hour per gram that's<br/>13 obtained using a faster current?<br/>14 MR. STAMATOPOULOS: Object to<br/>15 form.<br/>16 <b>A. Yeah. The reason I picked the specific</b><br/>17 <b>capacity at a lower current density, 10 microamp</b><br/>18 <b>per centimeter squared, it's more close</b><br/>19 <b>equilibrium. And that's more close to the --</b><br/>20 <b>that's a number typical we use to consider as</b><br/>21 <b>capacity, as a theoretic capacity value.</b><br/>22 <b>As I explained to you earlier, you know,</b></p> |
| <p>170</p> <p>1 <b>of 4.2 volt likely exceeds 270 million ampere per</b><br/>2 <b>gram of battery or achieve a specific capacity of</b><br/>3 <b>270 milliampere per gram at approximately 4.1</b><br/>4 <b>volt. So that's why I just use this number, which</b><br/>5 <b>is as a theoretic capacity at the 4.2 in my</b><br/>6 <b>calculation.</b><br/>7 Q. (BY MR. COLIN) Well, the theoretic<br/>8 maximum capacity of that material is 285<br/>9 milliamp-hours per gram; right?<br/>10 MR. STAMATOPOULOS: Object to<br/>11 form.<br/>12 <b>A. I think that's correct.</b><br/>13 Q. (BY MR. COLIN) Okay. So your opinion in<br/>14 paragraph 84 is that the theoretical capacity of<br/>15 layered lithium manganese oxide at 4.2 volts<br/>16 likely exceeds 270 milliamp-hours per gram;<br/>17 correct?<br/>18 MR. STAMATOPOULOS: Object to<br/>19 form.<br/>20 <b>A. Yeah, but it's very close to this number.</b><br/>21 Q. (BY MR. COLIN) Okay. So you believe<br/>22 that the theoretic capacity of 4.2 volts likely --</p>                                                                                                                           | <p>172</p> <p>1 that's how experimentally, you know, determine the<br/>2 theoretic capacity and know the X, you know,<br/>3 extraction ratio, typically at a very slow rate.<br/>4 25 milliamp per centimeter is much higher rate.<br/>5 It's not considered close to equilibrium current<br/>6 capacity.<br/>7 Q. (BY MR. COLIN) So if you charge<br/>8 something as slowly as possible, you obtain more<br/>9 capacity, correct? --<br/>10 MR. STAMATOPOULOS: Object to<br/>11 form.<br/>12 Q. (BY MR. COLIN) -- at a certain voltage?<br/>13 <b>A. When you charge a battery as slow as</b><br/>14 <b>possible, you can get the practical capacity as</b><br/>15 <b>close to the theoretic capacity that's close,</b><br/>16 <b>much -- you know, you have more agreement with the</b><br/>17 <b>two terms.</b><br/>18 Q. And so Armstrong demonstrates that just<br/>19 changing the current -- charging current, you<br/>20 could obtain capacities of 200 or 270<br/>21 milliamp-hours per gram; right?<br/>22 MR. STAMATOPOULOS: Object to</p>                                   |

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| <p>173</p> <p>1 form.</p> <p>2 <b>A. Can you repeat your question? I didn't</b></p> <p>3 <b>understand --</b></p> <p>4 Q. (BY MR. COLIN) Yeah. Armstrong teaches</p> <p>5 that, depending what current he applies, he either</p> <p>6 obtains a initial capacity of 270 milliamp-hours</p> <p>7 per gram or initial capacity of 200 milliamp-hours</p> <p>8 per gram; correct?</p> <p>9 MR. STAMATOPOULOS: Same</p> <p>10 objection.</p> <p>11 <b>A. That's what it shows, yes.</b></p> <p>12 Q. (BY MR. COLIN) In the last paragraph of</p> <p>13 Armstrong where it starts with "Some preliminary</p> <p>14 cycling data" -- do you see that?</p> <p>15 <b>A. Yes.</b></p> <p>16 Q. Okay. In the second sentence Armstrong</p> <p>17 indicates, "Previous studies using cyclic</p> <p>18 voltometry indicated that the electrolyte was</p> <p>19 stable in contact with this electrode up to at</p> <p>20 least 4.4 volts"; correct?</p> <p>21 <b>A. That's what is written, yes.</b></p> <p>22 Q. And it's your opinion sitting here today</p>                                                                                                        | <p>175</p> <p>1 teach what's going on at the cathode to determine</p> <p>2 whether it meets the charge cut-off limitation?</p> <p>3 MR. STAMATOPOULOS: Object to</p> <p>4 form.</p> <p>5 <b>A. It's full cell. According to '641 claim,</b></p> <p>6 <b>it's different between the cathode and the anode</b></p> <p>7 <b>potential need to reach 4.2 volt.</b></p> <p>8 Q. Okay. In paragraph 67 of your</p> <p>9 declaration, you indicate that Armstrong 1996 does</p> <p>10 not disclose a battery voltage of 4.2 volts where</p> <p>11 a full-cell voltage of 4.2 volts, only an applied</p> <p>12 voltage of 4.3 volts relative to lithium metal;</p> <p>13 correct?</p> <p>14 <b>A. Which paragraph?</b></p> <p>15 Q. 67. Starts at the bottom of page 30 and</p> <p>16 goes on to the top of page 31.</p> <p>17 <b>A. That's correct.</b></p> <p>18 Q. Okay. So even though Armstrong does not</p> <p>19 disclose a battery voltage of 4.2 volts or a</p> <p>20 full-cell voltage of 4.2 volts, only an applied</p> <p>21 voltage of 4.3 volts relative to lithium metal,</p> <p>22 you apply the Armstrong value as a theoretical</p>                                    |
| <p>174</p> <p>1 that this reference, which teaches two different</p> <p>2 charging currents and charging the lithium</p> <p>3 manganese layered oxide material up to 4.4 volts,</p> <p>4 does not teach the charge cut-off voltage of the</p> <p>5 claims?</p> <p>6 MR. STAMATOPOULOS: Object to</p> <p>7 form.</p> <p>8 <b>A. No, it didn't teach. Here it</b></p> <p>9 <b>specifically says the electrolyte was stable in</b></p> <p>10 <b>contact with up to 4.4. It didn't say the battery</b></p> <p>11 <b>voltage at the equilibrium at end of the charge is</b></p> <p>12 <b>4.4 volt.</b></p> <p>13 Q. Right. So Armstrong took a half cell</p> <p>14 with its cathode of layered lithium manganese</p> <p>15 oxide, an electrode, charged it up to 4.4 volts</p> <p>16 relative to lithium, and found that the</p> <p>17 electrolyte was stable at that voltage; correct?</p> <p>18 <b>A. See, the electrolyte is stable as a</b></p> <p>19 <b>voltage; but we are talking about electrode. It</b></p> <p>20 <b>didn't say anything on electrode in this</b></p> <p>21 <b>paragraph.</b></p> <p>22 Q. So in your opinion reference needs to</p> | <p>176</p> <p>1 specific capacity from lithium manganese oxide at</p> <p>2 4.2 volts; correct?</p> <p>3 MR. STAMATOPOULOS: Object to</p> <p>4 form.</p> <p>5 <b>A. Yes. There's two separate things. One,</b></p> <p>6 <b>charge cathode voltage of the full cell. The</b></p> <p>7 <b>other is capacity ratio. When we use the capacity</b></p> <p>8 <b>ratio calculation, we consider half-cell capacity</b></p> <p>9 <b>relevant to this metal. So that's why we can use</b></p> <p>10 <b>this 270 milliamp-hour capacity as a theoretic</b></p> <p>11 <b>capacity so there's no inconsistency here.</b></p> <p>12 Q. (BY MR. COLIN) Well, you said the</p> <p>13 theoretic capacity of 4.2 volts under your</p> <p>14 proposed construction does not include measured</p> <p>15 capacity; correct?</p> <p>16 MR. STAMATOPOULOS: Object to</p> <p>17 form.</p> <p>18 <b>A. As I explained to you, the measured</b></p> <p>19 <b>capacity at close to equilibrium condition can be</b></p> <p>20 <b>used to construct the theoretic capacity X value.</b></p> <p>21 <b>So, yeah, the same -- you know, very close number,</b></p> <p>22 <b>materially the same number.</b></p> |

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| <p>177</p> <p>1 Q. (BY MR. COLIN) So now your opinion to</p> <p>2 the board is that, depending on the charging</p> <p>3 value, a measured capacity may be a theoretic</p> <p>4 capacity?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form.</p> <p>7 <b>A. The theoretic capacity and the measured</b></p> <p>8 <b>capacity, at a certain condition the value could</b></p> <p>9 <b>be the same. Right? That's the reason you have</b></p> <p>10 <b>theoretic capacity, to guide the design. So if</b></p> <p>11 <b>the measured practical capacity is far away from</b></p> <p>12 <b>the theoretic capacity, what's the point of the</b></p> <p>13 <b>theoretic capacity?</b></p> <p>14 <b>So there are two different numbers,</b></p> <p>15 <b>terms, but at certain condition you could have the</b></p> <p>16 <b>same value. So it's fully consistent with what I</b></p> <p>17 <b>had described previously.</b></p> <p>18 Q. (BY MR. COLIN) You use the 270</p> <p>19 milliamp-hour per gram as a theoretic capacity for</p> <p>20 doped materials in Uemura, even though you admit</p> <p>21 that doping affects capacity; correct?</p> <p>22 MR. STAMATOPOULOS: Object to</p> | <p>179</p> <p>1 Q. (BY MR. COLIN) Yet you apply what you</p> <p>2 call a theoretic specific capacity of 4.2 volts</p> <p>3 for lithium manganese oxide as a theoretic</p> <p>4 capacity of 4.2 volts for various doped versions</p> <p>5 of lithium manganese oxide?</p> <p>6 MR. STAMATOPOULOS: Object to</p> <p>7 form.</p> <p>8 <b>A. If you're referring to -- referring to</b></p> <p>9 <b>the paragraph 136, what I state here is that</b></p> <p>10 <b>"Following Uemura's approach in ascertaining the</b></p> <p>11 <b>specific capacity of each of the 17 examples, I</b></p> <p>12 <b>calculated the theoretical capacity at 4.2 volts</b></p> <p>13 <b>of these cathode materials based on the equation</b></p> <p>14 <b>below: Theoretical specific capacity at 4.2 volts</b></p> <p>15 <b>equals 270 milliamp-hours per gram."</b></p> <p>16 <b>Also I have a note, 86, here. So "it</b></p> <p>17 <b>would be apparent to a POSA this data were not</b></p> <p>18 <b>genuine experimental data because they do not have</b></p> <p>19 <b>any degree of error, which is impossible in the</b></p> <p>20 <b>field of electrochemistry. They are also</b></p> <p>21 <b>inconsistent with what is reported in the</b></p> <p>22 <b>literature."</b></p> |
| <p>178</p> <p>1 form.</p> <p>2 <b>A. Can you point to where I state that in my</b></p> <p>3 <b>declaration?</b></p> <p>4 Q. (BY MR. COLIN) You don't know where in</p> <p>5 your declaration you state doping affects</p> <p>6 capacity?</p> <p>7 MR. STAMATOPOULOS: Object to</p> <p>8 form.</p> <p>9 <b>A. I know. I just want to be more specific.</b></p> <p>10 Q. (BY MR. COLIN) I believe it's somewhere</p> <p>11 in the 190s.</p> <p>12 <b>A. Yeah. Several places I talk about that.</b></p> <p>13 MR. STAMATOPOULOS: Is this like</p> <p>14 a memory test?</p> <p>15 <b>A. Some -- so let me...</b></p> <p>16 Q. (BY MR. COLIN) It's in the 170s. Let me</p> <p>17 just ask you the question.</p> <p>18 You agree with me that doping affects</p> <p>19 capacity; correct?</p> <p>20 MR. STAMATOPOULOS: Object to</p> <p>21 form.</p> <p>22 <b>A. As a general matter, that's true.</b></p>                                                                                                                                                                                                                                                                                  | <p>180</p> <p>1 <b>So basically I used 270, I just follow</b></p> <p>2 <b>Uemura's approach. In fact, later -- in later</b></p> <p>3 <b>section we did calculate for -- considering the</b></p> <p>4 <b>difference of tokens in the later tables.</b></p> <p>5 Q. (BY MR. COLIN) Dr. Yao, you took the</p> <p>6 amount of lithium in each of the 17 examples in --</p> <p>7 in Uemura and just multiplied them by 270. It</p> <p>8 didn't matter that some were lithium manganese</p> <p>9 cobalt oxide, some were lithium manganese iron</p> <p>10 oxide, some were lithium manganese aluminum oxide,</p> <p>11 you, in your analysis of what the specific</p> <p>12 capacity or the theoretical capacity of 4.2 volts</p> <p>13 is, simply applied all those dope materials by 270</p> <p>14 milliamp-hours per gram; correct?</p> <p>15 MR. STAMATOPOULOS: Object to the</p> <p>16 form.</p> <p>17 Q. (BY MR. COLIN) That's what you did in</p> <p>18 paragraph 137.</p> <p>19 MR. STAMATOPOULOS: Same</p> <p>20 objection.</p> <p>21 <b>A. Yeah. So I have a two-part answer to</b></p> <p>22 <b>your question. First, page 67 of my IPR I list a</b></p>                                                                                                      |

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| <p style="text-align: right;">181</p> <p>1 table which shows the specific capacity calculated<br/>2 based on Uemura's reported data. So you can see<br/>3 all this data, last column, follows a trend which<br/>4 is they use 180 milliamp hour plan times this<br/>5 amount. So what that describes in the paragraph<br/>6 136 is follow the same approach that's used in<br/>7 Uemura's approach in this first part.<br/>8 Second part in my -- in page 87,<br/>9 paragraph 171, I have a table to list the<br/>10 theoretic maximum capacity which calculates<br/>11 considering that doping molecular weight<br/>12 difference. So that's here in this, you know,<br/>13 table in page 87 and 88. That shows the<br/>14 theoretical maximum capacity value.<br/>15 Q. (BY MR. COLIN) Dr. Yao, in paragraph<br/>16 137, you apply what you call the correct approach<br/>17 for deriving the theoretic capacity at 4.2 volts;<br/>18 correct? And that's to multiply the amount of<br/>19 lithium by 270 milliamp-hours per gram?<br/>20 A. That's correct.<br/>21 Q. Okay. And so your approach ignored that<br/>22 examples 1 to 17 have different compositions;</p> | <p style="text-align: right;">183</p> <p>1 Q. (BY MR. COLIN) -- under the claim<br/>2 construction.<br/>3 MR. STAMATOPOULOS: Object to<br/>4 form.<br/>5 A. Yeah. This is a relatively simple<br/>6 approach, the best estimate I can have. Basically<br/>7 I follow the same methodology that's Uemura's<br/>8 approach that I show here in paragraph 137 -- 36,<br/>9 he use 180; I use 270 as in -- 270 is a better<br/>10 value. You know, but because 17 materials used I<br/>11 think that's the best approach we can<br/>12 to approximate --<br/>13 Q. (BY MR. COLIN) Let me ask you about<br/>14 that, then. It's your opinion that as you --<br/>15 you've said a few times you believe that Uemura<br/>16 just multiplied the amount of lithium by 180<br/>17 milliamp-hours per gram in Figure 3; correct?<br/>18 That's how he got his values?<br/>19 MR. STAMATOPOULOS: Object to<br/>20 form.<br/>21 Q. (BY MR. COLIN) That's what you say in<br/>22 paragraph 165 and 166.</p> |
| <p style="text-align: right;">182</p> <p>1 right?<br/>2 MR. STAMATOPOULOS: Object to<br/>3 form.<br/>4 A. In the page 88 and 89 I have that correct<br/>5 value laid out in the table for maximum theoretic<br/>6 capacity.<br/>7 Q. (BY MR. COLIN) Dr. Yao, the theoretic<br/>8 maximum capacity is not what the claims are<br/>9 directed to; correct?<br/>10 MR. STAMATOPOULOS: Object to<br/>11 form.<br/>12 A. That's correct.<br/>13 Q. (BY MR. COLIN) You tell the board in<br/>14 paragraph 136 and 137 of your declaration that the<br/>15 way you determine the theoretic capacity at 4.2<br/>16 volts is you just multiply the amount of lithium,<br/>17 the molar amount of lithium by 270 regardless of<br/>18 the exact composition of the cathode material;<br/>19 correct? You tell the board that that's the<br/>20 proper analysis --<br/>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p>                                                                                                                                                                                                                                                              | <p style="text-align: right;">184</p> <p>1 MR. STAMATOPOULOS: Object to<br/>2 form.<br/>3 A. That's my analysis of the Figure 3 in<br/>4 Uemura's patent. And that's how I render my<br/>5 opinion in the paragraph 132 to 133, and that's --<br/>6 that's how I understand the data.<br/>7 Q. (BY MR. COLIN) Okay. So based on your<br/>8 review of Figure 3 in Uemura, you believe that<br/>9 Uemura multiplied the molar amount of lithium by<br/>10 180 milliamp-hours per gram to get his capacity<br/>11 values for the cathode; right?<br/>12 A. That's correct.<br/>13 MR. COLIN: Let's take a break.<br/>14 THE VIDEOGRAPHER: On the record<br/>15 at 3:44 p.m.<br/>16 (Recess from 3:44 p.m. to 4:00 p.m.)<br/>17 THE VIDEOGRAPHER: The time is<br/>18 4 p.m., and we're back on the record.<br/>19 Q. (BY MR. COLIN) Dr. Yao, did you discuss<br/>20 the substance of your testimony with counsel<br/>21 during the break?<br/>22 A. No, I didn't.</p>                              |

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| <p>185</p> <p>1 Q. In paragraph 1 -- can you turn to</p> <p>2 paragraph 117 of your declaration. It's on page</p> <p>3 55.</p> <p>4 <b>A. Yes, sir.</b></p> <p>5 Q. Okay. You there?</p> <p>6 <b>A. Yes.</b></p> <p>7 Q. In paragraph 117 you cite to Uemura at 81</p> <p>8 for its disclosure that the charge-discharge was</p> <p>9 repeatedly performed at constant current of 0.5</p> <p>10 milliamps per centimeter squared and a voltage</p> <p>11 ranging from 4.3 volts to 2.0 volts at an</p> <p>12 atmospheric temperature of 60 degrees Celsius;</p> <p>13 correct?</p> <p>14 <b>A. That's correct.</b></p> <p>15 Q. You agree that Uemura teaches an applied</p> <p>16 voltage of 4.3 volts?</p> <p>17 <b>A. That's right.</b></p> <p>18 Q. All right. And that's because Uemura</p> <p>19 discloses using constant current charging at .5</p> <p>20 milliamps-hour per centimeter squared to a voltage</p> <p>21 of 4.3 volts; correct?</p> <p>22 MR. STAMATOPOULOS: Object to</p>             | <p>187</p> <p>1 Q. (BY MR. COLIN) Yeah. I'm asking you if</p> <p>2 the board finds that the charge cut-off voltage is</p> <p>3 a charging voltage, then Uemura discloses a charge</p> <p>4 cut-off limitation; correct?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form.</p> <p>7 <b>A. I cannot answer the question with a</b></p> <p>8 <b>hypothetical condition. This is not what the</b></p> <p>9 <b>court find.</b></p> <p>10 Q. (BY MR. COLIN) Dr. Yao, I'm asking</p> <p>11 you -- I'm allowed to ask you hypotheticals.</p> <p>12 <b>A. Okay.</b></p> <p>13 Q. You cannot refuse to answer my questions.</p> <p>14 <b>A. Hm-hm.</b></p> <p>15 Q. If the board finds that a charge cut-off</p> <p>16 voltage is a charging voltage, then Uemura</p> <p>17 discloses the charge cut-off limitation; correct?</p> <p>18 MR. STAMATOPOULOS: Object to</p> <p>19 form. He hasn't, by the way, refused to answer</p> <p>20 your question. He answered your question. Just</p> <p>21 to be clear.</p> <p>22 MR. COLIN: That is an improper</p> |
| <p>186</p> <p>1 form.</p> <p>2 <b>A. Yes, at high voltage of 4.3 volts.</b></p> <p>3 Q. (BY MR. COLIN) Okay. So the maximum</p> <p>4 voltage to which Uemura is charged is 4.3 volts;</p> <p>5 correct?</p> <p>6 MR. STAMATOPOULOS: Object to</p> <p>7 form.</p> <p>8 <b>A. I was going to say high voltage 4.3</b></p> <p>9 <b>volts. You know, it's not at equilibrium</b></p> <p>10 <b>condition. So the battery voltage would be lower</b></p> <p>11 <b>than 4.3 volt.</b></p> <p>12 MR. COLIN: Can you please speak</p> <p>13 up a little bit? I think the court reporter might</p> <p>14 be having a little hard time hearing you.</p> <p>15 THE WITNESS: Okay.</p> <p>16 Q. (BY MR. COLIN) So if the board finds</p> <p>17 that the charge cut-off voltage is a charging</p> <p>18 voltage, Uemura discloses the charge cut-off</p> <p>19 voltage limitation; correct?</p> <p>20 MR. STAMATOPOULOS: Object to</p> <p>21 form. Scope.</p> <p>22 <b>A. Are you asking a hypothetical question?</b></p> | <p>188</p> <p>1 speaking objection, Counsel.</p> <p>2 MR. STAMATOPOULOS: Disagree with</p> <p>3 that. But proceed.</p> <p>4 MR. COLIN: Counsel, it's</p> <p>5 inappropriate.</p> <p>6 Q. (BY MR. COLIN) Dr. Yao, if the board</p> <p>7 finds that a charge cut-off voltage is a charging</p> <p>8 voltage, then Uemura discloses the charge cut-off</p> <p>9 limitation; correct?</p> <p>10 MR. STAMATOPOULOS: Same</p> <p>11 objection.</p> <p>12 <b>A. I think the court has decided in the</b></p> <p>13 <b>claim construction the charge cut-off voltage is a</b></p> <p>14 <b>maximum voltage that batteries -- hold on. Let me</b></p> <p>15 <b>-- sorry. I withdraw.</b></p> <p>16 Q. (BY MR. COLIN) Dr. Yao, that is not my</p> <p>17 question. I'm not asking you about the court's</p> <p>18 claim construction.</p> <p>19 My question is simply, if the board finds</p> <p>20 that an applied voltage is the charge cut-off</p> <p>21 voltage of the claims, then Uemura discloses the</p> <p>22 charge cut-off limitation; correct?</p> |

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| <p>189</p> <p>1 MR. STAMATOPOULOS: Object to</p> <p>2 form.</p> <p>3 <b>A. I'm not available -- I'm not able to form</b></p> <p>4 <b>opinion on this hypothetical question.</b></p> <p>5 Q. (BY MR. COLIN) So sitting here today,</p> <p>6 you have no opinion on whether the disclosure of</p> <p>7 Uemura about charging up to 4.3 volts, if the</p> <p>8 board finds that an applied voltage is a charge</p> <p>9 cut-off voltage of the claims, you have no opinion</p> <p>10 whether that discloses it?</p> <p>11 MR. STAMATOPOULOS: Object to</p> <p>12 form.</p> <p>13 <b>A. I'm not ready to form an opinion today as</b></p> <p>14 <b>I sit here for this hypothetical question.</b></p> <p>15 Q. (BY MR. COLIN) Dr. Yao, if the board</p> <p>16 finds that a POSITA would understand that constant</p> <p>17 current charging involves charging a battery at</p> <p>18 constant current until it reaches the charge</p> <p>19 cut-off voltage, then Uemura discloses the charge</p> <p>20 cut-off voltage limitation; correct?</p> <p>21 MR. STAMATOPOULOS: Object to the</p> <p>22 form.</p> <p>190</p> <p>1 <b>A. So my deposition -- in my declaration,</b></p> <p>2 <b>paragraph 199 -- 119, what I state here, because a</b></p> <p>3 <b>battery Uemura was purpose -- purposely only</b></p> <p>4 <b>charged with a constant current, and there was no</b></p> <p>5 <b>constant voltage phase, the battery was not fully</b></p> <p>6 <b>charged when the applied voltage reached 4.3</b></p> <p>7 <b>volts. In fact, the note page 64 had its own</b></p> <p>8 <b>calculation as the current density of .5 milliamps</b></p> <p>9 <b>per centimeter squared --</b></p> <p>10 MR. COLIN: Dr. Yao, you're not</p> <p>11 answering my question. Move to strike as</p> <p>12 nonresponsive.</p> <p>13 Q. (BY MR. COLIN) Dr. Yao, you under -- I'm</p> <p>14 asking you the question, if the board finds that a</p> <p>15 POSITA would understand that constant current</p> <p>16 charging involves charging a battery at constant</p> <p>17 current until it reaches the charge cut-off</p> <p>18 voltage, then Uemura discloses the charge cut-off</p> <p>19 voltage limitation; correct?</p> <p>20 MR. STAMATOPOULOS: Object to the</p> <p>21 form. And I'll note, you interrupted his previous</p> <p>22 answer --</p> | <p>191</p> <p>1 MR. COLIN: Counsel, these</p> <p>2 objections are improper.</p> <p>3 MR. STAMATOPOULOS: Putting it on</p> <p>4 the record that you've interrupted the witness --</p> <p>5 MR. COLIN: You're impeding this</p> <p>6 deposition, Counsel. Do we need to bring this up</p> <p>7 with the board?</p> <p>8 MR. STAMATOPOULOS: You can do as</p> <p>9 you see fit. You can do as you see fit. Now, if</p> <p>10 you want to restate your question, unless the</p> <p>11 witness remembers it.</p> <p>12 MR. COLIN: Please stop with</p> <p>13 these improper objections, Counsel.</p> <p>14 Q. (BY MR. COLIN) Dr. Yao, if the board</p> <p>15 finds that a POSITA would understand that constant</p> <p>16 current charging involves charging a battery at</p> <p>17 constant current until it reaches the charge</p> <p>18 cut-off voltage limitation, then Uemura discloses</p> <p>19 the charge cut-off limitation; correct?</p> <p>20 MR. STAMATOPOULOS: Object to</p> <p>21 form.</p> <p>22 <b>A. You have a long -- if -- can you repeat</b></p> <p>192</p> <p>1 <b>if -- the whole sentence again? It's a little bit</b></p> <p>2 <b>long for me.</b></p> <p>3 Q. (BY MR. COLIN) Dr. Yao --</p> <p>4 <b>A. If you can write it down, it would be</b></p> <p>5 <b>better.</b></p> <p>6 Q. (BY MR. COLIN) -- let's go to Exhibit</p> <p>7 2022 again, your own claim construction</p> <p>8 declaration. Let's go to paragraph 33.</p> <p>9 <b>A. Which --</b></p> <p>10 Q. Exhibit 2022, your Apple claim</p> <p>11 construction declaration.</p> <p>12 <b>A. Okay.</b></p> <p>13 Q. So I'll make this simple. You told the</p> <p>14 court --</p> <p>15 <b>A. Which paragraph?</b></p> <p>16 Q. 33 -- "In many laboratory settings</p> <p>17 batteries are charged at a constant current</p> <p>18 without a constant voltage stage." You see that?</p> <p>19 MR. STAMATOPOULOS: So where --</p> <p>20 which line is that?</p> <p>21 <b>A. I see that, yes.</b></p> <p>22 Q. (BY MR. COLIN) You continue, Dr. Yao,</p> |
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| <p>193</p> <p>1 "Once the battery reaches a predetermined<br/>2 voltage -- i.e., the charge cut-off voltage -- the<br/>3 charging stops"; correct?<br/>4 <b>A. Correct.</b><br/>5 Q. So if the board agrees with you in your<br/>6 declaration in paragraph 1 -- sorry -- 33 of the<br/>7 Apple IPR declaration that a POSITA would<br/>8 understand that constant current is applied until<br/>9 the battery reaches a predetermined voltage --<br/>10 i.e., the charge cut-off voltage -- then the<br/>11 charging stops, Uemura discloses the charge<br/>12 cut-off limitation; correct?<br/>13 MR. STAMATOPOULOS: Object to the<br/>14 form.<br/>15 <b>A. First, what you refer to is not Apple</b><br/>16 <b>IPR. It's Apple claim construction. Second, in</b><br/>17 <b>Uemura case, I have cited on the cover page, table</b><br/>18 <b>contents, reasons A, B, and C. A is Uemura</b><br/>19 <b>doesn't disclose the claim charge cut-off voltage</b><br/>20 <b>limitation. B, Uemura doesn't disclose the claim</b><br/>21 <b>result limitation. And C, Uemura is not an</b><br/>22 <b>enabling reference.</b></p>                                                                                               | <p>195</p> <p>1 <b>full capacity, using only current charging.</b><br/>2 <b>So in this particular condition we cannot</b><br/>3 <b>consider that the -- that, you know, the voltage</b><br/>4 <b>reaches charge cut-off voltage, even if the court</b><br/>5 <b>find it reasonable.</b><br/>6 Q. (BY MR. COLIN) You didn't tell the<br/>7 district of -- Central District of California that<br/>8 constant current charging may reach the charge<br/>9 cut-off voltage; correct? You said it's applied<br/>10 until it reaches the charge cut-off voltage;<br/>11 right?<br/>12 MR. STAMATOPOULOS: Object to<br/>13 form.<br/>14 <b>A. We didn't specify the current condition.</b><br/>15 <b>But, as I stated earlier, at that time the matter</b><br/>16 <b>of dispute is always charging hourly. It's not</b><br/>17 <b>the difference between applied voltage versus</b><br/>18 <b>measured voltage.</b><br/>19 Q. (BY MR. COLIN) So you're reading the<br/>20 court's claim construction to be the maximum<br/>21 voltage to which the battery is charged; correct?<br/>22 You require it to actually be charged to that</p> |
| <p>194</p> <p>1 <b>So even if in a hypothetical situation</b><br/>2 <b>the court find what you proposed reasonable, just</b><br/>3 <b>do other B and C, which with the prevented become</b><br/>4 <b>valid.</b><br/>5 Q. (BY MR. COLIN) So, Dr. Yao, if I<br/>6 understand that correctly, it's your testimony<br/>7 that if the board agrees with your opinions in<br/>8 paragraph 33 of Exhibit 2022 concerning constant<br/>9 current charging, Uemura discloses the charge<br/>10 cut-off limitation of the claims; correct?<br/>11 MR. STAMATOPOULOS: Object to the<br/>12 form.<br/>13 <b>A. We need to look at the individual case.</b><br/>14 <b>Constant current charging, if you are doing the</b><br/>15 <b>very slow rate, the predetermined voltage would be</b><br/>16 <b>the same as the charge cut-off voltage. But in</b><br/>17 <b>this particular Uemura's case, as I've written and</b><br/>18 <b>analyzed here in the page 56 and 57 in my</b><br/>19 <b>declaration, note 64, it's with the last -- the</b><br/>20 <b>charging would take three to four hours. It's</b><br/>21 <b>relative medium charging current, not cut-off</b><br/>22 <b>current still charging would charge battery at</b></p> | <p>196</p> <p>1 voltage?<br/>2 <b>A. That's correct.</b><br/>3 Q. So if Uemura had said with the charge<br/>4 constant current at C 50 to 4.3 volts, would that<br/>5 be the limitation under your understanding?<br/>6 <b>A. C over 50 means take 50 hour to charge,</b><br/>7 <b>that's close to be equilibrium. I would consider</b><br/>8 <b>that.</b><br/>9 Q. Okay. If Uemura had indicated charging<br/>10 using constant current, constant voltage to 4.3<br/>11 volts, would that mean the limitation under your<br/>12 understanding?<br/>13 MR. STAMATOPOULOS: Object to the<br/>14 form. Scope.<br/>15 <b>A. Constant current and the constant voltage</b><br/>16 <b>charging would be considered a measure to charge</b><br/>17 <b>the battery to reach equilibrium. Yes.</b><br/>18 Q. (BY MR. COLIN) If Uemura had said it was<br/>19 charged with a constant voltage to 4.3 volts,<br/>20 would that meet the limitation under your<br/>21 understanding?<br/>22 MR. STAMATOPOULOS: Object to</p>                                                                                                                  |

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| <p>197</p> <p>1 form.</p> <p>2 <b>A. During constant voltage charging, we also</b></p> <p>3 <b>need to look at how much the cut-off current. You</b></p> <p>4 <b>know. So in certain conditions, yes, it can reach</b></p> <p>5 <b>equilibrium state when charging.</b></p> <p>6 Q. (BY MR. COLIN) So it's your opinion to</p> <p>7 the board that Uemura actually needs to show an</p> <p>8 electrochemical measurement indicating it was</p> <p>9 fully charged to 4.3 volts to meet the limitation,</p> <p>10 under your understanding?</p> <p>11 MR. STAMATOPOULOS: Object to</p> <p>12 form.</p> <p>13 <b>A. Yes, that's correct.</b></p> <p>14 Q. (BY MR. COLIN) So in paragraph 120 of</p> <p>15 your IPR declaration -- are you there?</p> <p>16 <b>A. Yes.</b></p> <p>17 Q. Okay. The third sentence you say, "While</p> <p>18 the current rate is one of the key factors, many</p> <p>19 other factors come into play, including electrode</p> <p>20 active material density, as particle size and</p> <p>21 distribution, conductivity of the electrode, the</p> <p>22 thickness of the electrode, the surface areas, the</p>                             | <p>199</p> <p>1 Q. (BY MR. COLIN) So it's your opinion</p> <p>2 that, even though Uemura says the battery was</p> <p>3 repeatedly charged to 4.3 volts, Uemura's actual</p> <p>4 batteries were not fully charged to 4.3 volts?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form.</p> <p>7 <b>A. That's correct.</b></p> <p>8 Q. (BY MR. COLIN) So it's your opinion that</p> <p>9 the charging at constant current in Uemura stopped</p> <p>10 before it hit the 4.3 volt limitation?</p> <p>11 MR. STAMATOPOULOS: Object to</p> <p>12 form.</p> <p>13 MR. COLIN: Let me rephrase that.</p> <p>14 Q. (BY MR. COLIN) It's your opinion that</p> <p>15 the charging at constant current in Uemura stopped</p> <p>16 before the battery was charged to 4.3 volts?</p> <p>17 MR. STAMATOPOULOS: Object to</p> <p>18 form.</p> <p>19 <b>A. I -- after charging stops, I would</b></p> <p>20 <b>believe that some equilibrium potential of the</b></p> <p>21 <b>battery will be lower than 4.3 volts.</b></p> <p>22 Q. (BY MR. COLIN) So it's your opinion that</p>                                           |
| <p>198</p> <p>1 compositional electrolyte, temperature, and</p> <p>2 electrode porosity"; right?</p> <p>3 <b>A. Correct.</b></p> <p>4 Q. So it's your understanding that a</p> <p>5 reference must disclose all that information to</p> <p>6 teach a charge cut-off voltage above 4.2 volts?</p> <p>7 MR. STAMATOPOULOS: Object to</p> <p>8 form, scope.</p> <p>9 <b>A. In this paragraph -- Since the battery</b></p> <p>10 <b>charge to 4.3 volt in order to determine if the</b></p> <p>11 <b>battery has reached a charge cut-off voltage of</b></p> <p>12 <b>higher than 4.2 volts, so the potential is about</b></p> <p>13 <b>.1 volts. So in order to answer this question we</b></p> <p>14 <b>need some more information in order to understand</b></p> <p>15 <b>the similar equilibrium battery voltage.</b></p> <p>16 Q. (BY MR. COLIN) The '641 patent doesn't</p> <p>17 describe any of those factors that you list out in</p> <p>18 paragraph 120 of your declaration; correct?</p> <p>19 MR. STAMATOPOULOS: Object to</p> <p>20 form.</p> <p>21 <b>A. I was not asked to look into this</b></p> <p>22 <b>particularly, other potential issues.</b></p> | <p>200</p> <p>1 the charging at a constant current in Uemura</p> <p>2 stopped before the battery was charged at 4.3</p> <p>3 volts; correct?</p> <p>4 MR. STAMATOPOULOS: Object to</p> <p>5 form.</p> <p>6 <b>A. I didn't say "stopped." But if you</b></p> <p>7 <b>measure open circuit voltage of the battery after</b></p> <p>8 <b>charge stops, the voltage would be lower than 4.3</b></p> <p>9 <b>volt.</b></p> <p>10 Q. (BY MR. COLIN) The claim construction</p> <p>11 doesn't require a open circuit voltage; right?</p> <p>12 <b>A. That's how I want to explain that what's</b></p> <p>13 <b>equilibrium means.</b></p> <p>14 Q. So it's your opinion that, under the</p> <p>15 court's claim construction, charge cut-off</p> <p>16 voltage, is that open circuit voltage?</p> <p>17 MR. STAMATOPOULOS: Object to</p> <p>18 form.</p> <p>19 <b>A. You know, you have this claim</b></p> <p>20 <b>construction. The charge cut-off voltage is the</b></p> <p>21 <b>maximum voltage to which the battery is configured</b></p> <p>22 <b>to be charged. So once you're fully charged, it's</b></p> |

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| <p>201</p> <p>1 <b>reach equilibrium.</b></p> <p>2 Q. (BY MR. COLIN) But you're not applying</p> <p>3 "configured to be charged"; right? You're saying</p> <p>4 the battery must be charged to 4.3 volts; correct?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form.</p> <p>7 <b>A. I don't know what's the difference.</b></p> <p>8 Q. (BY MR. COLIN) You don't know what the</p> <p>9 difference between being configured to be charged</p> <p>10 versus actually charged is?</p> <p>11 MR. STAMATOPOULOS: Object to the</p> <p>12 form.</p> <p>13 <b>A. My interpretation is "configured to be</b></p> <p>14 <b>charged" means you're fully charged to reach</b></p> <p>15 <b>equilibrium. You know, after you're charged, you</b></p> <p>16 <b>may not reach equilibrium. You may or may not.</b></p> <p>17 <b>Depends on your charging algorithms.</b></p> <p>18 Q. (BY MR. COLIN) So, to be clear, you</p> <p>19 don't see any difference between a battery being</p> <p>20 configured to be charged to a voltage and a</p> <p>21 battery actually charged to a voltage?</p> <p>22 MR. STAMATOPOULOS: Object to the</p>        | <p>203</p> <p>1 opinions on this. This is the construction.</p> <p>2 You're saying the battery must actually be</p> <p>3 charged. And the construction says it must be</p> <p>4 configured to be charged.</p> <p>5 So I'm asking you, is it your opinion</p> <p>6 that a battery that must be configured to be</p> <p>7 charged to a voltage must be charged to that</p> <p>8 voltage?</p> <p>9 MR. STAMATOPOULOS: Object to the</p> <p>10 form of the question.</p> <p>11 <b>A. It's different.</b></p> <p>12 Q. (BY MR. COLIN) Dr. Yao, you relied on</p> <p>13 Dr. Liang's testing for your analysis in paragraph</p> <p>14 123 and other paragraphs; correct?</p> <p>15 <b>A. That's correct.</b></p> <p>16 Q. You never discussed the testing with</p> <p>17 Dr. Liang before he performed it?</p> <p>18 MR. STAMATOPOULOS: Object to...</p> <p>19 I'm going to caution you not to disclose any</p> <p>20 privileged information. If you can answer without</p> <p>21 divulging privileged communications, please go</p> <p>22 ahead and do so.</p> |
| <p>202</p> <p>1 form.</p> <p>2 <b>A. Well, we just use a charge cut-off</b></p> <p>3 <b>voltage is the definition of this. So charge</b></p> <p>4 <b>cut-off voltage is a battery property. So you</b></p> <p>5 <b>measure the open circuit voltage of the battery at</b></p> <p>6 <b>equilibrium. If it is 4.3 volt, it's 4.3 volt.</b></p> <p>7 <b>With apply voltage at the 4.3 volt doesn't give</b></p> <p>8 <b>you a battery with equilibrium potential for 4.3</b></p> <p>9 <b>volts.</b></p> <p>10 MR. COLIN: That did not answer</p> <p>11 my question, Dr. Yao. Move to strike.</p> <p>12 Q. (BY MR. COLIN) Dr. Yao, you don't see</p> <p>13 any difference between a battery being configured</p> <p>14 to be charged to a voltage and a battery actually</p> <p>15 charged to a voltage. Correct?</p> <p>16 MR. STAMATOPOULOS: Object to</p> <p>17 form.</p> <p>18 <b>A. How do you define a battery actually</b></p> <p>19 <b>charged to 4.3 volt? What -- what's your</b></p> <p>20 <b>definition?</b></p> <p>21 Q. (BY MR. COLIN) Dr. Yao, I'm asking for</p> <p>22 your opinions, because you've provided plenty of</p> | <p>204</p> <p>1 MR. COLIN: I'm not asking for</p> <p>2 any privileged information, Counsel. I'm just</p> <p>3 being very clear. The question is simply, did he</p> <p>4 have a discussion with Dr. Liang about the testing</p> <p>5 before Dr. Liang performed it.</p> <p>6 MR. STAMATOPOULOS: So, again --</p> <p>7 MR. COLIN: That's a "yes" or</p> <p>8 "no" question.</p> <p>9 MR. STAMATOPOULOS: Okay. So you</p> <p>10 can answer "yes" or "no."</p> <p>11 <b>A. No, I didn't.</b></p> <p>12 Q. (BY MR. COLIN) You never discussed the</p> <p>13 testing results with Dr. Liang before you</p> <p>14 submitted your declaration; correct? "Yes" or</p> <p>15 "no" question.</p> <p>16 MR. STAMATOPOULOS: You can</p> <p>17 answer.</p> <p>18 <b>A. I've had one conversation with Dr. Liang</b></p> <p>19 <b>in the presence of counsel.</b></p> <p>20 Q. (BY MR. COLIN) Was that conversation</p> <p>21 before you submitted your IPR declaration or after</p> <p>22 you submitted your IPR declaration?</p>                                      |

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| <p>205</p> <p>1 <b>A. Before I submitted my declaration.</b></p> <p>2 Q. Okay. What did you discuss with</p> <p>3 Dr. Liang?</p> <p>4 <b>A. I'm not -- I'm not lawyer, and the</b></p> <p>5 <b>conversation was with counsel. So I assume it's a</b></p> <p>6 <b>privileged discussion.</b></p> <p>7 MR. COLIN: Counsel, I'm happy to</p> <p>8 take a break on this. If he had a discussion with</p> <p>9 Dr. Liang -- I don't care if counsel was in the</p> <p>10 room -- that is a discoverable conversation, and</p> <p>11 I'm entitled to ask questions about it.</p> <p>12 MR. STAMATOPOULOS: So I think --</p> <p>13 MR. COLIN: We can take a</p> <p>14 break --</p> <p>15 MR. STAMATOPOULOS: Well, let me</p> <p>16 put something on the record first. So I'm happy</p> <p>17 to take a break to discuss this with you, and then</p> <p>18 I'll discuss it with him. I think we may have</p> <p>19 different opinions on the issue. But I want to</p> <p>20 resolve it, and I want to move this along. So</p> <p>21 let's you and I talk first, and then I'll talk to</p> <p>22 him.</p> | <p>207</p> <p>1 MR. STAMATOPOULOS: My</p> <p>2 instruction is that you can answer "yes" or</p> <p>3 "no" -- first of all, if you want to ask that -- I</p> <p>4 don't want to have a dispute with you -- ask him</p> <p>5 if he recalls, and that's non- --</p> <p>6 MR. COLIN: Counsel, I'm entitled</p> <p>7 to ask the questions I want. You could object or</p> <p>8 not. This is improper.</p> <p>9 Q. (BY MR. COLIN) Dr. Yao, my question is,</p> <p>10 what did you discuss with Dr. Liang?</p> <p>11 <b>A. I don't remember what was discussed in</b></p> <p>12 <b>the conversation.</b></p> <p>13 Q. You don't recall anything that you</p> <p>14 discussed with Dr. Liang concerning his testing?</p> <p>15 <b>A. Yeah. It's a few months ago, and -- I</b></p> <p>16 <b>remember I was traveling. So it's a very short,</b></p> <p>17 <b>brief call and, you know, is not really much in my</b></p> <p>18 <b>memory.</b></p> <p>19 Q. So, sitting here today, you remember you</p> <p>20 had a conversation with Dr. Liang before you</p> <p>21 submitted your declaration; correct?</p> <p>22 <b>A. Yes.</b></p> |
| <p>206</p> <p>1 MR. COLIN: Okay. Let's go off</p> <p>2 the record.</p> <p>3 THE VIDEOGRAPHER: Off the record</p> <p>4 at 4:27 p.m.</p> <p>5 (Recess from 4:27 p.m. to 4:40 p.m.)</p> <p>6 THE VIDEOGRAPHER: The time is</p> <p>7 4:40 p.m., and we're back on the record.</p> <p>8 Q. (BY MR. COLIN) Dr. Yao, you testified</p> <p>9 today that before you submitted your IPR</p> <p>10 declaration, you had a conversation with Dr. Liang</p> <p>11 concerning his testing; correct?</p> <p>12 <b>A. I had discussion with Dr. Liang in the</b></p> <p>13 <b>presence of counsel.</b></p> <p>14 Q. What did you discuss with Dr. Liang?</p> <p>15 MR. STAMATOPOULOS: And just to</p> <p>16 be clear because you earlier voiced a concern</p> <p>17 about privilege, you can answer "yes" or "no" if</p> <p>18 you remember what you discussed with Dr. Liang.</p> <p>19 MR. COLIN: Counsel --</p> <p>20 MR. STAMATOPOULOS: That's my --</p> <p>21 MR. COLIN: -- that's not my</p> <p>22 question.</p>                                                                                           | <p>208</p> <p>1 Q. You did not disclose to the board that</p> <p>2 you had a discussion with Dr. Liang concerning his</p> <p>3 testing; correct?</p> <p>4 MR. STAMATOPOULOS: Object to</p> <p>5 form.</p> <p>6 <b>A. There was no requirement for me to</b></p> <p>7 <b>disclose those.</b></p> <p>8 Q. (BY MR. COLIN) So just to be clear, you</p> <p>9 did not indicate in your IPR declaration that you</p> <p>10 had any discussions with Dr. Liang concerning his</p> <p>11 testing; correct?</p> <p>12 <b>A. No, I didn't.</b></p> <p>13 Q. So you're not -- you didn't rely on</p> <p>14 anything you discussed with Dr. Liang concerning</p> <p>15 his testing in your declaration?</p> <p>16 <b>A. No, I didn't. I rely on his -- the</b></p> <p>17 <b>declaration document to form my opinion.</b></p> <p>18 Q. Okay. So if information that you</p> <p>19 discussed with Dr. Liang was not disclosed in his</p> <p>20 declaration, you did not rely on it in providing</p> <p>21 your opinions here?</p> <p>22 MR. STAMATOPOULOS: Object to the</p>                                                               |

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| <p>209</p> <p>1 form. It's a bit of a double negative. Want to<br/>2 clear it up a little bit. I do want this to be a<br/>3 clear line of questioning.<br/>4 <b>A. Can you rephrase your question?</b><br/>5 Q. (BY MR. COLIN) You did not rely on<br/>6 anything discussed with Dr. Liang that was not --<br/>7 if it's not -- let me start again.<br/>8 If something about Dr. Liang's testing is<br/>9 not in his declaration, it was not considered by<br/>10 you in providing your opinions here?<br/>11 <b>A. That's correct.</b><br/>12 Q. So the only thing you relied on in<br/>13 providing your opinions on Dr. Liang's testing is<br/>14 his declaration; correct?<br/>15 <b>A. That's correct.</b><br/>16 Q. You were Dr. Liang's postdoc advisor;<br/>17 correct?<br/>18 <b>A. I was, yes.</b><br/>19 Q. You published multiple references with<br/>20 Dr. Liang as coauthors?<br/>21 <b>A. That's correct.</b><br/>22 Q. You're co-inventors with Dr. Liang on a</p> | <p>211</p> <p>1 <b>A. As far as I know, the income is</b><br/>2 <b>considered revenue. It's not distributed to</b><br/>3 <b>anyone in the company.</b><br/>4 Q. So as a co-owner of LiBeyond, you don't<br/>5 receive a proportion of any revenue?<br/>6 <b>A. At the end of physical year based on</b><br/>7 <b>the -- I think it's not related to the -- I</b><br/>8 <b>withdraw my statement.</b><br/>9 Q. (BY MR. COLIN) Dr. Yao, I'm entitled to<br/>10 know if you received any compensation from<br/>11 Dr. Liang's testing. I'm simply asking, as a<br/>12 co-owner of LiBeyond, you receive a portion of<br/>13 revenue generated by the company in a given year;<br/>14 correct?<br/>15 <b>A. Yes.</b><br/>16 Q. What's your ownership percentage of<br/>17 LiBeyond?<br/>18 <b>A. I'm not sure that's information I</b><br/>19 <b>should -- I need to disclose.</b><br/>20 MR. STAMATOPOULOS: Can we go on<br/>21 a brief break on this? Because I know there's a<br/>22 confidentiality issue, potentially. And, if so,</p> |
| <p>210</p> <p>1 number of patents?<br/>2 <b>A. Correct.</b><br/>3 Q. You're a cofounder of LiBeyond with<br/>4 Dr. Liang; correct?<br/>5 <b>A. Correct.</b><br/>6 Q. Your company, LiBeyond, was contracted to<br/>7 do the testing that Dr. Liang performed for this<br/>8 proceeding; correct?<br/>9 <b>A. That's correct.</b><br/>10 Q. Did the compensation LiBeyond received<br/>11 for that testing go to you partially?<br/>12 <b>A. No.</b><br/>13 Q. How does the compensation received by<br/>14 LiBeyond get distributed between you and<br/>15 Dr. Liang?<br/>16 <b>A. I did not receive compensation from that</b><br/>17 <b>revenue. Decide by CEO of the company.</b><br/>18 Q. Who's the CEO of the company?<br/>19 <b>A. That's Matt Lee.</b><br/>20 Q. Okay. So it's your testimony that any<br/>21 income received by LiBeyond is distributed based<br/>22 on the decisions of Matt Lee?</p>                                                                     | <p>212</p> <p>1 I -- we can resolve it by designating this --<br/>2 <b>A. But I can -- under questioning, I didn't</b><br/>3 <b>receive any compensation from this -- this</b><br/>4 <b>expense.</b><br/>5 Q. (BY MR. COLIN) Let me ask you this. So<br/>6 there would have been revenue generated by<br/>7 LiBeyond this year for the testing. So I<br/>8 understand you say you haven't received revenue<br/>9 yet. But at the end of the year, is the revenue<br/>10 divided up among the owners of the company?<br/>11 <b>A. So in the past several years, I would all</b><br/>12 <b>expect this year would be at loss. That would be</b><br/>13 <b>not -- that's no net profit of the company.</b><br/>14 Q. Dr. Liang provided no controls for his<br/>15 testing; correct?<br/>16 MR. STAMATOPOULOS: Object to<br/>17 form.<br/>18 <b>A. Can you be specific when you say "no</b><br/>19 <b>control"?</b><br/>20 Q. (BY MR. COLIN) Dr. Liang made no control<br/>21 cells; correct?<br/>22 MR. STAMATOPOULOS: Same</p>           |

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| <p>213</p> <p>1 objection.</p> <p>2 <b>A. I provide -- I provide recipe with</b></p> <p>3 <b>counsel. Counsel gave the recipe to Dr. Liang.</b></p> <p>4 <b>In my recipe I didn't prescribe a control</b></p> <p>5 <b>experiment.</b></p> <p>6 Q. (BY MR. COLIN) Dr. Liang didn't make a</p> <p>7 single working cell; correct?</p> <p>8 MR. STAMATOPOULOS: Object to</p> <p>9 form.</p> <p>10 <b>A. I think he did.</b></p> <p>11 Q. (BY MR. COLIN) Where in his declaration</p> <p>12 did he provide a working cell?</p> <p>13 <b>A. Can you provide me the exhibit?</b></p> <p>14 Q. Sure. Actually, where in your</p> <p>15 declaration do you indicate that Dr. Liang made a</p> <p>16 single working cell?</p> <p>17 <b>A. So in my declaration, paragraph 153, so I</b></p> <p>18 <b>described "Dr. Liang successfully synthesized pure</b></p> <p>19 <b>layered lithium .8 manganese .5 cobalt .5 O2 based</b></p> <p>20 <b>on the ion-exchange method. He then tested the</b></p> <p>21 <b>capacity of the synthesized cathode material at</b></p> <p>22 <b>different voltage using lithium metal as the</b></p> | <p>215</p> <p>1 Q. (BY MR. COLIN) Dr. Yao, you don't know</p> <p>2 anywhere in your declaration how many times</p> <p>3 Dr. Liang tried to reproduce any of the examples</p> <p>4 of Uemura; correct?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form.</p> <p>7 <b>A. I think I know how many times, you know,</b></p> <p>8 <b>he tried. I said multiple attempts he tried in</b></p> <p>9 <b>the paragraph 144.</b></p> <p>10 Q. (BY MR. COLIN) So it's your</p> <p>11 understanding that Dr. Liang tried multiple times</p> <p>12 to create example 1 of Uemura?</p> <p>13 MR. STAMATOPOULOS: Object.</p> <p>14 Form.</p> <p>15 <b>A. I think Dr. Liang tried to follow exactly</b></p> <p>16 <b>the Uemura's since his conditions which I</b></p> <p>17 <b>prescribed. He was not able to produce cathode</b></p> <p>18 <b>materials and that he made some adjustment to</b></p> <p>19 <b>synthesize electrolyte in air instead of in argon,</b></p> <p>20 <b>which was taught to synthesize in Uemura's patent.</b></p> <p>21 <b>And also he was not able to form the right phase</b></p> <p>22 <b>of the lithium oxide. I think this is completely</b></p> |
| <p>214</p> <p>1 counter electrode, and the results was consistent</p> <p>2 with what is reported in the literature." So</p> <p>3 reference 105.</p> <p>4 Q. Okay.</p> <p>5 <b>A. I think that's statement where I think he</b></p> <p>6 <b>made working cells.</b></p> <p>7 Q. That's using a different method than the</p> <p>8 method applied in Uemura; correct?</p> <p>9 MR. STAMATOPOULOS: Object to</p> <p>10 form.</p> <p>11 <b>A. That's using ion exchange method. Yeah,</b></p> <p>12 <b>it's different from Uemura disclosed. But that's</b></p> <p>13 <b>the general method the literature has been</b></p> <p>14 <b>reporting that has lead to successful synthesis of</b></p> <p>15 <b>this layered manganese oxide material.</b></p> <p>16 Q. (BY MR. COLIN) Dr. Yao, you don't note</p> <p>17 anywhere in your declaration how many times</p> <p>18 Dr. Liang tried to reproduce any of the examples</p> <p>19 of Uemura; correct?</p> <p>20 MR. STAMATOPOULOS: Object to</p> <p>21 form.</p> <p>22 <b>A. Can you repeat your question?</b></p>                                                           | <p>216</p> <p>1 appropriate.</p> <p>2 <b>So this indicates that Uemura's method</b></p> <p>3 <b>did not lead to the successful synthesis of the</b></p> <p>4 <b>layered lithium oxide.</b></p> <p>5 Q. (BY MR. COLIN) Dr. Yao, you understand</p> <p>6 that Dr. Liang tried to create example 1 of Uemura</p> <p>7 one time; correct?</p> <p>8 MR. STAMATOPOULOS: Object to</p> <p>9 form.</p> <p>10 <b>A. Could you please give me his declaration</b></p> <p>11 <b>form?</b></p> <p>12 Q. (BY MR. COLIN) I'll give you the</p> <p>13 declaration. It doesn't state it. You can look.</p> <p>14 It's not in there. And I can tell you he</p> <p>15 testified that he only tried to create it once.</p> <p>16 MR. STAMATOPOULOS: Is that a</p> <p>17 question?</p> <p>18 MR. COLIN: That's not a</p> <p>19 question. That's a statement.</p> <p>20 MR. STAMATOPOULOS: Do you think</p> <p>21 it's appropriate to be saying this to the witness?</p> <p>22 MR. COLIN: Counsel, that's not</p>                                                                                                                                                                        |

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| <p>217</p> <p>1 an appropriate objection. I don't know what<br/>2 you're doing on the record, to be honest.<br/>3 MR. STAMATOPOULOS: I don't<br/>4 think -- I don't think you have that one right,<br/>5 Jeff.<br/>6 THE REPORTER: Do I mark this?<br/>7 MR. COLIN: You don't need to.<br/>8 You can just give it to the witness. That's not<br/>9 the one I was looking for.<br/>10 This is already marked as Exhibit<br/>11 31. The Liang declaration.<br/>12 Q. (BY MR. COLIN) My question, Dr. Yao, is<br/>13 you understand that Dr. Liang only tried to create<br/>14 example 1 of Uemura one time following the<br/>15 teachings of Uemura; correct?<br/>16 MR. STAMATOPOULOS: Object to<br/>17 form.<br/>18 <b>A. Yes.</b><br/>19 Q. (BY MR. COLIN) Dr. Yao, you understand<br/>20 that Dr. Liang only tried to create example 2 of<br/>21 Uemura one time following the teachings of Uemura;<br/>22 correct?</p>                                                                                                                            | <p>219</p> <p>1 <b>times trial; it's the correctness of the procedure</b><br/>2 <b>of synthesis. In the -- as I have pointed out in</b><br/>3 <b>my declaration, there are many reports saying that</b><br/>4 <b>I change method, as the desire method for</b><br/>5 <b>synthesis layered manganese oxide material. And</b><br/>6 <b>many people tried, you know, the similar method</b><br/>7 <b>proposed by Uemura and does not lead to success</b><br/>8 <b>synthesis. You can try a hundred times, I -- is</b><br/>9 <b>hypothetical condition -- even try a hundred</b><br/>10 <b>times, that would not able to lead to the success</b><br/>11 <b>synthesis of this material.</b><br/>12 Q. (BY MR. COLIN) So it's your opinion to<br/>13 the board that the data made up in Uemura, that<br/>14 the data in Figure 3 is just made up, it's just<br/>15 fake data?<br/>16 MR. STAMATOPOULOS: Object to<br/>17 form.<br/>18 <b>A. So in paragraph 173, basically I state --</b><br/>19 <b>sorry. Paragraph one -- end of the paragraph 172,</b><br/>20 <b>"A POSA with satisfactory results highly</b><br/>21 <b>improbable, indeed impossible, and with the</b><br/>22 <b>question whether data was would generate</b></p> |
| <p>218</p> <p>1 <b>A. That's true.</b><br/>2 Q. Dr. Yao, you understand that Dr. Liang<br/>3 only tried to create example 3 of Uemura one time<br/>4 following the teachings of Uemura; correct?<br/>5 <b>A. Yes.</b><br/>6 Q. So it's your testimony to the board that<br/>7 one failed attempt to make example 1 shows<br/>8 evidence of nonenablement of example 1?<br/>9 MR. STAMATOPOULOS: Object to<br/>10 form.<br/>11 <b>A. Based on Dr. Liang's declaration, I</b><br/>12 <b>believe Uemura's teaching of the synthesized</b><br/>13 <b>material is wrong. No matter how many tries you</b><br/>14 <b>make, if it's the wrong method, you will not be</b><br/>15 <b>able to make a successful synthesis of the</b><br/>16 <b>material no matter how many times you try.</b><br/>17 Q. (BY MR. COLIN) Dr. Yao, one failed<br/>18 attempt at synthesizing a material shows evidence<br/>19 of nonenablement, in your opinion?<br/>20 MR. STAMATOPOULOS: Object to<br/>21 form.<br/>22 <b>A. My opinion is -- is not the number of the</b></p> | <p>220</p> <p>1 <b>experimental data." In paragraph 173 in the</b><br/>2 <b>end --</b><br/>3 Q. (BY MR. COLIN) Let's stop there for a<br/>4 second, Dr. Yao. You testified earlier today that<br/>5 reviewing Figure 3, it's your understanding that<br/>6 the data for the capacity of the cathode ratio is<br/>7 calculated data; correct?<br/>8 MR. STAMATOPOULOS: Object to<br/>9 form.<br/>10 <b>A. Can you -- can you repeat?</b><br/>11 Q. (BY MR. COLIN) Yeah. You testified<br/>12 earlier today that, after reviewing Figure 3, that<br/>13 you believe that the data for the capacity of the<br/>14 cathode is calculated based on simply multiplying<br/>15 the molar ratio of lithium by 180; correct?<br/>16 MR. STAMATOPOULOS: Object to<br/>17 form.<br/>18 <b>A. That's correct.</b><br/>19 Q. (BY MR. COLIN) So under that<br/>20 understanding, there would be no errors in the<br/>21 capacity values, right, because they're<br/>22 calculated, in your opinion?</p>                                                                                                                                                                                                                                       |

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| <p style="text-align: right;">221</p> <p>1 MR. STAMATOPOULOS: Object to<br/>2 form.<br/>3 <b>A. I think Uemura is intent to present</b><br/>4 <b>Figure 3 as experimental data.</b><br/>5 Q. (BY MR. COLIN) Where does Uemura say the<br/>6 capacity data is experimental?<br/>7 And I'll point you to page -- paragraph<br/>8 130 of your declaration and specifically...<br/>9 So in paragraph 130 you indicate, "On the<br/>10 calculated side, Uemura uses the total capacity of<br/>11 the cathode material to calculate the capacity<br/>12 balance which was allegedly experimentally<br/>13 determined," and you have footnote 77, which cites<br/>14 a Uemura at 81 and 102.<br/>15 So I would like you to go to Uemura at<br/>16 paragraph 81 and show me where in Uemura he says<br/>17 the data is experimentally determined for the<br/>18 capacity.<br/>19 <b>A. On Uemura's patent -- Uemura's patent.</b><br/>20 <b>So, you know, paragraph 74 to 79 basic describes</b><br/>21 <b>the methods of fabrication of batteries. And</b><br/>22 <b>paragraph 81 describe experimental transition.</b></p>               | <p style="text-align: right;">223</p> <p>1 Q. (BY MR. COLIN) You're making that<br/>2 assumption based on the disclosures in Uemura.<br/>3 Uemura doesn't say that the capacity was actually<br/>4 measured; correct?<br/>5 <b>A. Well, the cycle life you cannot -- the</b><br/>6 <b>cycle life must be an experimental measure. You</b><br/>7 <b>cannot theoretically predict cycle life.</b><br/>8 Q. I agree with you there, Doctor. But my<br/>9 question is simply, you're making an assumption<br/>10 based on those paragraphs in Uemura that the<br/>11 capacity is experimentally measured; correct?<br/>12 MR. STAMATOPOULOS: Object to<br/>13 form.<br/>14 <b>A. Yeah, that's my assumption, correct,</b><br/>15 <b>because that's, you know, if -- what's the point</b><br/>16 <b>of making battery and testing without monitoring</b><br/>17 <b>the battery data? So that's my assumption; it's</b><br/>18 <b>experimental.</b><br/>19 Q. (BY MR. COLIN) Well, the experimental<br/>20 actually described there, that's for the cycling;<br/>21 correct? As you said, that is experimental, and<br/>22 that's in Figure 1 -- or Figure 3; right?</p>            |
| <p style="text-align: right;">222</p> <p>1 "The charge-discharge was repeatedly performed at<br/>2 a constant rate of .5 milliamp centimeters squared<br/>3 and a voltage ranging from 4.3 to 2.0 volt at an<br/>4 atmospheric temperature of 60 degrees C."<br/>5 And the last sentence, "A result thereof<br/>6 is shown in Table 1 together with the other<br/>7 values."<br/>8 So also in paragraph 102, "As apparent<br/>9 from the results shown in table of Figure 3, while<br/>10 the comparative example employing the lithium<br/>11 metal plate without total irreversible capacity<br/>12 negative electrode exhibits only 10 cycle of<br/>13 resistance, it was found out that the respective<br/>14 example of the present invention exhibit the<br/>15 cyclic resistance of roughly 10 to 35 cycles."<br/>16 So table -- Figure 3 describes a<br/>17 lifetime, number of cycles of different examples.<br/>18 And they discuss how they made the battery, how<br/>19 they test the battery.<br/>20 So this was leading to attribute E. This<br/>21 data presented here is experimental determined<br/>22 value.</p> | <p style="text-align: right;">224</p> <p>1 <b>A. Yeah. But typically we present all</b><br/>2 <b>experimental data in the same figure. You do not</b><br/>3 <b>present some -- some as theoretical, some</b><br/>4 <b>experimental.</b><br/>5 Q. Let me ask you this. The '641 patented<br/>6 discloses cycling results, but it does not<br/>7 disclose theoretic capacity of the electrodes at<br/>8 4.2 volts, correct, for any of the examples?<br/>9 <b>A. I think the, you know, '641 patent</b><br/>10 <b>discuss, you know, theoretic capacity for 4.2</b><br/>11 <b>volt. In the first comment; right? So the</b><br/>12 <b>practical capacity that you referred to is about</b><br/>13 <b>one -- you know, something --</b><br/>14 Q. (BY MR. COLIN) No, Dr. Yao, I'm asking<br/>15 you about the examples.<br/>16 <b>A. Examples. Okay.</b><br/>17 Q. Right? The '641 patent, if you look at,<br/>18 for example, example 1, it gives you the capacity<br/>19 of the battery, and it gives you the capacity<br/>20 after 400 cycles. Right? It doesn't give you a<br/>21 measured capacity of the anode and a measured<br/>22 capacity of the cathode; correct?</p> |

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| <p>225</p> <p>1 <b>A. That's correct.</b></p> <p>2 Q. If you turn to paragraph 125 of your</p> <p>3 declaration, you publish Figure 3 of Uemura;</p> <p>4 correct?</p> <p>5 <b>A. Correct.</b></p> <p>6 Q. Okay. And Uemura discloses a capacity</p> <p>7 balance of the positive electrode to the negative</p> <p>8 electrode; correct?</p> <p>9 <b>A. That's correct.</b></p> <p>10 Q. Okay. So, for example 1, Uemura reports</p> <p>11 a capacity ratio of 1 to 1.3; correct?</p> <p>12 <b>A. Yes.</b></p> <p>13 Q. 1.3 falls within a range of 1 to 2.5;</p> <p>14 correct?</p> <p>15 <b>A. That's correct.</b></p> <p>16 Q. 1.5 falls within the range of 1 to 2.5?</p> <p>17 <b>A. That's correct.</b></p> <p>18 Q. 1.1 to 1 falls within the range of 1 to</p> <p>19 2.5; correct?</p> <p>20 <b>A. That's correct.</b></p> <p>21 Q. So all of the examples in Figure 3 of</p> <p>22 Uemura provide a capacity balance that falls</p>                                                                                                                                          | <p>227</p> <p>1 <b>material. So inactive material should now be</b></p> <p>2 <b>used, according to claim construction.</b></p> <p>3 Q. (BY MR. COLIN) You believe that inactive</p> <p>4 material has a capacity?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form.</p> <p>7 <b>A. As I stated in the paragraph 114,</b></p> <p>8 <b>according to Uemura, the irreversible capacity of</b></p> <p>9 <b>anode material is directly proportional to the</b></p> <p>10 <b>noncarbon content. The more impure the anode</b></p> <p>11 <b>material is, the more reversible capacity the</b></p> <p>12 <b>anode material has. So, in other words, according</b></p> <p>13 <b>to Uemura, the sole purpose of alleged noncarbon</b></p> <p>14 <b>content was to create irreversible capacity.</b></p> <p>15 Q. (BY MR. COLIN) Uemura specifically</p> <p>16 describes the use of complex oxide or nitrides as</p> <p>17 negative electrode material; correct?</p> <p>18 <b>A. I think Uemura was using hydrocarbon with</b></p> <p>19 <b>noncarbon content as anode material.</b></p> <p>20 Q. If you turn to paragraph 29 of Uemura --</p> <p>21 <b>A. Yes.</b></p> <p>22 Q. -- Uemura explicitly teaches the negative</p>               |
| <p>226</p> <p>1 within a range of 1 to 2.5; correct?</p> <p>2 MR. STAMATOPOULOS: Object to</p> <p>3 form.</p> <p>4 <b>A. The ratio is correct, but the whole they</b></p> <p>5 <b>calculate is wrong.</b></p> <p>6 Q. (BY MR. COLIN) Okay. I understand your</p> <p>7 position. But if the board finds that the</p> <p>8 capacity ratio limitation is not limited to</p> <p>9 theoretic capacity, the examples of Uemura</p> <p>10 disclose the claimed capacity ratio; correct?</p> <p>11 MR. STAMATOPOULOS: Object to the</p> <p>12 form.</p> <p>13 <b>A. Can you repeat the question?</b></p> <p>14 Q. (BY MR. COLIN) If the board finds that</p> <p>15 the capacity ratio limitation is not limited to</p> <p>16 theoretic capacity, the examples of Uemura</p> <p>17 disclose the claimed capacity ratio; correct?</p> <p>18 MR. STAMATOPOULOS: Object to the</p> <p>19 form.</p> <p>20 <b>A. Those are not correct. In the paragraph</b></p> <p>21 <b>179, page 71, so Uemura calculates the capacity</b></p> <p>22 <b>balance use anode capacity that include inactive</b></p> | <p>228</p> <p>1 electrode material described above is not limited</p> <p>2 to carbon material but various complex oxide or</p> <p>3 nitride can also be used. When these materials</p> <p>4 are employed as a negative electrode material, it</p> <p>5 is recommended to use negative electrode</p> <p>6 material -- and it goes on.</p> <p>7 Uemura discloses the use of complex oxide</p> <p>8 or nitrides in paragraphs 29 and paragraphs 53 as</p> <p>9 active material; correct?</p> <p>10 <b>A. In paragraph 30 in the same patent it</b></p> <p>11 <b>also state, "It should be noted that, in the case</b></p> <p>12 <b>where a carbon material is employed as negative</b></p> <p>13 <b>electrode material of the rechargeable lithium</b></p> <p>14 <b>battery, the irreversible capacity..."</b></p> <p>15 <b>So in addition to the oxide nitride you</b></p> <p>16 <b>mentioned, the carbon material is also used as a</b></p> <p>17 <b>negative electrode --</b></p> <p>18 Q. Right. But doesn't Uemura disclose the</p> <p>19 use of complex oxide or nitrides to increase the</p> <p>20 irreversible capacity of the electrode because the</p> <p>21 lithium plates to it?</p> <p>22 MR. STAMATOPOULOS: Object to</p> |

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| <p>229</p> <p>1 form.</p> <p>2 <b>A. To my understanding, there's no good</b></p> <p>3 <b>oxide in the nitride anode negative electrode</b></p> <p>4 <b>materials. I think the majorities in negative</b></p> <p>5 <b>electrode material discussed in this Uemura's</b></p> <p>6 <b>patent is carbon materials.</b></p> <p>7 Q. (BY MR. COLIN) So you didn't just -- you</p> <p>8 didn't provide any opinions on the fact that</p> <p>9 Uemura discloses complex oxides or nitrides that</p> <p>10 can actually affect intercalation to increase the</p> <p>11 reversible capacity of the electrode?</p> <p>12 MR. STAMATOPOULOS: Object to</p> <p>13 form.</p> <p>14 <b>A. In the paragraph 91 to 98, all examples 9</b></p> <p>15 <b>to 16, they all use carbon as a negative</b></p> <p>16 <b>electrode. I think I didn't provide my opinion</b></p> <p>17 <b>using nitride and oxide as anode material.</b></p> <p>18 Q. (BY MR. COLIN) So you're focusing only</p> <p>19 on the examples which have the very low</p> <p>20 irreversible capacity?</p> <p>21 <b>A. Well, I was only look at that page.</b></p> <p>22 <b>So...</b></p> | <p>231</p> <p>1 <b>negative.</b></p> <p>2 Q. (BY MR. COLIN) Okay. So, to be clear,</p> <p>3 paragraph 33 of Uemura discloses a ratio of</p> <p>4 positive electrode material -- of negative</p> <p>5 electrode material to positive electrode material</p> <p>6 of 1 to 1.5; correct?</p> <p>7 <b>A. That's correct.</b></p> <p>8 Q. Okay. A range of 1 to 1.5 falls within a</p> <p>9 range of 1 to 2.5; correct?</p> <p>10 <b>A. That's correct.</b></p> <p>11 Q. Paragraph 33 just refers to capacity;</p> <p>12 correct?</p> <p>13 MR. STAMATOPOULOS: Object to</p> <p>14 form.</p> <p>15 MR. COLIN: Let me rephrase.</p> <p>16 Q. (BY MR. COLIN) Paragraph 33 doesn't</p> <p>17 refer to theoretic capacity; right?</p> <p>18 <b>A. It's not clear to me what "capacity"</b></p> <p>19 <b>refers to.</b></p> <p>20 Q. Dr. Yao, paragraph 33 doesn't mention</p> <p>21 "theoretic capacity"; right?</p> <p>22 <b>A. Yes, it didn't.</b></p>                                                                   |
| <p>230</p> <p>1 Q. You provide no opinions in your</p> <p>2 declaration concerning Uemura's disclosure of the</p> <p>3 use of complex oxides or nitrides; right? That's</p> <p>4 just not in your declaration?</p> <p>5 <b>A. That's correct.</b></p> <p>6 Q. Okay. In paragraph 126 of your</p> <p>7 declaration, you cite to paragraph 33 of Uemura;</p> <p>8 correct?</p> <p>9 <b>A. 126?</b></p> <p>10 Q. 126.</p> <p>11 <b>A. That's correct.</b></p> <p>12 Q. Okay. Uemura indicates in paragraph 33</p> <p>13 that the capacity ratio should be fixed at a range</p> <p>14 of 1 to 1.5 anode to cathode; correct?</p> <p>15 MR. STAMATOPOULOS: Object to</p> <p>16 form.</p> <p>17 <b>A. It said, "the total capacity B of the</b></p> <p>18 <b>negative electrode material to the total capacity</b></p> <p>19 <b>A of the positive electrode material." So, you</b></p> <p>20 <b>know, positive and negative sometimes can be --</b></p> <p>21 <b>you know, be used as cathode anode, but cathode</b></p> <p>22 <b>anode is less strict compared to positive and</b></p>                                                         | <p>232</p> <p>1 Q. Paragraph 33 doesn't mention "practical</p> <p>2 specific capacity"; right?</p> <p>3 <b>A. No. It talk about capacity.</b></p> <p>4 Q. Right. So it's your opinion that</p> <p>5 discussion of capacity within a range of 1 to 1.5</p> <p>6 does not anticipate or render obvious the claimed</p> <p>7 range; correct?</p> <p>8 <b>A. That's correct.</b></p> <p>9 Q. In paragraph 127, you indicate that you</p> <p>10 consider paragraph 33 of Uemura and Figure 3 to be</p> <p>11 one and the same; correct?</p> <p>12 MR. STAMATOPOULOS: Object to</p> <p>13 form.</p> <p>14 <b>A. Can you repeat the last few words in the</b></p> <p>15 <b>sentence -- question?</b></p> <p>16 Q. (BY MR. COLIN) You state -- you refer to</p> <p>17 paragraph 33 of Uemura, then you refer to Figure 3</p> <p>18 of Uemura, and you state, "I, therefore, consider</p> <p>19 the two aspects of Uemura one and the same";</p> <p>20 correct?</p> <p>21 MR. STAMATOPOULOS: Object to</p> <p>22 form.</p> |

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| <p>233</p> <p>1 <b>A. That's correct.</b></p> <p>2 Q. (BY MR. COLIN) So you believe that</p> <p>3 disclosed range of capacities and specific</p> <p>4 embodiments should be treated as one and the same</p> <p>5 for an invalidity analysis?</p> <p>6 MR. STAMATOPOULOS: Object to</p> <p>7 form.</p> <p>8 <b>A. Repeat the last two sentence -- two</b></p> <p>9 <b>words?</b></p> <p>10 Q. (BY MR. COLIN) Yeah. You treat a</p> <p>11 disclosed capacity range and specific embodiments</p> <p>12 as one and the same for your invalidity analysis;</p> <p>13 correct?</p> <p>14 MR. STAMATOPOULOS: Object to</p> <p>15 form.</p> <p>16 <b>A. I don't know those.</b></p> <p>17 Q. (BY MR. COLIN) Can you repeat that?</p> <p>18 <b>A. I do not know that. I do not have answer</b></p> <p>19 <b>to your question.</b></p> <p>20 Q. Well, you state in 127, you told the</p> <p>21 board that you considered the two aspects of</p> <p>22 Uemura one and the same; correct? Those words are</p> | <p>235</p> <p>1 Q. You provide no analysis that paragraph 33</p> <p>2 of Uemura is not enabled in your declaration;</p> <p>3 correct?</p> <p>4 MR. STAMATOPOULOS: Object to</p> <p>5 form.</p> <p>6 <b>A. Can you repeat?</b></p> <p>7 Q. (BY MR. COLIN) You provide no analysis</p> <p>8 in your declaration that paragraph 33 of Uemura is</p> <p>9 not enabled in your declaration; correct?</p> <p>10 MR. STAMATOPOULOS: Same</p> <p>11 objection.</p> <p>12 <b>A. I think I provide analysis to support --</b></p> <p>13 Q. (BY MR. COLIN) Well, I understand --</p> <p>14 <b>A. -- paragraph 33 is incorrect.</b></p> <p>15 Q. -- that you provided analysis about the</p> <p>16 cathode materials. I understand that. That's</p> <p>17 clearly within your declaration. I'm asking you a</p> <p>18 very specific question. I have not seen it in</p> <p>19 here.</p> <p>20 You provide no analysis in your</p> <p>21 declaration that paragraph 33 of Uemura, which</p> <p>22 just discloses a claim capacity ratio, is not</p>                                                                                       |
| <p>234</p> <p>1 there?</p> <p>2 <b>A. Yes.</b></p> <p>3 Q. Sitting here today, you have no opinion</p> <p>4 on whether you treated a disclosed range and</p> <p>5 specific embodiments as one and the same for your</p> <p>6 analysis?</p> <p>7 MR. STAMATOPOULOS: Object to</p> <p>8 form.</p> <p>9 <b>A. That's not the question you asked</b></p> <p>10 <b>earlier. Can you ask the same question? I think</b></p> <p>11 <b>it's different.</b></p> <p>12 Q. (BY MR. COLIN) Dr. Yao, sitting here</p> <p>13 today, you have no opinion on whether you treated</p> <p>14 the disclosed range in paragraph 33 and the</p> <p>15 specific embodiments in Figure 3 as one and the</p> <p>16 same in your analysis?</p> <p>17 MR. STAMATOPOULOS: Same</p> <p>18 objection.</p> <p>19 <b>A. I state there are the two aspects of</b></p> <p>20 <b>Uemura one and the same.</b></p> <p>21 Q. (BY MR. COLIN) Okay.</p> <p>22 <b>A. That's correct.</b></p>                                             | <p>236</p> <p>1 enabled; correct?</p> <p>2 MR. STAMATOPOULOS: Object to the</p> <p>3 form.</p> <p>4 <b>A. I provide analysis in my declaration, 142</b></p> <p>5 <b>paragraph. I said -- stated, "As shown in the</b></p> <p>6 <b>table below, if the correct capacities are used to</b></p> <p>7 <b>calculate the claimed ratio of the '641 patent,</b></p> <p>8 <b>all of the examples have ratios falling outside</b></p> <p>9 <b>the claimed range, as shown in the yellow</b></p> <p>10 <b>highlight column. In other words, all" --</b></p> <p>11 Q. (BY MR. COLIN) That paragraph is</p> <p>12 directed to Figure 3, Dr. Yao; right? I'm not</p> <p>13 trying to be difficult here, but I'm asking a very</p> <p>14 specific question. You had --</p> <p>15 <b>A. That's my analysis.</b></p> <p>16 Q. On Figure 3. Correct?</p> <p>17 <b>A. Yes.</b></p> <p>18 Q. You don't provide the opinion in your</p> <p>19 declaration that paragraph 33 of Uemura is not</p> <p>20 enabled; correct? You simple apply your analysis</p> <p>21 that the cathode materials of Figure 3 are not</p> <p>22 enabled; correct?</p> |

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| <p>237</p> <p>1 MR. STAMATOPOULOS: Object to<br/>2 form.<br/>3 <b>A. No, I didn't provide opinion on this.</b><br/>4 Q. (BY MR. COLIN) Prior to his testing for<br/>5 this case, Dr. Liang never tried making materials<br/>6 similar -- similar to those in Uemura; correct?<br/>7 MR. STAMATOPOULOS: Object to<br/>8 form.<br/>9 <b>A. I'm not sure.</b><br/>10 Q. (BY MR. COLIN) That's not something you<br/>11 considered in relying on it, in your declaration;<br/>12 correct?<br/>13 <b>A. That's correct.</b><br/>14 Q. Okay. Dr. Liang provided no pictures of<br/>15 his experiments to support his declaration;<br/>16 correct?<br/>17 MR. STAMATOPOULOS: Object to the<br/>18 form.<br/>19 <b>A. All I rely on is his report. I didn't</b><br/>20 <b>see pictures.</b><br/>21 Q. (BY MR. COLIN) Dr. Liang didn't provide<br/>22 the actual data to you prior to you submitting</p>                                                                                                                                          | <p>239</p> <p>1 THE VIDEOGRAPHER: Off the record<br/>2 at 5:34 p.m.<br/>3 (Recess from 5:34 p.m. to 5:43 p.m.)<br/>4 THE VIDEOGRAPHER: The time is<br/>5 5:43 p.m., and we're back on the record.<br/>6 Q. (BY MR. COLIN) Turning to paragraph 144<br/>7 of your IPR declaration, you don't provide an<br/>8 opinion on how much experimentation is undue<br/>9 experimentation in your declaration; correct?<br/>10 MR. STAMATOPOULOS: Object to<br/>11 form.<br/>12 <b>A. In this paragraph I state he make</b><br/>13 <b>"multiple attempts and further improvements," he</b><br/>14 <b>make some adjustment, for example, in the</b><br/>15 <b>annealing condition in the air. But he was still</b><br/>16 <b>not able to reproduce the secondary lithium ion</b><br/>17 <b>battery with a performance process described by</b><br/>18 <b>Uemura. So I'm not sure what "undue experiment"</b><br/>19 <b>really means.</b><br/>20 Q. (BY MR. COLIN) Right. And I'm just<br/>21 confirming -- I understand Dr. Liang made one<br/>22 attempt using Uemura's procedures and one attempt</p>                                                                                                       |
| <p>238</p> <p>1 your declaration; correct?<br/>2 <b>A. Can you repeat?</b><br/>3 Q. Dr. Liang didn't provide the actual data,<br/>4 which was not included in his report, prior to you<br/>5 submitting your declaration; correct?<br/>6 <b>A. So you're referring to raw data -- I</b><br/>7 <b>referring raw data for the data testers?</b><br/>8 Q. Yeah, the actual machine data that came<br/>9 out, which was produced after Dr. Liang's<br/>10 deposition, that's not something that you relied<br/>11 on in considering his declaration; correct?<br/>12 <b>A. He didn't provide, but that's no reason</b><br/>13 <b>to doubt the -- the accuracy of his data.</b><br/>14 Q. If you turn to paragraph 144 of your<br/>15 declaration.<br/>16 MR. STAMATOPOULOS: Jeff,<br/>17 question. Do you have a lot more on this line? I<br/>18 don't want to cut you off. Just wondering if it's<br/>19 a good time to take a brief break.<br/>20 MR. COLIN: We could take a break<br/>21 if you want.<br/>22 MR. STAMATOPOULOS: Okay.</p> | <p>240</p> <p>1 using his alleged further improvement. But you<br/>2 don't provide any opinion specifically on how much<br/>3 testing is required to be undue experimentation;<br/>4 correct?<br/>5 MR. STAMATOPOULOS: Object to<br/>6 form.<br/>7 <b>A. You are correct.</b><br/>8 Q. (BY MR. COLIN) In paragraph 147, you<br/>9 don't provide any basis for your statement that<br/>10 examples 1 to 4 are representative of the cathode<br/>11 active materials in examples 5 to 17; correct?<br/>12 <b>A. Actually, that's not true. In fact, I</b><br/>13 <b>provide the explanation in the same paragraph.</b><br/>14 <b>Here is what I stated. So "example 1 to 5 -- 1 to</b><br/>15 <b>5 purposely have the best cycle life of among all</b><br/>16 <b>17 examples. Further, example 2 is representative</b><br/>17 <b>of all examples in Uemura as it contains both</b><br/>18 <b>alleged innovative aspects of Uemura, namely that</b><br/>19 <b>example 2 purports to use a lithium deficient</b><br/>20 <b>cobalt doped lithium manganese oxide as the</b><br/>21 <b>cathode active material and also use an anode</b><br/>22 <b>material with more irreversible capacity than</b></p> |

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| <p style="text-align: right;">241</p> <p>1 conventional anode materials."<br/>2 So "Accordingly, a POSA would reasonably<br/>3 expect that when trying to reproduce the example<br/>4 in Uemura, those examples, which is cathode<br/>5 material in example 1 to 4 and example 2 battery,<br/>6 should have the best chance of being reproduced."<br/>7 So that's the reason --<br/>8 Q. So the only reason why you say examples 1<br/>9 to 4 are representative of the other examples are<br/>10 because they allegedly had the best cycle life?<br/>11 MR. STAMATOPOULOS: Object to<br/>12 form.<br/>13 A. That's one of the reason. There's other<br/>14 reasons I just described.<br/>15 Q. (BY MR. COLIN) The other reasons for<br/>16 talking about example 2 of the anode material;<br/>17 correct?<br/>18 A. It's a combination of the cathode and,<br/>19 you know, anode material --<br/>20 Q. Dr. Yao, examples 1 to 9 were made by a<br/>21 coprecipitation method; right?<br/>22 A. Can you repeat?</p>                                          | <p style="text-align: right;">243</p> <p>1 described in Uemura at paragraphs 69 to 71;<br/>2 correct?<br/>3 A. That's correct.<br/>4 Q. (BY MR. COLIN) Examples 10 to 17 were<br/>5 made by --<br/>6 MR. STAMATOPOULOS: Jeff --<br/>7 Q. (BY MR. COLIN) -- use of a solid phase<br/>8 mixing method, correct, as described in paragraphs<br/>9 69 and 72 to 73?<br/>10 MR. STAMATOPOULOS: Objection to<br/>11 form.<br/>12 A. That's correct.<br/>13 Q. (BY MR. COLIN) You provide no analysis<br/>14 regarding those two different fabrication methods<br/>15 in your declaration; correct?<br/>16 MR. STAMATOPOULOS: Object to<br/>17 form.<br/>18 A. In the paragraph 148 in my declaration I<br/>19 basically state that "Uemura disclose -- disclose<br/>20 all three cathode materials in example 1 through 4<br/>21 were prepared according to a coprecipitation<br/>22 method described at paragraph 71." And that's all</p>                                                                                                      |
| <p style="text-align: right;">242</p> <p>1 Q. Examples 1 to 9 of Uemura were made by a<br/>2 coprecipitation method, as described in Uemura at<br/>3 paragraph 69 to 71?<br/>4 MR. STAMATOPOULOS: Can we go off<br/>5 the record for a second?<br/>6 MR. COLIN: There's no basis to<br/>7 go off the record when there's a question pending,<br/>8 Counsel.<br/>9 MR. STAMATOPOULOS: This has<br/>10 nothing to do with this question. This has<br/>11 something to do with -- I -- I need -- I need to<br/>12 resolve -- I have a dispute with you. And I can<br/>13 put it on the record; I can put it off the record.<br/>14 We can wait for him to answer your question. But<br/>15 we're going to need to do this promptly.<br/>16 MR. COLIN: This is<br/>17 inappropriate, Counsel.<br/>18 MR. STAMATOPOULOS: Please answer<br/>19 the question, and afterwards I'll ask that we go<br/>20 on the record. You can repeat your question.<br/>21 Q. (BY MR. COLIN) Dr. Yao, examples 1 to 9<br/>22 of Uemura were made by a coprecipitation method as</p> | <p style="text-align: right;">244</p> <p>1 the same method -- recipe I prescribed to counsel;<br/>2 so instruct totally on two -- two sentences.<br/>3 Q. (BY MR. COLIN) Dr. Yao, that didn't<br/>4 answer my question. My question was simply, you<br/>5 provide no analysis regarding the two different<br/>6 synthesis methods of examples 1 to 9 and examples<br/>7 10 to 17 of Uemura; correct?<br/>8 MR. STAMATOPOULOS: Object to<br/>9 form.<br/>10 A. Because I only instruct Dr. Liang to<br/>11 synthesize examples 1 to 4; so, you are right, I<br/>12 didn't provide a comparative analysis on these two<br/>13 methods.<br/>14 MR. COLIN: Let's take a break.<br/>15 THE VIDEOGRAPHER: Off the record<br/>16 at 5:51 p.m.<br/>17 (Recess from 5:51 p.m. to 5:53 p.m.)<br/>18 THE VIDEOGRAPHER: The time is<br/>19 5:53 p.m., and we're back on the record.<br/>20 Q. (BY MR. COLIN) Dr. Yao, you indicated<br/>21 that the anode of example 2 is representative of<br/>22 the anode of all the other examples in Uemura;</p> |

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| <p>245</p> <p>1 correct?</p> <p>2 MR. STAMATOPOULOS: Object to</p> <p>3 form.</p> <p>4 Q. (BY MR. COLIN) That's in paragraph 147.</p> <p>5 <b>A. This statement here, anode materials,</b></p> <p>6 <b>example 2, has more irreversible capacity. I</b></p> <p>7 <b>think this -- you know, according to the patent</b></p> <p>8 <b>this would have the highest cycle life. I'm not</b></p> <p>9 <b>saying that is representative of all examples in</b></p> <p>10 <b>Figure 3. Because clearly --</b></p> <p>11 Q. Dr. Yao, you say specifically in</p> <p>12 paragraph 147, "Example 2 is representative of all</p> <p>13 examples in Uemura"; correct?</p> <p>14 <b>A. Yes.</b></p> <p>15 Q. Example 2 has an anode with a total</p> <p>16 irreversible capacity of .44; correct?</p> <p>17 <b>A. .44 milliamp-hour.</b></p> <p>18 Q. There's multiple examples which use an</p> <p>19 anode that has very little irreversible capacity,</p> <p>20 .002; correct?</p> <p>21 <b>A. That's correct.</b></p> <p>22 Q. You provide no analysis about how the</p>                                                                                                                                                                | <p>247</p> <p>1 Q. My question is simply, you provided no</p> <p>2 analysis about how the anode of example 2, which</p> <p>3 has a relatively high irreversible capacity as you</p> <p>4 put it, more than the conventional anode, is</p> <p>5 representative of anodes that have extremely low</p> <p>6 irreversible capacity such as the anode of example</p> <p>7 9; correct? That analysis is not in your report?</p> <p>8 MR. STAMATOPOULOS: Object to</p> <p>9 form.</p> <p>10 <b>A. I did an analysis because the claim of</b></p> <p>11 <b>the Uemura patent is saying higher irreversible is</b></p> <p>12 <b>better for cycle life. So that's why there's no</b></p> <p>13 <b>reason we need to perform that type of analysis.</b></p> <p>14 Q. (BY MR. COLIN) So you think you could</p> <p>15 just ignore the embodiments of Uemura that have an</p> <p>16 extremely low irreversible capacity in the anode?</p> <p>17 <b>A. We didn't explore --</b></p> <p>18 MR. STAMATOPOULOS: Object to --</p> <p>19 Sorry. Let me put in my objection. Object to</p> <p>20 form. You can answer.</p> <p>21 <b>A. Can you repeat your question?</b></p> <p>22 Q. (BY MR. COLIN) To me you still haven't</p> |
| <p>246</p> <p>1 anode of example 2 is representative of the anode</p> <p>2 of example 5, 6, 7; correct?</p> <p>3 MR. STAMATOPOULOS: Object to</p> <p>4 form.</p> <p>5 <b>A. Well, I did do some analysis. In Figure</b></p> <p>6 <b>3, example 2 has a number of cycle life 430 -- 330</b></p> <p>7 <b>cycles. That's one of the highest -- one of the</b></p> <p>8 <b>highest cycle life. So those with lower</b></p> <p>9 <b>irreversibility, about .002 milliamp-hour, has a</b></p> <p>10 <b>relatively lower cycle life. So that's why I say</b></p> <p>11 <b>that in the handout paragraph 147, "a POSA would</b></p> <p>12 <b>reasonably respect when trying to reproduce the</b></p> <p>13 <b>example in Uemura, those examples -- example 2,</b></p> <p>14 <b>for example -- should have the best chance of</b></p> <p>15 <b>being reproduced."</b></p> <p>16 <b>So because the -- my instruction to</b></p> <p>17 <b>Dr. Liang cannot repeat every single example in</b></p> <p>18 <b>this table; so we will pick the one that has the</b></p> <p>19 <b>best chance of being reproduced.</b></p> <p>20 Q. (BY MR. COLIN) Dr. Yao, my question --</p> <p>21 MR. COLIN: Move to strike as</p> <p>22 nonresponsive.</p> | <p>248</p> <p>1 answered my question. My question was simply, you</p> <p>2 provide no analysis in your declaration about how</p> <p>3 an example with the anode material which you</p> <p>4 quote, say is more irreversible capacity than</p> <p>5 conventional anode materials, is representative of</p> <p>6 anodes that have been precycled to have an</p> <p>7 extremely low irreversible capacity; correct?</p> <p>8 That analysis is not in your declaration.</p> <p>9 MR. STAMATOPOULOS: Object to</p> <p>10 form.</p> <p>11 <b>A. So your question is a long and negative</b></p> <p>12 <b>statement. Can you rephrase in the positive</b></p> <p>13 <b>statement?</b></p> <p>14 Q. (BY MR. COLIN) Dr. Yao, in paragraph 147</p> <p>15 you state example 2 is representative of all</p> <p>16 examples in Uemura; correct?</p> <p>17 <b>A. That's right.</b></p> <p>18 Q. My question is simply, you provide no</p> <p>19 analysis showing that the anode of example 2,</p> <p>20 which you indicate is a higher irreversible</p> <p>21 capacity than conventional anode materials, is</p> <p>22 representative of an anode that is precycled to</p>                                                 |

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| <p style="text-align: right;">249</p> <p>1 have an extremely low irreversible capacity such<br/>2 as the anode in example 9 and 10; correct?<br/>3 MR. STAMATOPOULOS: Object to<br/>4 form.<br/>5 <b>A. Although I didn't present the</b><br/>6 <b>analytical -- analytics in my declaration, you</b><br/>7 <b>know, I can tell you now that...</b><br/>8 Q. (BY MR. COLIN) Dr. Yao, that's -- you've<br/>9 already answered my question. I don't -- if you<br/>10 want testify about other stuff, your counsel can<br/>11 redirect you.<br/>12 Dr. Yao, you provided no analysis in your<br/>13 declaration comparing the procedures used by<br/>14 Dr. Liang -- let me restate that.<br/>15 You don't indicate anywhere in your<br/>16 declaration where the procedures used by Dr. Liang<br/>17 differed from the conditions described by Uemura;<br/>18 correct?<br/>19 MR. STAMATOPOULOS: Object to<br/>20 form.<br/>21 <b>A. Can you repeat?</b><br/>22 Q. (BY MR. COLIN) You don't indicate</p>                                                                                 | <p style="text-align: right;">251</p> <p>1 MR. STAMATOPOULOS: Object to<br/>2 form.<br/>3 <b>A. I was trying to answer your question. In</b><br/>4 <b>the paragraph 150 is different, the condition, as</b><br/>5 <b>Uemura's condition. So that's my comment in</b><br/>6 <b>paragraph 151. I say, "The failed attempts by</b><br/>7 <b>Dr. Liang are not surprising." That's my, you</b><br/>8 <b>know, opinion. That, you know, failure is not</b><br/>9 <b>that surprising because, blah, blah, blah.</b><br/>10 <b>Because what I show here in the paragraph 151. So</b><br/>11 <b>if I understand your question correctly. So your</b><br/>12 <b>question is pretty hard to understand.</b><br/>13 Q. (BY MR. COLIN) Dr. Liang indicates he<br/>14 tried to replicate Uemura's teachings; right?<br/>15 That's one of his experiments?<br/>16 <b>A. That he was instructed to duplicate.</b><br/>17 Q. Okay. And for his experiment where he<br/>18 tried to duplicate Uemura, you don't indicate<br/>19 anywhere in your declaration when he used<br/>20 procedures that did not duplicate Uemura; correct?<br/>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p> |
| <p style="text-align: right;">250</p> <p>1 anywhere in your declaration where Dr. Liang used<br/>2 procedures of synthesizing the examples of Uemura<br/>3 where he used different conditions than those<br/>4 described by Uemura; correct?<br/>5 MR. STAMATOPOULOS: Same<br/>6 objection.<br/>7 <b>A. So in paragraph 150 of my declaration,</b><br/>8 <b>Dr. Liang modify the synthesis process and</b><br/>9 <b>annealed the mixture in the air of 500 degrees C</b><br/>10 <b>for five hours and then 900 degrees C for 12</b><br/>11 <b>hours."</b><br/>12 Q. Dr. Yao, I understand that --<br/>13 <b>A. So -- so --</b><br/>14 Q. -- Dr. Liang did his own modifications --<br/>15 <b>A. Yeah.</b><br/>16 Q. -- to Uemura as a second experiment. But<br/>17 for his first experiment where he tried to<br/>18 recreate Uemura, all I'm asking you is, you don't<br/>19 indicate anywhere in your declaration where<br/>20 Dr. Liang used procedures of synthesizing the<br/>21 examples where he used different conditions than<br/>22 those described by Uemura; correct?</p> | <p style="text-align: right;">252</p> <p>1 <b>A. Can you repeat the question?</b><br/>2 Q. (BY MR. COLIN) You provide no analysis<br/>3 on the fact that Dr. Liang used a five-hour<br/>4 pre-annealing step that is not described in<br/>5 Uemura; correct?<br/>6 MR. STAMATOPOULOS: Object to<br/>7 form.<br/>8 <b>A. I see in paragraph 149 I have put my --</b><br/>9 <b>put my opinion on the result Dr. Liang followed</b><br/>10 <b>and the result he accomplished is consistent with</b><br/>11 <b>the literature. So I'm not surprised --</b><br/>12 Q. You provide no analysis on the fact that<br/>13 Dr. Liang failed to apply a pressure of two tons<br/>14 per centimeter squared as Uemura taught; right?<br/>15 <b>A. Where do you find that?</b><br/>16 Q. You provide no analysis in your<br/>17 declaration on the fact that Dr. Liang used<br/>18 electrode with different diameter than Uemura;<br/>19 correct?<br/>20 MR. STAMATOPOULOS: Object to<br/>21 form.<br/>22 <b>A. Those details would not lead to</b></p>                                                                                                                              |

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| <p style="text-align: right;">253</p> <p>1 <b>reasonable doubt of the accuracy of his results.</b></p> <p>2 Q. (BY MR. COLIN) You provide no analysis</p> <p>3 on the fact that Dr. Liang used a molybdenum</p> <p>4 electrode which is different from Uemura; correct?</p> <p>5 MR. STAMATOPOULOS: Object to</p> <p>6 form.</p> <p>7 <b>A. The electrode used, it was not make any</b></p> <p>8 <b>change of the result accomplished.</b></p> <p>9 Q. (BY MR. COLIN) You provide no analysis</p> <p>10 of the fact that Dr. Liang used a different</p> <p>11 electrolyte than Uemura; correct?</p> <p>12 MR. STAMATOPOULOS: Object to</p> <p>13 form.</p> <p>14 <b>A. I think the electrolyte similar in both</b></p> <p>15 <b>cases.</b></p> <p>16 Q. (BY MR. COLIN) Dr. Liang, you provide no</p> <p>17 analysis in your report on the fact that Dr. Liang</p> <p>18 used a different separator than Uemura; correct?</p> <p>19 MR. STAMATOPOULOS: Object to</p> <p>20 form.</p> <p>21 <b>A. Different separator -- separator used</b></p> <p>22 <b>would not lead to the different behavior of the</b></p> | <p style="text-align: right;">255</p> <p>1 form.</p> <p>2 <b>A. I'm not sure that's a -- that's right</b></p> <p>3 <b>statement in term of loading.</b></p> <p>4 Q. (BY MR. COLIN) There's no analysis of it</p> <p>5 in your declaration to look at; correct?</p> <p>6 MR. STAMATOPOULOS: Object to</p> <p>7 form.</p> <p>8 <b>A. Those difference would not materially</b></p> <p>9 <b>change the conclusion.</b></p> <p>10 Q. (BY MR. COLIN) You're telling the board</p> <p>11 that different loading on the electrode doesn't</p> <p>12 have a material effect?</p> <p>13 MR. STAMATOPOULOS: Object to</p> <p>14 form.</p> <p>15 <b>A. That's the low rate. That's what I</b></p> <p>16 <b>instructed to do.</b></p> <p>17 Q. (BY MR. COLIN) Dr. Liang never performed</p> <p>18 any chemical analysis to determine whether his</p> <p>19 compositions actually contain the proper amount of</p> <p>20 lithium; correct?</p> <p>21 MR. STAMATOPOULOS: Object to</p> <p>22 form.</p>                                                                                                                                                                                                            |
| <p style="text-align: right;">254</p> <p>1 <b>cathode material which is the focus on this</b></p> <p>2 <b>patent.</b></p> <p>3 Q. (BY MR. COLIN) You provide no analysis</p> <p>4 in your declaration on the fact that Dr. Liang</p> <p>5 used a different current from Uemura; correct?</p> <p>6 MR. STAMATOPOULOS: Same</p> <p>7 objection.</p> <p>8 <b>A. Can you repeat?</b></p> <p>9 Q. You provide no analysis in your</p> <p>10 declaration on the fact that Dr. Liang used a</p> <p>11 different current from Uemura?</p> <p>12 MR. STAMATOPOULOS: Same</p> <p>13 objection.</p> <p>14 <b>A. What do you mean, current from --</b></p> <p>15 Q. Currents.</p> <p>16 <b>A. Currents. I was instruct him to as slow</b></p> <p>17 <b>as possible, which typically would give you higher</b></p> <p>18 <b>levels of capacity compared of higher rate.</b></p> <p>19 Q. (BY MR. COLIN) You provide no analysis</p> <p>20 of the fact in your declaration that Dr. Liang</p> <p>21 used a different loading than Uemura; correct?</p> <p>22 MR. STAMATOPOULOS: Object to</p>                                | <p style="text-align: right;">256</p> <p>1 <b>A. I think that statement is not true.</b></p> <p>2 <b>Dr. Liang in his report indicate isometry of</b></p> <p>3 <b>lithium in the compound he synthesized, which was</b></p> <p>4 <b>.8. I think that's close to what Uemura's</b></p> <p>5 <b>patent --</b></p> <p>6 Q. (BY MR. COLIN) So you're opining here</p> <p>7 that Dr. Liang actually did chemical analysis to</p> <p>8 determine whether his composition actually</p> <p>9 contained the proper amount of lithium?</p> <p>10 <b>A. That's what he stated in his statement.</b></p> <p>11 Q. Okay. Dr. Liang -- Dr. Yao, in paragraph</p> <p>12 149, you talk about literature at the time. My</p> <p>13 question is for you, did you perform a literature</p> <p>14 search to see what publications were out there on</p> <p>15 layered lithium manganese oxide?</p> <p>16 <b>A. That's correct.</b></p> <p>17 Q. So you performed the search yourself?</p> <p>18 <b>A. Yes.</b></p> <p>19 Q. And how long did you spend on it?</p> <p>20 <b>A. Well, that's a few months ago. I don't</b></p> <p>21 <b>think I remember how much -- how many -- how many</b></p> <p>22 <b>hours.</b></p> |

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| <p style="text-align: right;">257</p> <p>1 Q. So you can't provide me any range of time<br/>2 for how long you spent on the literature search<br/>3 concerning layered lithium manganese oxide?<br/>4 <b>A. Maybe, you know, two to three hours.</b><br/>5 Q. Turning to paragraph 188 of your<br/>6 declaration. For reference, I'll give you example<br/>7 1005 -- Exhibit 1005, which is the Abe reference.<br/>8 We're looking at paragraph 188 of your<br/>9 declaration, sir.<br/>10 So you quote a portion of paragraph 78 in<br/>11 paragraph 188; correct?<br/>12 <b>A. That's correct.</b><br/>13 Q. And so if you turn to paragraph 78 of<br/>14 Abe, which is Exhibit 1005 -- and keep out your<br/>15 declaration because we're going to be doing a<br/>16 little comparison. Okay.<br/>17 So you left out in your black quote the<br/>18 very first sentence of paragraph 78, correct,<br/>19 which is "in a nonaqueous electrolyte-based<br/>20 secondary battery according to the present<br/>21 invention, the designed capacity of the negative<br/>22 electrode is adjusted so that the design capacity</p> | <p style="text-align: right;">259</p> <p>1 <b>A. So this was -- this part is in</b><br/>2 <b>collaboration with counsel.</b><br/>3 Q. (BY MR. COLIN) Okay.<br/>4 <b>A. So I assume it's counsel.</b><br/>5 Q. Okay. So you provide no opinion in your<br/>6 declaration on that portion of paragraph 78 that<br/>7 you cut out; correct?<br/>8 MR. STAMATOPOULOS: Object to<br/>9 form.<br/>10 <b>A. Let me read the whole paragraph.</b><br/>11 <b>Can you repeat your question.</b><br/>12 Q. (BY MR. COLIN) I said, in your<br/>13 declaration you provide no opinion on that portion<br/>14 of paragraph 78 that you cut out of the quote and<br/>15 put in ellipses; correct?<br/>16 MR. STAMATOPOULOS: Object to<br/>17 form.<br/>18 <b>A. I do provide my opinion on paragraph 193</b><br/>19 <b>and 194 and -- yeah, to 197. So that's about</b><br/>20 <b>graphite anode material, which is very similar to</b><br/>21 <b>Abe's graphite of vapor-phase-growth carbon.</b><br/>22 <b>So --</b></p>                                                                                                                              |
| <p style="text-align: right;">258</p> <p>1 of the negative electrode is greater than the<br/>2 design capacity of the cathode"; correct?<br/>3 <b>A. That's not include in the declaration.</b><br/>4 Q. In your quote. Right. And then if you<br/>5 turn to page 98 of your declaration, that same<br/>6 paragraph, 188, in the middle there's a set of<br/>7 ellipses, right, where you see the four dots?<br/>8 <b>A. Hm-hm.</b><br/>9 Q. So you cut out a portion of the paragraph<br/>10 there, correct, and you put it in ellipses?<br/>11 <b>A. Yes.</b><br/>12 Q. Okay. So if we turn to paragraph 78 of<br/>13 Abe, the portion you left out is "The<br/>14 predetermined voltage is 0 volts at the<br/>15 vapor-phase-grown carbon fiber negative<br/>16 electrode"; correct? You left that out of your<br/>17 quote on paragraph 188?<br/>18 <b>A. Yes.</b><br/>19 Q. Okay. Who choose to cut out that portion<br/>20 of paragraph 78?<br/>21 MR. STAMATOPOULOS: Object to<br/>22 form.</p>                                                                                                                         | <p style="text-align: right;">260</p> <p>1 Q. (BY MR. COLIN) Dr. Yao, those paragraphs<br/>2 that you just pointed me to -- 193, 194, and<br/>3 197 -- are not directed to that portion of<br/>4 paragraph 78 that you left out of your<br/>5 declaration; correct?<br/>6 MR. STAMATOPOULOS: Object to<br/>7 form.<br/>8 <b>A. Is related, right? Because on paragraph</b><br/>9 <b>193, clear say Abe's graphite vapor-grows -- you</b><br/>10 <b>know, vapor-phase-grown carbon; right? So the</b><br/>11 <b>typical half-cell body of the anode material is</b><br/>12 <b>about .1 to .2 volt.</b><br/>13 Q. (BY MR. COLIN) Dr. Yao, in paragraph 193<br/>14 you're talking about paragraphs 99 and 102; you're<br/>15 not talking about paragraph 78. Correct?<br/>16 MR. STAMATOPOULOS: Object to<br/>17 form.<br/>18 <b>A. So you are asking the emission -- you</b><br/>19 <b>know, you're asking about predetermined voltage of</b><br/>20 <b>zero volt as the vapor-phase-grown carbon fiber</b><br/>21 <b>negative electrode. All right. So what is shown</b><br/>22 <b>here on the paragraph 193 is Abe's graphitized</b></p> |

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| <p style="text-align: right;">261</p> <p><b>1 vapor growth -- vapor-phase-grown carbon. So</b><br/><b>2 that's the same object we are referring to.</b><br/>3 Q. (BY MR. COLIN) Dr. Yao, you are not<br/>4 answering my question. In paragraph 193 you're<br/>5 simply referring to paragraphs 99 and 102 of Abe;<br/>6 correct? You provide no opinion in paragraph 193<br/>7 concerning the portion of Abe that you<br/>8 intentionally left out of seven -- paragraph 78?<br/>9 MR. STAMATOPOULOS: Object to the<br/>10 form of the questions.<br/><b>11 A. It can also refer to the paragraph 78. I</b><br/><b>12 do not see why it cannot.</b><br/>13 Q. (BY MR. COLIN) Dr. Yao, I'll ask you one<br/>14 more time because you're refusing to answer my<br/>15 question. You provide no opinions in your<br/>16 declaration concerning that language of paragraph<br/>17 78 of Abe that you intentionally struck with<br/>18 ellipses; correct?<br/>19 MR. STAMATOPOULOS: Object to the<br/>20 form of the question.<br/><b>21 A. I don't understand your question. Can</b><br/><b>22 you repeat?</b></p> | <p style="text-align: right;">263</p> <p>1 sitting here today, you can't point to anywhere in<br/>2 your declaration where you discuss the language of<br/>3 paragraph 78 of Abe that you intentionally struck<br/>4 out with ellipses; correct?<br/>5 MR. STAMATOPOULOS: Object to<br/>6 form.<br/><b>7 A. We didn't have that. That's why we</b><br/><b>8 didn't talk about that. I don't know what's the</b><br/><b>9 question you're trying to ask.</b><br/>10 Q. (BY MR. COLIN) Paragraph 18 of Abe<br/>11 doesn't indicate a certain voltage; correct?<br/>12 MR. STAMATOPOULOS: Object to<br/>13 form.<br/><b>14 A. Can you repeat?</b><br/>15 Q. (BY MR. COLIN) Sure. So in paragraph 18<br/>16 Abe discloses "a nonaqueous electrolyte-based<br/>17 secondary battery according to" -- and in<br/>18 parentheses 4 -- "having a design capacity of more<br/>19 than 1 and less than or equal to 1.6 for the<br/>20 design capacity of the positive electrode<br/>21 described in 4." Correct?<br/>22 MR. STAMATOPOULOS: Object to</p> |
| <p style="text-align: right;">262</p> <p>1 Q. (BY MR. COLIN) Dr. Yao, you provide no<br/>2 opinions in your declaration concerning the<br/>3 language of paragraph 78 of Abe that you<br/>4 intentionally struck with ellipses; correct?<br/>5 MR. STAMATOPOULOS: Same<br/>6 objection.<br/><b>7 A. As written in the paragraph 193, my</b><br/><b>8 opinion of the graphitized vapor-phase-grown</b><br/><b>9 carbon described here in paragraph 78, the</b><br/><b>10 half-cell voltage is .1 to .2 volt. That's my</b><br/><b>11 opinion.</b><br/>12 Q. (BY MR. COLIN) You can't point anywhere<br/>13 in your declaration sitting here today where you<br/>14 discuss the language of paragraph 78 of Abe that<br/>15 you intentionally struck out with ellipses;<br/>16 correct?<br/>17 MR. STAMATOPOULOS: Object to<br/>18 form.<br/><b>19 A. The same anode material described in</b><br/><b>20 paragraph 193 in my declaration as well same as</b><br/><b>21 paragraph 78 in Abe's patent.</b><br/>22 Q. (BY MR. COLIN) So it's correct that,</p>                                                      | <p style="text-align: right;">264</p> <p>1 form.<br/><b>2 A. Which parts? I did not find it.</b><br/>3 Q. (BY MR. COLIN) So it's on page 19 of 31<br/>4 and right in the middle.<br/><b>5 A. Okay.</b><br/>6 MR. STAMATOPOULOS: Which line,<br/>7 approximately?<br/>8 MR. COLIN: There's no line<br/>9 numbers. It's right in the middle of the page.<br/>10 MR. STAMATOPOULOS: Okay.<br/>11 Q. (BY MR. COLIN) So it says number 4,<br/>12 "having a design capacity of more than 1 and less<br/>13 than or equal to 1.6 for the design capacity of<br/>14 the positive electrode"; correct?<br/>15 MR. STAMATOPOULOS: Object to<br/>16 form.<br/><b>17 A. That's what it says in this patent.</b><br/>18 Q. (BY MR. COLIN) Right. In this paragraph<br/>19 where it's talking about the capac- -- secondary<br/>20 battery should have a designed capacity of more<br/>21 than 1 and less than or equal to 1.6 for the<br/>22 design capacity of the positive electrode, doesn't</p>                                                         |

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| <p style="text-align: right;">265</p> <p>1 indicate a specific voltage for that capacity<br/>2 ratio; correct?<br/>3 MR. STAMATOPOULOS: Object to<br/>4 form.<br/>5 <b>A. Can you repeat your question?</b><br/>6 Q. (BY MR. COLIN) Right. In paragraph 18<br/>7 where Abe discloses that the battery should have a<br/>8 design capacity of more than 1 and less than or<br/>9 equal to 1.6 for the design capacity of the<br/>10 positive electrode, it does not disclose that that<br/>11 capacity ratio should be determined at any<br/>12 particular voltage; correct?<br/>13 MR. STAMATOPOULOS: Object to<br/>14 form.<br/>15 <b>A. That's correct.</b><br/>16 Q. (BY MR. COLIN) It's your opinion that<br/>17 using 4.2 volts for determining a capacity ratio<br/>18 is something that a POSA would do?<br/>19 MR. STAMATOPOULOS: Object to<br/>20 form.<br/>21 <b>A. Do? Sorry. Do what?</b><br/>22 Q. (BY MR. COLIN) Let me restate. It's</p> | <p style="text-align: right;">267</p> <p>1 at 6:42 p.m.<br/>2 (Recess from 6:42 p.m. to 6:53 p.m.)<br/>3 THE VIDEOGRAPHER: The time is<br/>4 6:53 p.m. We're back on the record.<br/>5 EXAMINATION<br/>6 BY MR. STAMATOPOULOS:<br/>7 Q. Welcome back, Dr. Yao. Just have a few<br/>8 questions.<br/>9 Now, do you recall you were asked by<br/>10 counsel a number of questions as to whether you<br/>11 did or did not provide opinions in your<br/>12 declaration about a number of issues in this IPR?<br/>13 MR. COLIN: Objection to form.<br/>14 <b>A. Yes, I recall.</b><br/>15 Q. (BY MR. STAMATOPOULOS) Sir, have you<br/>16 memorized your declaration?<br/>17 <b>A. No, I didn't. It's a long declaration.</b><br/>18 Q. You tried, to the best of your ability,<br/>19 to remember whether you provided opinions on<br/>20 certain issues or not; right, sir?<br/>21 MR. COLIN: Objection to form.<br/>22 Leading.</p>                                                                                                                                                                                                                      |
| <p style="text-align: right;">266</p> <p>1 your opinion that it's conventional to use a<br/>2 charge cut-off voltage of 4.2 volts to determine a<br/>3 capacity ratio; correct?<br/>4 MR. STAMATOPOULOS: Object to<br/>5 form.<br/>6 <b>A. That's correct.</b><br/>7 MR. COLIN: Let's take a break.<br/>8 THE VIDEOGRAPHER: Off the record<br/>9 at 6:32 p.m.<br/>10 (Recess from 6:33 p.m. to 6:41 p.m.)<br/>11 THE VIDEOGRAPHER: The time is<br/>12 6:41 p.m. We're back on the record.<br/>13 MR. COLIN: I'll pass the<br/>14 witness.<br/>15 MR. STAMATOPOULOS: All right.<br/>16 We're going to take 15 minutes, and I'll have some<br/>17 limited redirect, I think. But we'll be back in<br/>18 15. Is that okay?<br/>19 MR. COLIN: Okay.<br/>20 MR. STAMATOPOULOS: All right.<br/>21 Great.<br/>22 THE VIDEOGRAPHER: Off the record</p>                                                                                                         | <p style="text-align: right;">268</p> <p>1 <b>A. Yes, I tried my best.</b><br/>2 Q. (BY MR. STAMATOPOULOS) Dr. Yao, you were<br/>3 asked by counsel if the '641 patent provided<br/>4 details as to how to conduct its cycling test. Do<br/>5 you recall that?<br/>6 <b>A. Yes.</b><br/>7 Q. Do you recall if you provided opinions in<br/>8 this IPR concerning this issue?<br/>9 MR. COLIN: Objection to form.<br/>10 <b>A. Yeah, in this IPR -- IPR declaration in</b><br/>11 <b>paragraph 59 I offered my opinion how '641 patent</b><br/>12 <b>tackle the charge cut-off voltage and the capacity</b><br/>13 <b>ratio in tandem.</b><br/>14 Q. (BY MR. STAMATOPOULOS) You said<br/>15 paragraph 59?<br/>16 <b>A. 59. And how the -- what the charge</b><br/>17 <b>cut-off voltage, how the -- wait. Also how do the</b><br/>18 <b>-- how the inventors addressed anode cathode</b><br/>19 <b>capacity ratio and how they addressed charge</b><br/>20 <b>cut-off ratio so they could safely exceed 4.2 volt</b><br/>21 <b>without substantial performance loss. So that's</b><br/>22 <b>already to how battery was fabricated and how they</b></p> |

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| <p>269</p> <p>1 are charged for cycling.</p> <p>2 Q. Does paragraph 59 describe in detail how</p> <p>3 to conduct the '641 patent's -- let me withdraw</p> <p>4 that question.</p> <p>5 Does paragraph 59 contain specific</p> <p>6 citations to the '641 patent portions that</p> <p>7 describe in detail how to conduct the '641 patent</p> <p>8 cycling tests?</p> <p>9 MR. COLIN: Objection to form.</p> <p>10 A. Can you repeat your question?</p> <p>11 Q. (BY MR. STAMATOPOULOS) Does paragraph 59</p> <p>12 of your declaration contain specific citations to</p> <p>13 the '641 patent portions that describe in detail</p> <p>14 how to conduct the '641 patent cycling tests?</p> <p>15 MR. COLIN: Objection to form.</p> <p>16 A. No, it didn't.</p> <p>17 Q. (BY MR. STAMATOPOULOS) Now, you've</p> <p>18 provided a declaration in the parallel Apple</p> <p>19 litigation; correct?</p> <p>20 A. That's correct.</p> <p>21 Q. Can I invite your attention to your</p> <p>22 second declaration in that litigation marked</p> | <p>271</p> <p>1 understand that the charge and discharge</p> <p>2 conditions for the cycling tests would not be</p> <p>3 outside the normal operating condition for</p> <p>4 commercial device of general applicability.</p> <p>5 So the testing details could be used</p> <p>6 standard, normal operating conditions for '641</p> <p>7 patent.</p> <p>8 Q. (BY MR. STAMATOPOULOS) Does paragraph 15</p> <p>9 contain citations to the '641 patent?</p> <p>10 MR. COLIN: Objection. Leading.</p> <p>11 A. Yes. Multiple citations in this</p> <p>12 paragraph. In paragraph 15, "The '641 patent</p> <p>13 explains how to prepare the cathode, the anode,</p> <p>14 and how to build a battery with the key</p> <p>15 components." That's '641 patent, column 9:61 to</p> <p>16 10:25.</p> <p>17 "'641 patent also provides the claim</p> <p>18 capacity ratio of the positive electrode material</p> <p>19 to the negative electrode material and the charge</p> <p>20 cut-off voltage" in column 10:29 to 15:54.</p> <p>21 Also, "The '641 patent is clear that the</p> <p>22 invention is focused on commercial batteries for</p> |
| <p>270</p> <p>1 Exhibit 1036 in this deposition.</p> <p>2 A. Yes.</p> <p>3 Q. Can I invite your attention to paragraph</p> <p>4 15, page 8, of that declaration. I'll invite you</p> <p>5 to spend a moment to read that paragraph and</p> <p>6 familiarize yourself.</p> <p>7 A. Which paragraph?</p> <p>8 Q. 15.</p> <p>9 A. Okay.</p> <p>10 MR. COLIN: Objection. Leading</p> <p>11 and outside the scope.</p> <p>12 Q. (BY MR. STAMATOPOULOS) Does that refresh</p> <p>13 your recollection, Dr. Yao, as to whether you've</p> <p>14 formed opinions about the '641 patent's</p> <p>15 descriptions of its cycling tests?</p> <p>16 MR. COLIN: Objection. Leading</p> <p>17 and outside the scope.</p> <p>18 And outside the scope of his</p> <p>19 declaration.</p> <p>20 A. Yes. This Apple claim construction</p> <p>21 Exhibit 1036 in the paragraph 15, I do state my</p> <p>22 opinion that the POSA reading '641 patent would</p>                                                                                                | <p>272</p> <p>1 generally applicable uses" in column 1:19 to 28,</p> <p>2 column 1:64 to 67, column 4:43 to 53, column 7:1</p> <p>3 to 8; column 9:45 to 48; column 16:45 to 51.</p> <p>4 And then I also state that, "Finally, the</p> <p>5 patent states that, except voltage, all process</p> <p>6 parameters for charge and discharge are commonly</p> <p>7 used in the art." In -- yeah, paragraph 9:22 to</p> <p>8 23.</p> <p>9 So this -- basically, that's a detail --</p> <p>10 I think that's, you know, the detail charge and</p> <p>11 discharge parameters typical for use in '641</p> <p>12 patent.</p> <p>13 Q. (BY MR. STAMATOPOULOS) Do you recall</p> <p>14 during your direct examination being asked by</p> <p>15 counsel as to whether you were a person of</p> <p>16 ordinary skill in the art at the time of -- as of</p> <p>17 the priority date of the '641 patent?</p> <p>18 A. Yes.</p> <p>19 Q. You were not a person of ordinary skill</p> <p>20 in the art as of the priority date; correct?</p> <p>21 A. That's correct.</p> <p>22 Q. Given that you were not a person of</p>                          |

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| <p>273</p> <p>1 ordinary skill in the art as of the priority date,<br/>2 how would you know what the understanding of a<br/>3 person of ordinary skill in the art would be with<br/>4 respect to concepts at issue in this IPR as of the<br/>5 priority date?<br/>6 MR. COLIN: Objection to form.<br/>7 <b>A. Lithium ion batteries was commercial in<br/>8 1991. Some -- some thing -- some basic principle<br/>9 and terminology would not change in the last<br/>10 several years.</b><br/>11 Q. (BY MR. STAMATOPOULOS) Now, Dr. Yao, you<br/>12 mentioned in your direct examination in response<br/>13 to certain questions by counsel the concept of<br/>14 equilibrium. Do you recall that?<br/>15 <b>A. Yes.</b><br/>16 Q. What is equilibrium, briefly?<br/>17 MR. COLIN: Objection to form.<br/>18 <b>A. Equilibrium means it's in a stable state<br/>19 that doesn't change. The voltage doesn't change<br/>20 anymore.</b><br/>21 Q. (BY MR. STAMATOPOULOS) Now, if a person<br/>22 of ordinary skill in the art were using constant</p>                                                                                     | <p>275</p> <p><b>1 measure the voltage.</b><br/>2 Q. (BY MR. STAMATOPOULOS) Is it necessary<br/>3 to measure the voltage if the battery is charged<br/>4 with a constant current algorithm at a fast rate<br/>5 in order to determine the battery voltage at the<br/>6 end of charging?<br/>7 MR. COLIN: Objection to form.<br/>8 <b>A. Yes.</b><br/>9 Q. (BY MR. STAMATOPOULOS) Why is that?<br/>10 <b>A. If you use a faster current, it most<br/>11 likely did not fully charge -- the battery is not<br/>12 fully charged. And so you have to do the<br/>13 measurement.</b><br/>14 Q. Do you recall being asked by counsel<br/>15 questions about whether it would be necessary for<br/>16 a POSA to do measurements to determine battery<br/>17 voltage as well as about a disclosure in the<br/>18 patent that the voltage is set to a particular<br/>19 value?<br/>20 MR. COLIN: Objection to form.<br/>21 Compound.<br/>22 <b>A. Yes.</b></p> |
| <p>274</p> <p>1 current and constant voltage to fully charge a<br/>2 battery with a 4.2 volt cut-off voltage, would it<br/>3 be necessary to measure the voltage at equilibrium<br/>4 to determine the battery voltage at equilibrium?<br/>5 MR. COLIN: Objection to form and<br/>6 outside the scope.<br/>7 <b>A. If you use a CC/CV measure to fully<br/>8 charge the battery, it's not necessary to measure<br/>9 again because it already reach the equilibrium at<br/>10 the fully charged state.</b><br/>11 Q. (BY MR. STAMATOPOULOS) And if a person<br/>12 of ordinary skill in the art were using very slow<br/>13 constant current to fully charge a battery with a<br/>14 4.2 volt cut-off voltage, would it be necessary to<br/>15 measure the voltage at equilibrium to determine<br/>16 the battery voltage at equilibrium?<br/>17 MR. COLIN: Objection to form.<br/>18 Outside the scope.<br/>19 <b>A. If they do it very slowly with constant<br/>20 current charging method to fully charge the<br/>21 battery, the battery would be at equilibrium at<br/>22 the end of the charge, and it is not necessary to</b></p> | <p>276</p> <p>1 Q. (BY MR. STAMATOPOULOS) Does the<br/>2 disclosure in the '641 patent about the charge<br/>3 cut-off voltage being set change your views or<br/>4 opinions one way or the other?<br/>5 MR. COLIN: Objection to form and<br/>6 outside the scope.<br/>7 <b>A. Can you repeat?</b><br/>8 Q. (BY MR. STAMATOPOULOS) Sure. Does the<br/>9 use of the word "set" in the '641 patent change<br/>10 your views or opinions one way or the other?<br/>11 MR. COLIN: Objection to form.<br/>12 Leading.<br/>13 <b>A. Change my previous opinion?</b><br/>14 Q. (BY MR. STAMATOPOULOS) Change your<br/>15 opinion as to whether the charge cut-off voltage<br/>16 is a battery property.<br/>17 MR. COLIN: Objection to form.<br/>18 Leading.<br/>19 <b>A. No, it doesn't.</b><br/>20 Q. (BY MR. STAMATOPOULOS) Why not?<br/>21 <b>A. Charge cut-off voltage, as I state in my<br/>22 declaration, is a battery property. What is set?</b></p>  |

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| <p style="text-align: right;">277</p> <p>1 <b>It supply the voltage. Doesn't matter how you</b><br/>2 <b>change. It still does not change charge cut-off</b><br/>3 <b>voltage.</b><br/>4 Q. Do you recall being asked by counsel<br/>5 whether you provided analysis as to a statement in<br/>6 your declaration that Uemura example 2 was<br/>7 representative of other examples in Uemura?<br/>8 MR. COLIN: Objection to form.<br/>9 <b>A. Yes.</b><br/>10 Q. (BY MR. STAMATOPOULOS) And you were<br/>11 asked questions about a number of different --<br/>12 such differences, including about the separator,<br/>13 the electrolyte, the pressure applied by<br/>14 Dr. Liang. Do you recall that?<br/>15 MR. COLIN: Object to form.<br/>16 Misstates.<br/>17 <b>A. Yes.</b><br/>18 Q. (BY MR. STAMATOPOULOS) Not trying to<br/>19 create an exhaustive list, but you recall being<br/>20 asked various questions about various differences.<br/>21 Fair?<br/>22 MR. COLIN: Objection to form.</p>                                | <p style="text-align: right;">279</p> <p>1 <b>batteries, you know, last 13 years. I have taught</b><br/>2 <b>this lithium battery class to hundreds of</b><br/>3 <b>students. Those inactive, other than separators,</b><br/>4 you know, current (unintelligible) are not -- do<br/>5 not play a critical role in the electrochemical<br/>6 reactions. Therefore, I draw the conclusion that<br/>7 the small difference would not materially change<br/>8 the results and conclusion from the experiments.<br/>9 MR. STAMATOPOULOS: Thank you,<br/>10 Dr. Yao. I don't have any further questions at<br/>11 this time. I'll pass the witness.<br/>12 EXAMINATION<br/>13 BY MR. COLIN:<br/>14 Q. Dr. Yao, you did not rely on Exhibit 1036<br/>15 in providing your opinions in this IPR; correct?<br/>16 <b>A. 1036?</b><br/>17 Q. Correct. That's not cited anywhere in<br/>18 your declaration?<br/>19 <b>A. I think you're correct.</b><br/>20 MR. COLIN: No further questions.<br/>21 THE VIDEOGRAPHER: Anything else?<br/>22 MR. STAMATOPOULOS: No further</p> |
| <p style="text-align: right;">278</p> <p>1 <b>A. Yes.</b><br/>2 Q. (BY MR. STAMATOPOULOS) Now, Dr. Yao,<br/>3 were you aware of these differences at the time<br/>4 you formed the opinions in your declaration?<br/>5 MR. COLIN: Objection. Form.<br/>6 Outside the scope of the declaration.<br/>7 <b>A. Yes, I'm aware of those differences when</b><br/>8 <b>I prepared the declaration.</b><br/>9 Q. (BY MR. STAMATOPOULOS) Did these<br/>10 differences affect your opinions in any way?<br/>11 MR. COLIN: Objection to form.<br/>12 Scope.<br/>13 <b>A. Not, it would not change my opinion as</b><br/>14 <b>shown here. Those difference are small enough</b><br/>15 <b>would not change -- materially change the</b><br/>16 <b>conclusion.</b><br/>17 Q. (BY MR. STAMATOPOULOS) What's your basis<br/>18 for saying that these differences are small enough<br/>19 that they wouldn't change your conclusions?<br/>20 MR. COLIN: Objection to form,<br/>21 scope.<br/>22 <b>A. You know, base my -- I work on lithium</b></p> | <p style="text-align: right;">280</p> <p>1 questions. Sorry.<br/>2 MR. COLIN: Thank you for your<br/>3 time today, Dr. Yao.<br/>4 THE VIDEOGRAPHER: We are off the<br/>5 record at 7:10 p.m.<br/>6 (Deposition concluded at 7:10 p.m.)<br/>7<br/>8<br/>9<br/>10<br/>11<br/>12<br/>13<br/>14<br/>15<br/>16<br/>17<br/>18<br/>19<br/>20<br/>21<br/>22</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| <p style="text-align: right;">281</p> <p>1        CERTIFICATE OF SHORTHAND REPORTER</p> <p>2</p> <p>3        I, Mark Tod Kislingbury, Certified Reporter</p> <p>4 and Notary Public within and for the State of</p> <p>5 Texas do hereby certify: That YAN YAO, PHD, the</p> <p>6 witness whose deposition is hereinbefore set</p> <p>7 forth, was duly sworn by me before the</p> <p>8 commencement of such deposition and that such</p> <p>9 deposition was taken before me and is a true</p> <p>10 record of the testimony given by such witness.</p> <p>11        I further certify that the adverse party,</p> <p>12 RJ Technology, LLC, was represented by counsel at</p> <p>13 the deposition.</p> <p>14        I further certify that the deposition of</p> <p>15 YAN YAO, PHD, occurred on August 8, 2024,</p> <p>16 commencing at 9:49 A.M. CT to 7:10 P.M. CT.</p> <p>17        I further certify that I am not related</p> <p>18 to any of the parties to this action by blood</p> <p>19 or marriage, I am not employed by or an attorney</p> <p>20 to any of the parties to this action, and that I</p> <p>21 am in no way interested, financially or otherwise,</p> <p>22 in the outcome of this matter.</p> |  |
| <p style="text-align: right;">282</p> <p>1        Certified to by me this 11th day of August,</p> <p>2 2024.</p> <p>3        <i>Mark Tod Kislingbury</i></p> <p>4</p> <p>5        Mark Tod Kislingbury, Texas CSR 298</p> <p>6        Expiration Date: 2/28/26</p> <p>7        Firm Registration No. 686</p> <p>8        451 Hungerford Drive</p> <p>9        Suite 400</p> <p>10        Rockville, MD 20850</p> <p>11        Phone: 888.433.3767</p> <p>12        Fax: 888.503.3767</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |

| A               |                     |                   |                   |
|-----------------|---------------------|-------------------|-------------------|
| <b>abe</b>      | 260:14, 260:15,     | <b>action</b>     | <b>admit</b>      |
| 127:17, 127:21, | 260:19, 263:8,      | 281:18, 281:20    | 177:20            |
| 128:10, 257:7,  | 264:19, 267:12,     | <b>active</b>     | <b>adopted</b>    |
| 257:14, 258:13, | 270:14, 275:15,     | 84:11, 84:13,     | 119:12            |
| 261:5, 261:7,   | 275:17, 276:2,      | 84:14, 84:15,     | <b>adverse</b>    |
| 261:17, 262:3,  | 277:11, 277:12,     | 84:16, 87:2,      | 281:11            |
| 262:14, 263:3,  | 277:20              | 87:5, 121:3,      | <b>advisor</b>    |
| 263:10, 263:16, | <b>above</b>        | 121:4, 121:6,     | 209:16            |
| 265:7           | 61:3, 97:22,        | 121:8, 137:6,     | <b>affect</b>     |
| <b>abe's</b>    | 98:6, 98:17,        | 137:8, 197:20,    | 229:10, 278:10    |
| 128:2, 128:5,   | 99:18, 100:8,       | 228:9, 240:11,    | <b>affects</b>    |
| 259:21, 260:9,  | 100:16, 101:8,      | 240:21            | 177:21, 178:5,    |
| 260:22, 262:21  | 101:17, 103:7,      | <b>actual</b>     | 178:18            |
| <b>ability</b>  | 103:11, 103:15,     | 123:7, 123:13,    | <b>after</b>      |
| 106:18, 267:18  | 103:20, 105:6,      | 125:2, 125:7,     | 21:10, 97:2,      |
| <b>able</b>     | 106:4, 106:7,       | 125:18, 133:15,   | 106:21, 106:22,   |
| 15:16, 162:8,   | 106:13, 146:16,     | 140:6, 140:16,    | 107:4, 111:4,     |
| 189:3, 215:17,  | 146:20, 147:18,     | 141:6, 162:3,     | 111:9, 111:14,    |
| 215:21, 218:15, | 151:19, 152:9,      | 199:3, 237:22,    | 112:15, 112:22,   |
| 219:10, 239:16  | 152:20, 153:5,      | 238:3, 238:8      | 148:11, 199:19,   |
| <b>about</b>    | 154:9, 154:20,      | <b>actually</b>   | 200:7, 201:15,    |
| 8:15, 9:15,     | 155:18, 162:20,     | 49:10, 124:6,     | 204:21, 220:12,   |
| 19:17, 22:5,    | 164:4, 198:6,       | 124:12, 128:11,   | 224:20, 238:9     |
| 26:4, 35:7,     | 228:1               | 140:12, 195:22,   | <b>afternoon</b>  |
| 37:10, 70:11,   | <b>above-styled</b> | 197:7, 201:10,    | 89:14, 89:15      |
| 92:7, 96:3,     | 2:13                | 201:21, 202:14,   | <b>afterwards</b> |
| 105:17, 106:21, | <b>abstract</b>     | 202:18, 203:2,    | 242:19            |
| 107:5, 107:6,   | 149:19, 150:5,      | 213:14, 223:3,    | <b>again</b>      |
| 124:7, 125:7,   | 158:8               | 223:20, 229:10,   | 8:9, 21:10,       |
| 125:18, 126:14, | <b>accepted</b>     | 240:12, 255:19,   | 23:12, 35:3,      |
| 126:16, 140:7,  | 141:17              | 256:7, 256:8      | 47:19, 52:7,      |
| 140:8, 141:8,   | <b>accomplished</b> | <b>added</b>      | 63:15, 66:18,     |
| 142:21, 144:2,  | 252:10, 253:8       | 38:21             | 67:6, 70:2,       |
| 146:4, 146:11,  | <b>according</b>    | <b>addition</b>   | 74:18, 87:9,      |
| 167:5, 174:19,  | 175:5, 227:2,       | 228:15            | 113:11, 113:15,   |
| 178:12, 183:13, | 227:8, 227:12,      | <b>additional</b> | 123:11, 125:6,    |
| 188:17, 189:7,  | 243:21, 245:7,      | 53:18, 100:22,    | 130:11, 137:12,   |
| 198:12, 204:4,  | 257:20, 263:17      | 103:8, 103:11,    | 155:12, 159:6,    |
| 205:11, 206:17, | <b>accordingly</b>  | 103:12, 159:7     | 192:1, 192:7,     |
| 209:8, 224:12,  | 241:2               | <b>address</b>    | 204:6, 209:7,     |
| 224:15, 232:3,  | <b>accuracy</b>     | 45:17, 76:22      | 274:9             |
| 235:15, 241:16, | 238:13, 253:1       | <b>addressed</b>  | <b>against</b>    |
| 245:22, 246:9,  | <b>accurate</b>     | 268:18, 268:19    | 99:18, 114:5,     |
| 247:2, 248:2,   | 11:1, 13:5,         | <b>adjusted</b>   | 115:4, 115:13     |
| 249:10, 256:12, | 14:5, 16:1,         | 77:20, 257:22     | <b>age</b>        |
| 259:19, 260:12, | 20:22, 25:20,       | <b>adjusting</b>  | 7:6               |
|                 | 34:2, 138:7         | 53:8              | <b>ago</b>        |
|                 | <b>achieve</b>      | <b>adjustment</b> | 39:2, 60:3,       |
|                 | 31:2, 170:2         | 215:18, 239:14    |                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 207:15, 256:20<br><b>agree</b><br>14:7, 14:11,<br>14:15, 15:7,<br>16:20, 17:6,<br>20:10, 22:14,<br>59:8, 59:15,<br>67:5, 105:11,<br>116:22, 120:18,<br>135:8, 178:18,<br>185:15, 223:8<br><b>agreed</b><br>119:5<br><b>agreeing</b><br>110:18<br><b>agreement</b><br>172:16<br><b>agrees</b><br>193:5, 194:7<br><b>ahead</b><br>203:22<br><b>air</b><br>215:19, 239:15,<br>250:9<br><b>algorithm</b><br>22:6, 22:9,<br>27:12, 32:9,<br>32:12, 32:17,<br>65:1, 65:13,<br>66:2, 275:4<br><b>algorithms</b><br>14:9, 42:15,<br>201:17<br><b>all</b><br>7:1, 16:15,<br>29:7, 35:17,<br>51:12, 52:19,<br>53:17, 56:13,<br>57:11, 58:5,<br>72:8, 73:5,<br>73:6, 90:10,<br>97:6, 117:4,<br>117:11, 117:18,<br>118:18, 119:18,<br>128:8, 131:20,<br>139:9, 146:19,<br>148:12, 163:3,<br>164:19, 180:13, | 181:3, 185:18,<br>198:5, 207:3,<br>212:11, 224:1,<br>225:21, 229:14,<br>229:15, 236:8,<br>236:10, 237:19,<br>240:15, 240:17,<br>243:20, 243:22,<br>244:22, 245:9,<br>245:12, 248:15,<br>250:18, 260:21,<br>266:15, 266:20,<br>272:5<br><b>alleged</b><br>227:13, 240:1,<br>240:18<br><b>allegedly</b><br>221:12, 241:10<br><b>allow</b><br>26:17<br><b>allowability</b><br>60:1, 60:10,<br>62:5<br><b>allowance</b><br>61:2, 61:17,<br>62:11, 63:5,<br>63:18<br><b>allowed</b><br>187:11<br><b>allows</b><br>17:19<br><b>almost</b><br>77:13<br><b>along</b><br>205:20<br><b>already</b><br>10:13, 12:10,<br>21:4, 21:11,<br>21:13, 28:7,<br>32:1, 94:12,<br>97:9, 100:15,<br>114:15, 114:17,<br>118:5, 119:2,<br>120:12, 146:9,<br>148:2, 148:7,<br>148:11, 149:7,<br>149:17, 164:21,<br>165:6, 217:10, | 249:9, 268:22,<br>274:9<br><b>also</b><br>3:22, 9:4,<br>11:6, 13:14,<br>24:8, 27:10,<br>31:1, 31:6,<br>32:10, 32:11,<br>32:16, 33:10,<br>34:8, 51:7,<br>71:12, 81:9,<br>82:6, 100:21,<br>102:7, 102:14,<br>109:14, 120:3,<br>162:10, 165:2,<br>179:16, 179:20,<br>197:2, 215:21,<br>222:8, 228:3,<br>228:11, 228:16,<br>240:21, 261:11,<br>268:17, 271:17,<br>271:21, 272:4<br><b>although</b><br>29:11, 72:14,<br>93:9, 249:5<br><b>aluminum</b><br>180:10<br><b>always</b><br>30:22, 195:16<br><b>among</b><br>212:10, 240:15<br><b>amount</b><br>84:12, 84:15,<br>87:2, 87:5,<br>121:4, 121:7,<br>180:6, 181:5,<br>181:18, 182:16,<br>182:17, 183:16,<br>184:9, 255:19,<br>256:9<br><b>ampere</b><br>170:1<br><b>amply</b><br>106:19<br><b>analysis</b><br>68:10, 68:18,<br>134:17, 145:3,<br>145:9, 146:1, | 146:21, 180:11,<br>182:20, 184:3,<br>203:13, 233:5,<br>233:12, 234:6,<br>234:16, 235:1,<br>235:7, 235:12,<br>235:15, 235:20,<br>236:4, 236:15,<br>236:20, 243:13,<br>244:5, 244:12,<br>245:22, 246:5,<br>247:2, 247:7,<br>247:10, 247:13,<br>248:2, 248:8,<br>248:19, 249:12,<br>252:2, 252:12,<br>252:16, 253:2,<br>253:9, 253:17,<br>254:3, 254:9,<br>254:19, 255:4,<br>255:18, 256:7,<br>277:5<br><b>analytical</b><br>249:6<br><b>analytics</b><br>249:6<br><b>analyzed</b><br>194:18<br><b>annealed</b><br>250:9<br><b>annealing</b><br>239:15<br><b>anode</b><br>38:3, 53:8,<br>80:4, 84:14,<br>84:15, 121:6,<br>121:7, 154:13,<br>154:14, 156:5,<br>156:10, 175:6,<br>224:21, 226:22,<br>227:9, 227:10,<br>227:12, 227:19,<br>229:3, 229:17,<br>230:14, 230:21,<br>230:22, 240:21,<br>241:1, 241:16,<br>241:19, 244:21,<br>244:22, 245:5, |
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| <p>245:15, 245:19,<br/>246:1, 247:2,<br/>247:4, 247:6,<br/>247:16, 248:3,<br/>248:5, 248:19,<br/>248:21, 248:22,<br/>249:2, 259:20,<br/>260:11, 262:19,<br/>268:18, 271:13<br/><b>anodes</b><br/>247:5, 248:6<br/><b>another</b><br/>76:7, 156:16,<br/>157:1, 157:6<br/><b>answer</b><br/>7:18, 8:7,<br/>15:6, 27:20,<br/>28:9, 36:1,<br/>42:17, 47:1,<br/>51:12, 51:21,<br/>53:18, 63:1,<br/>78:14, 83:13,<br/>89:5, 115:20,<br/>117:12, 118:3,<br/>118:4, 118:8,<br/>139:9, 148:11,<br/>148:20, 154:16,<br/>180:21, 187:7,<br/>187:13, 187:19,<br/>190:22, 198:13,<br/>202:10, 203:20,<br/>204:10, 204:17,<br/>206:17, 207:2,<br/>233:18, 242:14,<br/>242:18, 244:4,<br/>247:20, 251:3,<br/>261:14<br/><b>answered</b><br/>21:4, 28:7,<br/>28:8, 51:19,<br/>63:15, 81:18,<br/>118:5, 119:2,<br/>148:2, 187:20,<br/>248:1, 249:9<br/><b>answering</b><br/>53:16, 73:8,<br/>117:2, 148:7,<br/>190:11, 261:4</p> | <p><b>answers</b><br/>54:10, 117:11,<br/>118:14, 118:15<br/><b>anticipate</b><br/>232:6<br/><b>any</b><br/>8:11, 11:3,<br/>11:14, 11:18,<br/>13:1, 14:1,<br/>31:10, 31:15,<br/>32:4, 32:12,<br/>32:17, 33:17,<br/>34:10, 44:15,<br/>44:20, 45:11,<br/>46:4, 46:17,<br/>49:13, 49:21,<br/>51:13, 52:3,<br/>52:9, 54:5,<br/>68:1, 68:7,<br/>71:8, 72:1,<br/>72:9, 72:14,<br/>73:10, 73:14,<br/>74:1, 75:4,<br/>75:11, 81:6,<br/>81:22, 83:2,<br/>89:16, 100:13,<br/>105:17, 109:1,<br/>109:16, 111:3,<br/>112:13, 112:21,<br/>113:14, 122:17,<br/>126:11, 127:4,<br/>127:8, 131:1,<br/>136:18, 136:19,<br/>138:15, 148:21,<br/>152:12, 179:19,<br/>198:17, 201:19,<br/>202:13, 203:19,<br/>204:2, 208:10,<br/>210:20, 211:5,<br/>211:10, 212:3,<br/>214:18, 215:3,<br/>224:8, 229:8,<br/>240:2, 240:9,<br/>253:7, 255:18,<br/>257:1, 265:11,<br/>278:10, 279:10,<br/>281:18, 281:20<br/><b>anymore</b><br/>273:20</p> | <p><b>anymore"</b><br/>115:14<br/><b>anyone</b><br/>54:11, 211:3<br/><b>anything</b><br/>70:13, 71:2,<br/>72:2, 73:11,<br/>83:21, 96:17,<br/>107:6, 136:19,<br/>138:10, 139:20,<br/>174:20, 207:13,<br/>208:14, 209:6,<br/>279:21<br/><b>anything's</b><br/>7:21<br/><b>anywhere</b><br/>31:21, 35:8,<br/>44:13, 44:18,<br/>45:10, 45:18,<br/>46:2, 70:12,<br/>126:9, 127:2,<br/>129:18, 214:17,<br/>215:2, 249:15,<br/>250:1, 250:19,<br/>251:19, 262:12,<br/>263:1, 279:17<br/><b>apparent</b><br/>179:17, 222:8<br/><b>appeal</b><br/>1:2<br/><b>appearances</b><br/>4:4<br/><b>apple</b><br/>5:8, 11:7,<br/>11:11, 11:16,<br/>11:19, 11:22,<br/>12:4, 12:14,<br/>13:15, 21:14,<br/>27:6, 29:6,<br/>37:11, 41:2,<br/>62:15, 69:17,<br/>85:5, 86:8,<br/>111:18, 112:7,<br/>116:4, 116:11,<br/>116:17, 118:22,<br/>119:7, 128:18,<br/>131:20, 132:5,<br/>137:1, 192:10,</p> | <p>193:7, 193:15,<br/>193:16, 269:18,<br/>270:20<br/><b>applicability</b><br/>271:4<br/><b>applicable</b><br/>272:1<br/><b>applicant's</b><br/>97:21, 98:16,<br/>99:12<br/><b>application</b><br/>33:4, 86:3,<br/>86:4, 97:1,<br/>97:11, 99:5<br/><b>applied</b><br/>16:21, 17:7,<br/>18:8, 18:15,<br/>19:12, 24:10,<br/>25:16, 27:1,<br/>27:14, 27:22,<br/>28:20, 33:9,<br/>33:15, 33:18,<br/>33:21, 33:22,<br/>34:6, 34:7,<br/>34:9, 34:11,<br/>36:19, 36:20,<br/>37:15, 37:20,<br/>38:1, 38:7,<br/>38:8, 39:4,<br/>39:11, 39:19,<br/>40:11, 40:16,<br/>41:4, 41:10,<br/>41:15, 41:16,<br/>42:1, 42:8,<br/>45:3, 45:5,<br/>49:1, 50:12,<br/>63:11, 66:16,<br/>66:17, 66:21,<br/>67:8, 72:16,<br/>72:20, 73:1,<br/>73:3, 74:12,<br/>74:15, 75:1,<br/>75:5, 75:12,<br/>79:5, 159:2,<br/>175:11, 175:20,<br/>180:13, 185:15,<br/>188:20, 189:8,<br/>190:6, 193:8,</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>195:9, 195:17,<br/>214:8, 277:13<br/><b>applies</b><br/>24:14, 173:5<br/><b>apply</b><br/>24:14, 42:5,<br/>102:9, 102:14,<br/>121:16, 152:2,<br/>152:12, 162:14,<br/>175:22, 179:1,<br/>181:16, 202:7,<br/>236:20, 252:13<br/><b>applying</b><br/>26:22, 27:21,<br/>42:22, 167:17,<br/>201:2<br/><b>approach</b><br/>179:10, 180:2,<br/>181:6, 181:7,<br/>181:16, 181:21,<br/>183:6, 183:8,<br/>183:11<br/><b>approaches</b><br/>169:1<br/><b>approaching</b><br/>168:15, 169:6<br/><b>appropriate</b><br/>53:9, 117:15,<br/>166:22, 216:1,<br/>216:21, 217:1<br/><b>approximate</b><br/>183:12<br/><b>approximately</b><br/>170:3, 264:7<br/><b>areas</b><br/>197:22<br/><b>argon</b><br/>215:19<br/><b>argued</b><br/>131:16, 132:19<br/><b>argument</b><br/>69:4, 86:3,<br/>96:22, 97:22,<br/>98:16, 99:12,<br/>114:4, 114:21,<br/>115:3<br/><b>arguments</b><br/>97:17</p> | <p><b>armstrong</b><br/>165:2, 165:7,<br/>165:13, 165:19,<br/>166:6, 166:12,<br/>167:2, 167:4,<br/>167:5, 167:15,<br/>168:4, 168:11,<br/>168:21, 169:21,<br/>172:18, 173:4,<br/>173:13, 173:16,<br/>174:13, 175:9,<br/>175:18, 175:22<br/><b>around</b><br/>124:21, 171:7<br/><b>arrive</b><br/>60:17<br/><b>art</b><br/>60:16, 98:1,<br/>98:18, 99:14,<br/>101:7, 114:5,<br/>115:4, 115:12,<br/>144:8, 144:13,<br/>272:7, 272:16,<br/>272:20, 273:1,<br/>273:3, 273:22,<br/>274:12<br/><b>article</b><br/>157:18<br/><b>ascertaining</b><br/>179:10<br/><b>aside</b><br/>70:5<br/><b>asked</b><br/>47:15, 61:21,<br/>109:21, 113:4,<br/>117:3, 153:9,<br/>153:12, 198:21,<br/>234:9, 267:9,<br/>268:3, 272:14,<br/>275:14, 277:4,<br/>277:11, 277:20<br/><b>asking</b><br/>23:1, 23:17,<br/>35:6, 35:7,<br/>36:11, 39:8,<br/>46:11, 46:12,<br/>62:7, 64:8,<br/>103:18, 110:1,</p> | <p>118:9, 126:19,<br/>128:9, 186:22,<br/>187:1, 187:10,<br/>188:17, 190:14,<br/>202:21, 203:5,<br/>204:1, 211:11,<br/>224:14, 235:17,<br/>236:13, 250:18,<br/>260:18, 260:19<br/><b>aspects</b><br/>232:19, 233:21,<br/>234:19, 240:18<br/><b>assertion</b><br/>98:16<br/><b>assistant</b><br/>144:4<br/><b>assume</b><br/>7:19, 19:7,<br/>111:8, 112:3,<br/>130:3, 205:5,<br/>259:4<br/><b>assumed</b><br/>27:8<br/><b>assumption</b><br/>223:2, 223:9,<br/>223:14, 223:17<br/><b>atmospheric</b><br/>185:12, 222:4<br/><b>atoms</b><br/>140:21<br/><b>attached</b><br/>4:13, 5:2<br/><b>attempt</b><br/>155:6, 218:7,<br/>218:18, 239:22<br/><b>attempting</b><br/>103:6<br/><b>attempts</b><br/>215:8, 239:13,<br/>251:6<br/><b>attention</b><br/>97:6, 269:21,<br/>270:3<br/><b>attorney</b><br/>281:19<br/><b>attribute</b><br/>222:20<br/><b>august</b><br/>1:15, 2:13,</p> | <p>6:8, 158:4,<br/>281:15, 282:1<br/><b>available</b><br/>158:3, 189:3<br/><b>avenue</b><br/>3:5, 3:11<br/><b>avoid</b><br/>50:14<br/><b>aware</b><br/>11:3, 13:1,<br/>14:1, 31:21,<br/>81:3, 96:21,<br/>101:15, 114:3,<br/>114:20, 115:2,<br/>278:3, 278:7<br/><b>away</b><br/>177:11</p> <hr/> <p><b>B</b></p> <hr/> <p><b>bachelor's</b><br/>143:12<br/><b>back</b><br/>33:8, 55:5,<br/>77:1, 77:14,<br/>89:13, 89:19,<br/>128:17, 129:14,<br/>143:10, 156:17,<br/>167:4, 184:18,<br/>206:7, 239:5,<br/>244:19, 266:12,<br/>266:17, 267:4,<br/>267:7<br/><b>balance</b><br/>221:12, 225:7,<br/>225:22, 226:22<br/><b>base</b><br/>278:22<br/><b>based</b><br/>57:3, 141:21,<br/>141:22, 147:8,<br/>147:10, 164:17,<br/>169:21, 179:13,<br/>181:2, 184:7,<br/>210:21, 211:6,<br/>213:19, 218:11,<br/>220:14, 223:2,<br/>223:10<br/><b>basic</b><br/>111:22, 221:20,</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>273:8<br/><b>basically</b><br/>17:14, 125:13,<br/>180:1, 183:6,<br/>219:18, 243:19,<br/>272:9<br/><b>basis</b><br/>240:9, 242:6,<br/>278:17<br/><b>batteries</b><br/>14:8, 14:22,<br/>19:19, 26:9,<br/>50:21, 77:13,<br/>78:19, 79:2,<br/>79:6, 79:9,<br/>93:7, 106:19,<br/>108:2, 108:7,<br/>108:19, 140:4,<br/>143:18, 143:20,<br/>144:1, 144:2,<br/>144:5, 161:20,<br/>188:14, 192:17,<br/>199:4, 221:21,<br/>271:22, 273:7,<br/>279:1<br/><b>batteries"</b><br/>157:21, 161:16<br/><b>battery"</b><br/>74:16, 92:20<br/><b>battery's</b><br/>111:21, 120:2,<br/>152:3<br/><b>beater</b><br/>23:20<br/><b>because</b><br/>8:2, 27:11,<br/>43:2, 63:10,<br/>64:8, 70:17,<br/>72:5, 74:9,<br/>78:15, 81:19,<br/>83:20, 90:19,<br/>95:9, 96:19,<br/>99:18, 99:22,<br/>101:15, 102:18,<br/>107:11, 119:22,<br/>123:3, 128:2,<br/>147:14, 148:11,<br/>154:1, 156:4,</p> | <p>166:19, 179:18,<br/>183:10, 185:18,<br/>190:2, 202:22,<br/>206:16, 211:21,<br/>220:21, 223:15,<br/>228:20, 241:10,<br/>244:10, 245:10,<br/>246:16, 247:10,<br/>251:9, 251:10,<br/>257:15, 260:8,<br/>261:14, 274:9<br/><b>become</b><br/>140:20, 141:17,<br/>141:18, 194:3<br/><b>been</b><br/>7:13, 11:18,<br/>50:20, 51:2,<br/>60:5, 81:18,<br/>90:10, 97:10,<br/>102:2, 104:5,<br/>117:18, 119:10,<br/>142:20, 149:17,<br/>159:19, 160:12,<br/>161:5, 163:18,<br/>165:6, 212:6,<br/>214:13, 248:6<br/><b>before</b><br/>1:2, 2:14,<br/>7:13, 8:7, 54:2,<br/>108:3, 114:18,<br/>148:19, 149:6,<br/>163:15, 199:10,<br/>199:16, 200:2,<br/>203:17, 204:5,<br/>204:13, 204:21,<br/>205:1, 206:9,<br/>207:20, 281:7,<br/>281:9<br/><b>begin</b><br/>8:7<br/><b>begins</b><br/>6:2<br/><b>behalf</b><br/>3:2, 3:8, 6:17<br/><b>behavior</b><br/>253:22<br/><b>being</b><br/>7:6, 18:1,</p> | <p>24:9, 56:8,<br/>72:19, 74:15,<br/>80:22, 108:3,<br/>154:9, 201:9,<br/>201:19, 202:13,<br/>204:3, 241:6,<br/>246:15, 246:19,<br/>272:14, 275:14,<br/>276:3, 277:4,<br/>277:19<br/><b>believe</b><br/>10:8, 10:22,<br/>13:4, 14:4,<br/>20:21, 60:8,<br/>71:8, 77:12,<br/>82:6, 170:21,<br/>178:10, 183:15,<br/>184:8, 199:20,<br/>218:12, 220:13,<br/>227:3, 233:2<br/><b>below</b><br/>93:8, 112:1,<br/>125:1, 140:5,<br/>179:14, 236:6<br/><b>benefit</b><br/>103:8, 103:12<br/><b>besides</b><br/>11:15<br/><b>best</b><br/>7:17, 8:12,<br/>81:1, 183:6,<br/>183:11, 240:15,<br/>241:6, 241:10,<br/>246:14, 246:19,<br/>267:18, 268:1<br/><b>better</b><br/>88:5, 125:11,<br/>152:15, 183:9,<br/>192:5, 247:12<br/><b>between</b><br/>33:18, 34:11,<br/>38:22, 41:2,<br/>46:19, 50:9,<br/>69:21, 72:16,<br/>75:5, 75:11,<br/>95:20, 151:1,<br/>151:9, 151:18,<br/>153:18, 154:14,</p> | <p>154:22, 155:22,<br/>159:3, 175:6,<br/>195:17, 201:9,<br/>201:19, 202:13,<br/>210:14<br/><b>beyond</b><br/>60:20, 100:2,<br/>100:6<br/><b>bit</b><br/>37:10, 128:8,<br/>144:11, 186:13,<br/>192:1, 209:1,<br/>209:2<br/><b>black</b><br/>257:17<br/><b>blah</b><br/>251:9<br/><b>blood</b><br/>281:18<br/><b>board</b><br/>1:2, 22:17,<br/>23:3, 23:18,<br/>25:2, 25:8,<br/>25:20, 33:8,<br/>40:3, 40:4,<br/>47:16, 47:20,<br/>53:17, 54:5,<br/>54:11, 54:17,<br/>67:19, 77:9,<br/>79:4, 101:7,<br/>107:3, 112:13,<br/>112:20, 114:4,<br/>114:21, 115:3,<br/>115:11, 117:21,<br/>121:15, 129:18,<br/>136:11, 152:7,<br/>161:19, 162:18,<br/>164:2, 177:2,<br/>182:13, 182:19,<br/>186:16, 187:2,<br/>187:15, 188:6,<br/>188:19, 189:8,<br/>189:15, 190:14,<br/>191:7, 191:14,<br/>193:5, 194:7,<br/>197:7, 208:1,<br/>218:6, 219:13,<br/>226:7, 226:14,</p> |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| 233:21, 255:10<br><b>board's</b><br>113:8, 113:20,<br>114:16, 115:17<br><b>body</b><br>260:11<br><b>bold</b><br>132:14<br><b>both</b><br>27:8, 29:12,<br>29:13, 40:8,<br>41:5, 41:8,<br>41:21, 50:15,<br>163:2, 240:17,<br>253:14<br><b>bottom</b><br>21:21, 60:14,<br>86:8, 97:14,<br>124:20, 140:1,<br>175:15<br><b>brand-new</b><br>142:7<br><b>break</b><br>8:14, 8:15,<br>8:16, 53:22,<br>54:2, 89:7,<br>89:17, 95:18,<br>100:4, 142:22,<br>184:13, 184:21,<br>205:8, 205:14,<br>205:17, 211:21,<br>238:19, 238:20,<br>244:14, 266:7<br><b>brief</b><br>4:18, 4:22,<br>64:17, 207:17,<br>211:21, 238:19<br><b>briefly</b><br>60:2, 273:16<br><b>bring</b><br>191:6<br><b>broadly</b><br>68:7, 71:9<br><b>build</b><br>271:14<br><hr/> <b>C</b><br><hr/> <b>c-rate</b><br>154:4, 154:8, | 154:12, 156:5,<br>156:10, 162:10<br><b>calculate</b><br>84:10, 88:18,<br>120:7, 126:22,<br>130:4, 130:5,<br>133:3, 133:6,<br>133:11, 133:13,<br>180:3, 221:11,<br>226:5, 236:7<br><b>calculated</b><br>44:1, 86:22,<br>87:21, 88:9,<br>91:22, 121:2,<br>129:4, 130:9,<br>130:15, 130:20,<br>132:16, 179:12,<br>181:1, 220:7,<br>220:14, 220:22,<br>221:10<br><b>calculates</b><br>181:10, 226:21<br><b>calculating</b><br>166:21<br><b>calculation</b><br>95:15, 133:16,<br>141:21, 170:6,<br>176:8, 190:8<br><b>california</b><br>11:8, 195:7<br><b>california's</b><br>120:19<br><b>call</b><br>11:11, 117:21,<br>138:5, 138:10,<br>179:2, 181:16,<br>207:17<br><b>called</b><br>145:17<br><b>came</b><br>238:8<br><b>can't</b><br>8:11, 35:22,<br>142:5, 142:8,<br>142:12, 148:15,<br>154:8, 154:19,<br>155:17, 156:8,<br>160:1, 257:1, | 262:12, 263:1<br><b>cannot</b><br>83:2, 99:17,<br>133:5, 139:20,<br>159:12, 187:7,<br>187:13, 195:2,<br>223:5, 223:7,<br>246:17, 261:12<br><b>capac</b><br>264:19<br><b>capacities</b><br>106:21, 129:3,<br>132:12, 132:13,<br>132:14, 134:3,<br>172:20, 233:3,<br>236:6<br><b>capacities"</b><br>134:5<br><b>capacity"</b><br>132:3, 231:21,<br>232:2<br><b>carbon</b><br>228:2, 228:12,<br>228:16, 229:6,<br>229:15, 258:15,<br>259:21, 260:10,<br>260:20, 261:1,<br>262:9<br><b>care</b><br>205:9<br><b>carefully</b><br>32:19, 35:16,<br>37:8<br><b>case</b><br>1:10, 6:6, 9:4,<br>16:6, 24:16,<br>27:8, 42:20,<br>61:1, 163:9,<br>164:22, 193:17,<br>194:13, 194:17,<br>228:11, 237:5<br><b>cases</b><br>40:8, 65:13,<br>65:19, 81:10,<br>253:15<br><b>category</b><br>125:19<br><b>cathode</b><br>50:20, 53:7, | 53:8, 80:4,<br>84:11, 84:12,<br>99:20, 100:4,<br>101:8, 101:17,<br>102:20, 105:19,<br>107:6, 111:3,<br>121:3, 121:4,<br>128:4, 128:5,<br>139:2, 140:22,<br>141:6, 141:10,<br>142:7, 145:17,<br>146:13, 154:15,<br>161:20, 162:20,<br>163:12, 174:14,<br>175:1, 175:6,<br>176:6, 179:13,<br>182:18, 184:11,<br>213:21, 215:17,<br>220:6, 220:14,<br>221:11, 224:22,<br>230:14, 230:21,<br>235:16, 236:21,<br>240:10, 240:21,<br>241:4, 241:18,<br>243:20, 254:1,<br>268:18, 271:13<br><b>cathode"</b><br>258:2<br><b>cause</b><br>2:13, 146:12<br><b>caused</b><br>103:7<br><b>caution</b><br>203:19<br><b>cautioned</b><br>114:5, 115:4<br><b>cc</b><br>22:6, 22:7,<br>274:7<br><b>cell</b><br>60:19, 76:9,<br>76:11, 77:3,<br>77:19, 79:13,<br>79:22, 80:3,<br>80:9, 80:14,<br>80:18, 80:22,<br>81:1, 81:8,<br>81:9, 82:2, |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 82:7, 82:14,<br>83:4, 83:10,<br>83:16, 84:6,<br>84:19, 90:12,<br>90:18, 91:21,<br>92:11, 92:19,<br>93:11, 93:18,<br>94:3, 94:16,<br>95:2, 95:9,<br>95:16, 96:5,<br>106:16, 106:20,<br>107:12, 124:4,<br>128:12, 150:21,<br>154:21, 155:19,<br>158:22, 169:22,<br>174:13, 175:5,<br>176:6, 213:7,<br>213:12, 213:16<br><b>cells</b><br>94:20, 94:21,<br>104:12, 169:15,<br>212:21, 214:6<br><b>celsius</b><br>185:12<br><b>centimeter</b><br>165:20, 167:18,<br>167:21, 168:6,<br>168:14, 171:18,<br>172:4, 185:10,<br>185:20, 190:9,<br>252:14<br><b>centimeters</b><br>222:2<br><b>central</b><br>6:9, 11:8,<br>120:19, 195:7<br><b>centre</b><br>3:17<br><b>ceo</b><br>210:17, 210:18<br><b>certain</b><br>81:9, 97:5,<br>172:12, 177:8,<br>177:15, 197:4,<br>263:11, 267:20,<br>273:13<br><b>certificate</b><br>4:11, 5:4, | 281:1<br><b>certified</b><br>2:15, 281:3,<br>282:1<br><b>certify</b><br>281:5, 281:11,<br>281:14, 281:17<br><b>chance</b><br>241:6, 246:14,<br>246:19<br><b>change</b><br>42:7, 51:5,<br>102:5, 102:11,<br>219:4, 253:8,<br>255:9, 273:9,<br>273:19, 276:3,<br>276:9, 276:13,<br>276:14, 277:2,<br>278:13, 278:15,<br>278:19, 279:7<br><b>changed</b><br>47:12<br><b>changes</b><br>102:22<br><b>changing</b><br>172:19<br><b>charge-discharge</b><br>185:8, 222:1<br><b>charged</b><br>14:8, 14:22,<br>15:5, 17:15,<br>17:17, 17:20,<br>17:22, 18:9,<br>18:19, 19:3,<br>19:19, 20:6,<br>22:10, 24:5,<br>24:9, 26:9,<br>30:3, 49:2,<br>56:1, 72:19,<br>78:19, 79:2,<br>150:21, 154:21,<br>155:20, 159:1,<br>174:15, 186:4,<br>190:4, 190:6,<br>192:17, 195:21,<br>195:22, 196:19,<br>197:9, 199:3,<br>199:4, 199:16, | 200:2, 200:22,<br>201:4, 201:9,<br>201:10, 201:14,<br>201:15, 201:20,<br>201:21, 202:14,<br>202:15, 202:19,<br>203:3, 203:4,<br>203:7, 269:1,<br>274:10, 275:3,<br>275:12<br><b>charged"</b><br>56:10, 58:6,<br>201:3<br><b>charger</b><br>74:13<br><b>chemical</b><br>100:2, 255:18,<br>256:7<br><b>chemistry</b><br>79:7<br><b>child</b><br>33:4, 97:1,<br>99:5<br><b>china</b><br>3:20, 11:19,<br>88:17<br><b>chinese</b><br>85:11, 86:3,<br>86:16, 87:15,<br>87:19, 88:7,<br>88:15, 89:1<br><b>choose</b><br>258:19<br><b>chronically</b><br>19:20<br><b>circuit</b><br>200:7, 200:11,<br>200:16, 202:5<br><b>citations</b><br>269:6, 269:12,<br>271:9, 271:11<br><b>cite</b><br>52:2, 57:5,<br>57:6, 57:9,<br>59:22, 68:1,<br>68:7, 68:10,<br>68:18, 69:22,<br>70:3, 70:12, | 70:17, 70:19,<br>71:2, 71:4,<br>72:1, 72:5,<br>72:9, 72:14,<br>73:10, 73:12,<br>74:1, 74:9,<br>74:10, 85:9,<br>93:13, 94:8,<br>96:17, 99:22,<br>106:15, 107:1,<br>122:5, 122:9,<br>122:14, 122:17,<br>126:1, 126:8,<br>127:1, 127:8,<br>129:7, 136:18,<br>139:10, 139:17,<br>139:18, 139:20,<br>145:21, 147:11,<br>149:10, 149:13,<br>151:7, 155:4,<br>156:16, 158:14,<br>165:2, 167:2,<br>185:7, 230:7<br><b>cited</b><br>62:1, 62:2,<br>62:4, 62:8,<br>86:4, 97:3,<br>98:9, 99:16,<br>149:18, 156:16,<br>157:12, 158:15,<br>163:11, 165:8,<br>193:17, 279:17<br><b>cites</b><br>73:10, 156:16,<br>157:1, 157:6,<br>160:12, 163:18,<br>221:13<br><b>citing</b><br>69:3, 145:1<br><b>claimed</b><br>88:18, 166:21,<br>226:10, 226:17,<br>232:6, 236:7,<br>236:9<br><b>claims</b><br>14:17, 43:9,<br>43:10, 48:2,<br>85:14, 85:19, |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 86:21, 89:3,<br>90:1, 90:17,<br>91:5, 95:5,<br>108:16, 109:5,<br>174:5, 182:8,<br>188:21, 189:9,<br>194:10<br><b>clarify</b><br>110:9, 113:13<br><b>class</b><br>136:21, 279:2<br><b>clear</b><br>7:18, 18:4,<br>79:20, 80:7,<br>106:6, 110:17,<br>112:7, 113:18,<br>152:3, 152:4,<br>152:16, 162:11,<br>168:3, 169:7,<br>187:21, 201:18,<br>204:3, 206:16,<br>208:8, 209:2,<br>209:3, 231:2,<br>231:18, 260:9,<br>271:21<br><b>clearly</b><br>235:17, 245:10<br><b>close</b><br>87:6, 104:14,<br>170:20, 171:7,<br>171:18, 171:19,<br>172:5, 172:15,<br>176:19, 176:21,<br>196:7, 256:4<br><b>co-inventors</b><br>209:22<br><b>co-owner</b><br>211:4, 211:12<br><b>coauthors</b><br>209:20<br><b>cobalt</b><br>50:19, 51:2,<br>51:4, 93:5,<br>101:22, 102:2,<br>102:4, 102:16,<br>124:3, 126:16,<br>138:8, 138:9,<br>138:22, 139:4, | 139:13, 140:2,<br>141:4, 144:21,<br>145:6, 145:12,<br>145:19, 145:21,<br>146:4, 146:12,<br>146:22, 147:6,<br>147:8, 147:10,<br>147:13, 147:14,<br>147:17, 149:20,<br>150:6, 150:7,<br>150:14, 151:8,<br>153:5, 153:16,<br>155:20, 157:19,<br>158:9, 163:3,<br>164:18, 180:9,<br>213:19, 240:20<br><b>coefficient</b><br>138:6<br><b>cofounder</b><br>210:3<br><b>collaboration</b><br>259:2<br><b>colleague</b><br>6:22<br><b>column</b><br>75:17, 75:20,<br>77:17, 93:15,<br>93:21, 94:7,<br>94:10, 94:11,<br>95:3, 122:10,<br>123:20, 123:21,<br>123:22, 124:21,<br>129:8, 129:15,<br>139:22, 159:15,<br>160:2, 181:3,<br>236:10, 271:15,<br>271:20, 272:1,<br>272:2, 272:3<br><b>columns</b><br>77:1, 78:17,<br>93:13<br><b>combination</b><br>241:18<br><b>come</b><br>197:19<br><b>commencement</b><br>281:8<br><b>commencing</b><br>281:16 | <b>comment</b><br>224:11, 251:5<br><b>commercial</b><br>93:6, 108:2,<br>108:7, 140:4,<br>271:4, 271:22,<br>273:7<br><b>common</b><br>70:18, 72:6,<br>73:19, 130:3,<br>136:22<br><b>commonly</b><br>272:6<br><b>communications</b><br>203:21<br><b>community</b><br>71:10, 72:6<br><b>company</b><br>6:5, 210:6,<br>210:17, 210:18,<br>211:3, 211:13,<br>212:10, 212:13<br><b>comparative</b><br>222:10, 244:12<br><b>compare</b><br>107:13<br><b>compared</b><br>102:16, 105:7,<br>107:9, 107:10,<br>112:4, 164:14,<br>230:22, 254:18<br><b>comparing</b><br>111:8, 249:13<br><b>comparison</b><br>4:19, 38:18,<br>112:4, 257:16<br><b>compensation</b><br>210:10, 210:13,<br>210:16, 211:10,<br>212:3<br><b>complete</b><br>8:6, 17:18,<br>18:10, 71:5,<br>107:21, 156:5<br><b>completed</b><br>143:14<br><b>completely</b><br>27:10, 41:6, | 155:11, 215:22<br><b>complex</b><br>227:16, 228:2,<br>228:7, 228:19,<br>229:9, 230:3<br><b>complicated</b><br>146:8<br><b>component</b><br>135:18<br><b>components</b><br>135:9, 135:13,<br>136:6, 137:6,<br>137:8, 137:10,<br>137:17, 137:18,<br>137:20, 271:15<br><b>composition</b><br>182:18, 256:8<br><b>compositional</b><br>198:1<br><b>compositions</b><br>181:22, 255:19<br><b>compound</b><br>256:3, 275:21<br><b>compounds</b><br>152:19, 153:4<br><b>concentration</b><br>73:2<br><b>concept</b><br>273:13<br><b>concepts</b><br>35:17, 50:15,<br>273:4<br><b>concern</b><br>206:16<br><b>concerning</b><br>16:17, 46:18,<br>49:22, 51:14,<br>52:10, 52:20,<br>69:4, 98:15,<br>108:14, 111:3,<br>113:7, 113:19,<br>145:4, 145:10,<br>146:2, 146:22,<br>194:8, 206:11,<br>207:14, 208:2,<br>208:10, 208:14,<br>230:2, 257:3,<br>261:7, 261:16, |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| <p>262:2, 268:8<br/><b>concluded</b><br/>280:6<br/><b>conclusion</b><br/>16:10, 161:13,<br/>255:9, 278:16,<br/>279:6, 279:8<br/><b>conclusions</b><br/>278:19<br/><b>condition</b><br/>25:9, 41:20,<br/>176:19, 177:8,<br/>177:15, 186:10,<br/>187:8, 195:2,<br/>195:14, 219:9,<br/>239:15, 251:4,<br/>251:5, 271:3<br/><b>conditions</b><br/>16:1, 25:5,<br/>28:22, 105:19,<br/>105:22, 109:11,<br/>109:16, 110:4,<br/>110:6, 110:12,<br/>110:19, 123:4,<br/>147:1, 197:4,<br/>215:16, 249:17,<br/>250:3, 250:21,<br/>271:2, 271:6<br/><b>conduct</b><br/>268:4, 269:3,<br/>269:7, 269:14<br/><b>conducted</b><br/>144:1<br/><b>conductivity</b><br/>197:21<br/><b>confidentiality</b><br/>211:22<br/><b>configuration</b><br/>60:17, 81:11,<br/>82:8<br/><b>configured</b><br/>17:16, 18:9,<br/>18:16, 19:9,<br/>19:13, 24:4,<br/>30:3, 56:10,<br/>58:6, 200:21,<br/>201:3, 201:9,<br/>201:13, 201:20,</p> | <p>202:13, 203:4,<br/>203:6<br/><b>confirm</b><br/>65:22, 66:7<br/><b>confirming</b><br/>78:13, 239:21<br/><b>confirms</b><br/>56:8<br/><b>confusion</b><br/>50:14<br/><b>connecting</b><br/>6:21<br/><b>connection</b><br/>11:7, 95:2,<br/>124:17<br/><b>consequence</b><br/>102:10, 146:13<br/><b>consider</b><br/>153:12, 171:20,<br/>176:8, 195:3,<br/>196:7, 232:10,<br/>232:18<br/><b>considered</b><br/>15:5, 35:17,<br/>105:9, 108:12,<br/>154:2, 172:5,<br/>196:16, 209:9,<br/>211:2, 233:21,<br/>237:11<br/><b>considering</b><br/>100:4, 180:3,<br/>181:11, 238:11<br/><b>consistent</b><br/>26:1, 40:9,<br/>40:12, 43:7,<br/>79:9, 85:14,<br/>85:19, 89:2,<br/>177:16, 214:1,<br/>252:10<br/><b>consistently</b><br/>41:10<br/><b>constant</b><br/>14:11, 14:15,<br/>14:20, 14:21,<br/>15:1, 15:7,<br/>15:20, 16:19,<br/>16:20, 17:5,<br/>17:6, 17:15,</p> | <p>17:18, 17:21,<br/>17:22, 18:6,<br/>18:7, 18:14,<br/>19:12, 19:19,<br/>19:20, 20:5,<br/>20:10, 20:12,<br/>22:7, 22:9,<br/>22:11, 22:17,<br/>23:3, 23:19,<br/>24:16, 25:2,<br/>25:15, 26:9,<br/>26:10, 26:22,<br/>27:21, 28:20,<br/>29:8, 29:9,<br/>30:3, 30:9,<br/>30:14, 30:21,<br/>31:1, 31:6,<br/>150:22, 151:17,<br/>153:17, 154:22,<br/>155:21, 159:1,<br/>162:12, 162:13,<br/>165:19, 185:9,<br/>185:19, 189:16,<br/>189:18, 190:4,<br/>190:5, 190:15,<br/>190:16, 191:15,<br/>191:17, 192:17,<br/>192:18, 193:8,<br/>194:8, 194:14,<br/>195:8, 196:4,<br/>196:10, 196:15,<br/>196:19, 197:2,<br/>199:9, 199:15,<br/>200:1, 222:2,<br/>273:22, 274:1,<br/>274:13, 274:19,<br/>275:4<br/><b>construct</b><br/>176:20<br/><b>constructed</b><br/>50:11<br/><b>construction</b><br/>4:18, 4:22,<br/>11:22, 12:4,<br/>16:6, 16:7,<br/>16:9, 16:12,<br/>16:13, 16:16,<br/>20:18, 20:22,</p> | <p>21:14, 27:7,<br/>28:16, 29:6,<br/>29:18, 29:22,<br/>37:12, 41:3,<br/>42:14, 43:1,<br/>43:7, 56:2,<br/>60:11, 62:3,<br/>62:8, 62:15,<br/>64:16, 67:13,<br/>67:18, 67:19,<br/>68:10, 68:19,<br/>69:17, 86:15,<br/>88:13, 91:15,<br/>111:18, 112:17,<br/>116:7, 116:13,<br/>116:17, 118:21,<br/>119:6, 119:18,<br/>119:19, 120:11,<br/>120:20, 121:11,<br/>121:16, 121:21,<br/>122:19, 123:1,<br/>123:14, 124:13,<br/>127:12, 128:18,<br/>131:13, 131:14,<br/>131:18, 132:6,<br/>132:21, 134:19,<br/>176:14, 183:2,<br/>188:13, 188:18,<br/>192:7, 192:11,<br/>193:16, 195:20,<br/>200:10, 200:15,<br/>200:20, 203:1,<br/>203:3, 227:2,<br/>270:20<br/><b>construed</b><br/>119:14, 121:1,<br/>132:3<br/><b>contact</b><br/>173:19, 174:10<br/><b>contain</b><br/>255:19, 269:5,<br/>269:12, 271:9<br/><b>contained</b><br/>256:9<br/><b>containing</b><br/>152:19, 153:4,<br/>155:19<br/><b>contains</b><br/>240:17</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>content</b><br>227:10, 227:14,<br>227:19<br><b>contents</b><br>10:22, 193:18<br><b>context</b><br>34:1, 36:22,<br>37:3, 58:2,<br>62:16, 131:10,<br>131:13<br><b>continue</b><br>192:22<br><b>contracted</b><br>210:6<br><b>contrast</b><br>74:12<br><b>contribute</b><br>135:10, 135:13,<br>136:6, 136:9,<br>136:13<br><b>contributes</b><br>135:18<br><b>control</b><br>212:19, 212:20,<br>213:4<br><b>controlling</b><br>76:10, 77:2<br><b>controls</b><br>76:15, 77:8,<br>212:14<br><b>conventional</b><br>50:17, 96:13,<br>147:9, 241:1,<br>247:4, 248:5,<br>248:21, 266:1<br><b>conversation</b><br>204:18, 204:20,<br>205:5, 205:10,<br>206:10, 207:12,<br>207:20<br><b>coprecipitation</b><br>241:21, 242:2,<br>242:22, 243:21<br><b>copy</b><br>39:16<br><b>corner</b><br>21:22<br><b>correction</b><br>168:3 | <b>correctly</b><br>194:6, 251:11<br><b>correctness</b><br>219:1<br><b>cost</b><br>102:18, 108:10<br><b>could</b><br>15:14, 30:2,<br>30:9, 30:16,<br>30:20, 31:1,<br>31:7, 31:22,<br>34:1, 34:2,<br>36:21, 37:9,<br>41:19, 53:10,<br>55:21, 81:9,<br>90:6, 115:8,<br>117:4, 120:10,<br>149:5, 159:6,<br>172:20, 177:8,<br>177:15, 207:7,<br>216:10, 238:20,<br>247:14, 268:20,<br>271:5<br><b>counsel</b><br>6:14, 9:5, 9:7,<br>9:14, 9:17,<br>9:18, 9:21,<br>117:4, 118:10,<br>118:16, 148:3,<br>148:7, 149:1,<br>184:20, 188:1,<br>188:4, 191:1,<br>191:6, 191:13,<br>204:2, 204:19,<br>205:5, 205:7,<br>205:9, 206:13,<br>206:19, 207:6,<br>213:3, 216:22,<br>242:8, 242:17,<br>244:1, 249:10,<br>259:2, 259:4,<br>267:10, 268:3,<br>272:15, 273:13,<br>275:14, 277:4,<br>281:12<br><b>counsels</b><br>9:12, 10:2<br><b>counter</b><br>93:12, 93:18, | 94:4, 94:17,<br>94:20, 214:1<br><b>court</b><br>7:2, 8:2, 8:9,<br>17:12, 18:12,<br>18:18, 19:2,<br>20:4, 25:15,<br>26:1, 26:8,<br>26:13, 26:21,<br>27:20, 28:3,<br>28:19, 29:2,<br>30:1, 30:7,<br>30:15, 31:3,<br>37:19, 40:5,<br>40:20, 42:8,<br>43:2, 43:8,<br>56:17, 57:3,<br>64:20, 65:10,<br>65:21, 66:7,<br>88:14, 88:22,<br>119:13, 121:1,<br>128:22, 130:7,<br>130:12, 130:18,<br>131:4, 131:16,<br>132:1, 132:11,<br>134:1, 134:3,<br>186:13, 187:9,<br>188:12, 192:14,<br>194:2, 195:4<br><b>court's</b><br>20:18, 20:21,<br>21:16, 22:6,<br>22:14, 29:18,<br>120:11, 121:11,<br>134:18, 188:17,<br>195:20, 200:15<br><b>cover</b><br>193:17<br><b>create</b><br>142:11, 215:12,<br>216:6, 216:15,<br>217:13, 217:20,<br>218:3, 227:14,<br>277:19<br><b>critical</b><br>50:8, 279:5<br><b>criticize</b><br>109:9 | <b>criticized</b><br>110:2<br><b>crr</b><br>1:22<br><b>csr</b><br>1:22, 2:15,<br>282:5<br><b>ct</b><br>1:16, 281:16<br><b>current</b><br>14:11, 14:16,<br>14:20, 15:1,<br>15:7, 15:21,<br>16:19, 16:21,<br>17:5, 17:6,<br>17:15, 17:18,<br>18:6, 18:7,<br>18:14, 19:12,<br>19:20, 20:5,<br>20:11, 20:12,<br>22:7, 22:9,<br>22:11, 22:17,<br>23:3, 23:19,<br>24:16, 24:17,<br>25:2, 25:8,<br>25:15, 26:9,<br>27:1, 27:21,<br>28:20, 29:9,<br>30:4, 30:21,<br>31:6, 31:8,<br>31:10, 31:15,<br>32:4, 74:15,<br>105:22, 109:12,<br>110:4, 150:22,<br>151:17, 153:17,<br>154:22, 155:21,<br>159:1, 162:12,<br>162:13, 165:20,<br>167:17, 168:6,<br>168:13, 171:13,<br>171:17, 172:5,<br>172:19, 173:5,<br>185:9, 185:19,<br>189:17, 189:18,<br>190:4, 190:8,<br>190:15, 190:17,<br>191:16, 191:17,<br>192:17, 193:8, |
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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>194:9, 194:14,<br/>194:21, 194:22,<br/>195:1, 195:8,<br/>195:14, 196:4,<br/>196:10, 196:15,<br/>197:3, 197:18,<br/>199:9, 199:15,<br/>200:1, 254:5,<br/>254:11, 254:14,<br/>274:1, 274:13,<br/>274:20, 275:4,<br/>275:10, 279:4<br/><b>currents</b><br/>174:2, 254:15,<br/>254:16<br/><b>customers</b><br/>108:4<br/><b>cut</b><br/>238:18, 258:9,<br/>258:19, 259:7,<br/>259:14<br/><b>cv</b><br/>274:7<br/><b>cycle</b><br/>60:18, 103:4,<br/>105:7, 106:19,<br/>107:10, 107:13,<br/>107:14, 107:20,<br/>108:8, 109:3,<br/>111:9, 111:10,<br/>111:14, 112:10,<br/>112:15, 112:22,<br/>222:12, 223:5,<br/>223:6, 223:7,<br/>240:15, 241:10,<br/>245:8, 246:6,<br/>246:8, 246:10,<br/>247:12<br/><b>cycled</b><br/>108:3, 165:13<br/><b>cycles</b><br/>106:21, 106:22,<br/>107:4, 107:15,<br/>107:16, 107:17,<br/>107:21, 108:1,<br/>108:9, 108:12,<br/>111:4, 111:22,<br/>169:8, 222:15,</p> | <p>222:17, 224:20,<br/>246:7<br/><b>cyclic</b><br/>173:17, 222:15<br/><b>cycling</b><br/>51:7, 102:7,<br/>108:14, 110:13,<br/>110:20, 111:4,<br/>111:13, 173:14,<br/>223:20, 224:6,<br/>268:4, 269:1,<br/>269:8, 269:14,<br/>270:15, 271:2</p> <hr/> <p><b>D</b></p> <hr/> <p><b>data</b><br/>142:18, 173:14,<br/>179:17, 179:18,<br/>181:2, 181:3,<br/>184:6, 219:13,<br/>219:14, 219:15,<br/>219:22, 220:1,<br/>220:6, 220:7,<br/>220:13, 221:4,<br/>221:6, 221:17,<br/>222:21, 223:17,<br/>224:2, 237:22,<br/>238:3, 238:6,<br/>238:7, 238:8,<br/>238:13<br/><b>date</b><br/>6:8, 272:17,<br/>272:20, 273:1,<br/>273:5, 282:6<br/><b>dated</b><br/>13:9<br/><b>day</b><br/>53:17, 117:11,<br/>117:18, 282:1<br/><b>de-intercalation</b><br/>135:4, 135:21,<br/>136:3<br/><b>decade</b><br/>144:3<br/><b>decay</b><br/>103:14, 169:8<br/><b>decide</b><br/>210:17</p> | <p><b>decided</b><br/>188:12<br/><b>decision</b><br/>113:8, 113:20,<br/>114:6, 114:17,<br/>114:19, 115:5,<br/>115:18, 115:22,<br/>120:16<br/><b>decisions</b><br/>210:22<br/><b>declaration's</b><br/>35:22<br/><b>declarations</b><br/>11:22, 12:4,<br/>16:7, 69:17<br/><b>decrease</b><br/>105:4, 107:14<br/><b>decreases</b><br/>60:19<br/><b>deficient</b><br/>240:19<br/><b>define</b><br/>36:21, 37:2,<br/>202:18<br/><b>defined</b><br/>24:20, 45:5,<br/>125:12, 151:14<br/><b>defines</b><br/>129:1, 129:19,<br/>130:8, 130:13,<br/>130:19, 131:5,<br/>133:18<br/><b>definition</b><br/>24:6, 42:16,<br/>49:7, 130:5,<br/>135:17, 202:3,<br/>202:20<br/><b>degrades</b><br/>51:6, 102:6<br/><b>degree</b><br/>143:12, 143:15,<br/>179:19<br/><b>degrees</b><br/>104:12, 104:13,<br/>185:12, 222:4,<br/>250:9, 250:10<br/><b>demonstrated</b><br/>106:20</p> | <p><b>demonstrates</b><br/>172:18<br/><b>demonstrating</b><br/>139:11<br/><b>density</b><br/>50:21, 167:17,<br/>168:6, 168:13,<br/>171:17, 190:8,<br/>197:20<br/><b>depend</b><br/>62:16<br/><b>dependent</b><br/>109:5<br/><b>depending</b><br/>15:22, 24:17,<br/>25:5, 28:21,<br/>58:2, 74:14,<br/>128:4, 173:5,<br/>177:2<br/><b>depends</b><br/>15:12, 31:8,<br/>34:1, 41:20,<br/>123:4, 201:17<br/><b>depos</b><br/>6:11, 7:3<br/><b>deposed</b><br/>7:13<br/><b>deposes</b><br/>7:6<br/><b>deposi</b><br/>9:3<br/><b>deposition</b><br/>1:13, 2:1,<br/>2:10, 6:3, 6:12,<br/>9:1, 9:2, 9:5,<br/>9:11, 99:20,<br/>126:18, 131:22,<br/>190:1, 191:6,<br/>238:10, 270:1,<br/>280:6, 281:6,<br/>281:8, 281:9,<br/>281:13, 281:14<br/><b>derive</b><br/>141:12<br/><b>derives</b><br/>167:16<br/><b>deriving</b><br/>181:17</p> |
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| <p><b>describe</b><br/>31:10, 31:15,<br/>32:4, 56:9,<br/>198:17, 221:22,<br/>269:2, 269:7,<br/>269:13<br/><b>described</b><br/>140:10, 147:7,<br/>177:17, 213:18,<br/>223:20, 228:1,<br/>239:17, 241:14,<br/>242:2, 243:1,<br/>243:8, 243:22,<br/>249:17, 250:4,<br/>250:22, 252:4,<br/>262:9, 262:19,<br/>263:21<br/><b>describes</b><br/>22:10, 37:14,<br/>37:19, 38:7,<br/>39:12, 40:3,<br/>42:1, 139:21,<br/>181:5, 221:20,<br/>222:16, 227:16<br/><b>description</b><br/>4:14, 5:3,<br/>140:8<br/><b>descriptions</b><br/>41:8, 270:15<br/><b>design</b><br/>50:8, 123:5,<br/>127:10, 127:16,<br/>127:18, 127:21,<br/>128:2, 128:5,<br/>128:10, 177:10,<br/>257:22, 258:2,<br/>263:18, 263:20,<br/>264:12, 264:13,<br/>264:22, 265:8,<br/>265:9<br/><b>designating</b><br/>212:1<br/><b>designed</b><br/>257:21, 264:20<br/><b>desire</b><br/>219:4<br/><b>desired</b><br/>102:12</p> | <p><b>despite</b><br/>77:7, 79:1<br/><b>detail</b><br/>105:17, 269:2,<br/>269:7, 269:13,<br/>272:9, 272:10<br/><b>details</b><br/>97:6, 105:21,<br/>106:3, 109:10,<br/>109:15, 110:5,<br/>111:3, 252:22,<br/>268:4, 271:5<br/><b>determine</b><br/>79:13, 80:1,<br/>80:9, 80:22,<br/>81:2, 82:7,<br/>83:10, 84:19,<br/>109:3, 126:10,<br/>127:3, 128:4,<br/>154:8, 156:8,<br/>172:1, 175:1,<br/>182:15, 198:10,<br/>255:18, 256:8,<br/>266:2, 274:4,<br/>274:15, 275:5,<br/>275:16<br/><b>determined</b><br/>80:14, 80:18,<br/>81:7, 82:2,<br/>82:13, 83:4,<br/>83:16, 84:6,<br/>84:22, 112:9,<br/>128:2, 128:11,<br/>141:21, 168:5,<br/>221:13, 221:17,<br/>222:21, 265:11<br/><b>determines</b><br/>111:20<br/><b>determining</b><br/>265:17<br/><b>develop</b><br/>142:7<br/><b>developing</b><br/>53:5<br/><b>device</b><br/>76:4, 76:8,<br/>76:10, 76:15,<br/>76:20, 77:2,</p> | <p>77:8, 271:4<br/><b>diameter</b><br/>252:18<br/><b>differed</b><br/>249:17<br/><b>difference</b><br/>33:17, 34:11,<br/>38:21, 38:22,<br/>42:20, 46:18,<br/>50:9, 50:14,<br/>72:16, 131:1,<br/>131:2, 180:4,<br/>181:12, 195:17,<br/>201:7, 201:9,<br/>201:19, 202:13,<br/>255:8, 278:14,<br/>279:7<br/><b>differences</b><br/>277:12, 277:20,<br/>278:3, 278:7,<br/>278:10, 278:18<br/><b>different</b><br/>14:8, 16:15,<br/>27:12, 36:10,<br/>36:19, 38:3,<br/>38:9, 40:4,<br/>41:15, 41:20,<br/>43:3, 44:15,<br/>44:20, 45:3,<br/>45:6, 45:11,<br/>46:4, 47:8,<br/>47:9, 50:15,<br/>66:16, 66:21,<br/>76:4, 67:8,<br/>79:6, 79:8,<br/>79:9, 102:16,<br/>105:10, 111:11,<br/>128:8, 144:12,<br/>145:17, 152:5,<br/>160:13, 163:12,<br/>164:13, 169:11,<br/>174:1, 175:6,<br/>177:14, 181:22,<br/>203:11, 205:19,<br/>213:22, 214:7,<br/>214:12, 222:17,<br/>234:11, 243:14,<br/>244:5, 250:3,</p> | <p>250:21, 251:4,<br/>252:18, 253:4,<br/>253:10, 253:18,<br/>253:21, 253:22,<br/>254:5, 254:11,<br/>254:21, 255:11,<br/>277:11<br/><b>difficult</b><br/>236:13<br/><b>dioxide</b><br/>165:14<br/><b>diplomat</b><br/>2:16<br/><b>direct</b><br/>60:8, 97:12,<br/>104:6, 115:8,<br/>272:14, 273:12<br/><b>directed</b><br/>182:9, 236:12,<br/>260:3<br/><b>directly</b><br/>53:12, 54:6,<br/>90:19, 227:9<br/><b>disagree</b><br/>65:5, 65:9,<br/>148:21, 188:2<br/><b>disagrees</b><br/>132:2<br/><b>discharge</b><br/>32:13, 104:11,<br/>107:10, 110:3,<br/>110:12, 110:19,<br/>271:1, 272:6,<br/>272:11<br/><b>discharged</b><br/>150:21, 159:1<br/><b>discharging</b><br/>31:16, 32:5,<br/>109:11, 109:16,<br/>151:17<br/><b>disclose</b><br/>105:17, 106:3,<br/>106:7, 109:15,<br/>151:19, 152:1,<br/>152:8, 163:2,<br/>175:10, 175:19,<br/>193:19, 193:20,<br/>198:5, 203:19,</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>208:1, 208:7,<br/>211:19, 224:7,<br/>226:10, 226:17,<br/>228:18, 243:19,<br/>265:10<br/><b>disclosed</b><br/>105:20, 208:19,<br/>214:12, 233:3,<br/>233:11, 234:4,<br/>234:14<br/><b>discloses</b><br/>105:12, 151:7,<br/>152:7, 154:20,<br/>155:18, 185:19,<br/>186:18, 187:3,<br/>187:17, 188:8,<br/>188:21, 189:10,<br/>189:19, 190:18,<br/>191:18, 193:11,<br/>194:9, 224:6,<br/>225:6, 228:7,<br/>229:9, 231:3,<br/>235:22, 263:16,<br/>265:7<br/><b>disclosure</b><br/>151:16, 185:8,<br/>189:6, 230:2,<br/>275:17, 276:2<br/><b>disclosures</b><br/>223:2<br/><b>discoverable</b><br/>205:10<br/><b>discovered</b><br/>141:7<br/><b>discuss</b><br/>89:16, 106:12,<br/>184:19, 205:2,<br/>205:17, 205:18,<br/>206:14, 207:10,<br/>222:18, 224:10,<br/>262:14, 263:2<br/><b>discussed</b><br/>39:2, 69:14,<br/>76:19, 164:14,<br/>203:16, 204:12,<br/>206:18, 207:11,<br/>207:14, 208:14,<br/>208:19, 209:6,</p> | <p>229:5<br/><b>discusses</b><br/>70:13<br/><b>discussing</b><br/>39:4, 39:12,<br/>70:1, 70:4,<br/>70:20<br/><b>discussion</b><br/>9:4, 9:6,<br/>72:16, 152:16,<br/>204:4, 205:6,<br/>205:8, 206:12,<br/>208:2, 232:5<br/><b>discussions</b><br/>208:10<br/><b>dispute</b><br/>27:13, 29:5,<br/>41:3, 42:15,<br/>42:21, 43:3,<br/>195:16, 207:4,<br/>242:12<br/><b>dissolution</b><br/>100:5, 103:2<br/><b>distinct</b><br/>24:9, 72:20,<br/>125:13<br/><b>distinctions</b><br/>75:4, 75:11<br/><b>distinguish</b><br/>134:9<br/><b>distributed</b><br/>210:14, 210:21,<br/>211:2<br/><b>distribution</b><br/>197:21<br/><b>district</b><br/>11:8, 25:15,<br/>43:2, 120:19,<br/>121:1, 128:22,<br/>130:7, 130:12,<br/>131:4, 195:7<br/><b>divided</b><br/>84:13, 112:2,<br/>121:5, 212:10<br/><b>divulging</b><br/>203:21<br/><b>doctor</b><br/>118:8, 139:16,</p> | <p>223:8<br/><b>document</b><br/>62:2, 62:7,<br/>64:18, 88:15,<br/>208:17<br/><b>documents</b><br/>93:10<br/><b>doing</b><br/>64:3, 64:9,<br/>117:18, 142:9,<br/>142:13, 194:14,<br/>217:2, 257:15<br/><b>done</b><br/>54:3, 148:7<br/><b>dope</b><br/>180:13<br/><b>doped</b><br/>142:12, 163:3,<br/>177:20, 179:4,<br/>240:20<br/><b>doping</b><br/>177:21, 178:5,<br/>178:18, 181:11<br/><b>dot</b><br/>129:3, 129:4<br/><b>dots</b><br/>258:7<br/><b>double</b><br/>209:1<br/><b>doubt</b><br/>238:13, 253:1<br/><b>down</b><br/>65:20, 95:18,<br/>100:4, 142:17,<br/>192:4<br/><b>drastically</b><br/>60:19<br/><b>draw</b><br/>279:6<br/><b>drive</b><br/>282:8<br/><b>due</b><br/>50:21, 100:1<br/><b>duly</b><br/>2:12, 7:6,<br/>281:7<br/><b>duplicate</b><br/>251:16, 251:18,</p> | <p>251:20<br/><b>during</b><br/>17:20, 29:6,<br/>50:12, 66:22,<br/>67:9, 87:18,<br/>88:6, 89:1,<br/>89:17, 96:22,<br/>103:3, 184:21,<br/>197:2, 272:14</p> <hr/> <p><b>E</b></p> <hr/> <p><b>each</b><br/>9:19, 26:18,<br/>179:11, 180:6<br/><b>earlier</b><br/>119:2, 131:21,<br/>140:14, 163:10,<br/>164:15, 164:21,<br/>171:22, 195:15,<br/>206:16, 220:4,<br/>220:12, 234:10<br/><b>ease</b><br/>21:22<br/><b>easily</b><br/>86:21<br/><b>effect</b><br/>255:12<br/><b>efficiently</b><br/>17:20<br/><b>either</b><br/>29:18, 80:4,<br/>173:5<br/><b>electrochemical</b><br/>50:22, 197:8,<br/>279:5<br/><b>electrochemistry</b><br/>179:20<br/><b>electrode</b><br/>79:14, 80:1,<br/>80:5, 80:9,<br/>80:13, 80:17,<br/>81:2, 81:7,<br/>81:10, 82:2,<br/>82:7, 82:8,<br/>82:13, 83:4,<br/>83:15, 84:5,<br/>84:21, 86:20,<br/>87:3, 87:9,</p> |
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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>87:20, 88:9,<br/>91:9, 91:19,<br/>91:20, 93:6,<br/>93:12, 94:17,<br/>94:20, 96:3,<br/>96:6, 122:12,<br/>124:3, 125:14,<br/>128:12, 129:2,<br/>129:3, 130:14,<br/>130:15, 130:20,<br/>132:12, 132:13,<br/>132:15, 133:14,<br/>134:4, 140:3,<br/>150:5, 157:21,<br/>159:17, 160:10,<br/>161:4, 161:15,<br/>163:16, 164:4,<br/>173:19, 174:15,<br/>174:19, 174:20,<br/>197:19, 197:21,<br/>197:22, 198:2,<br/>214:1, 222:12,<br/>225:7, 225:8,<br/>227:17, 228:1,<br/>228:4, 228:5,<br/>228:13, 228:17,<br/>228:20, 229:3,<br/>229:5, 229:11,<br/>229:16, 230:18,<br/>230:19, 231:4,<br/>231:5, 252:18,<br/>253:4, 253:7,<br/>255:11, 257:22,<br/>258:1, 260:21,<br/>263:20, 264:22,<br/>265:10, 271:18,<br/>271:19<br/><b>electrode"</b><br/>93:19, 94:4,<br/>258:16, 264:14<br/><b>electrodes</b><br/>160:19, 163:20,<br/>224:7<br/><b>electrolyte</b><br/>103:3, 103:7,<br/>106:18, 173:18,<br/>174:9, 174:17,<br/>174:18, 198:1,</p> | <p>215:19, 253:11,<br/>253:14, 277:13<br/><b>electrolyte-based</b><br/>257:19, 263:16<br/><b>electronically</b><br/>158:4<br/><b>electronics</b><br/>1:4, 6:4, 6:18<br/><b>ellipses</b><br/>93:9, 258:7,<br/>258:10, 259:15,<br/>261:18, 262:4,<br/>262:15, 263:4<br/><b>else</b><br/>25:20, 54:11,<br/>70:12, 72:2,<br/>117:5, 138:11,<br/>279:21<br/><b>embodiments</b><br/>233:4, 233:11,<br/>234:5, 234:15,<br/>247:15<br/><b>emission</b><br/>260:18<br/><b>emphasize</b><br/>34:6, 34:8<br/><b>employed</b><br/>228:4, 228:12,<br/>281:19<br/><b>employing</b><br/>222:10<br/><b>enabled</b><br/>235:2, 235:9,<br/>236:1, 236:20,<br/>236:22<br/><b>enabling</b><br/>193:22<br/><b>end</b><br/>15:3, 24:17,<br/>25:12, 44:6,<br/>59:10, 85:13,<br/>95:11, 120:3,<br/>158:21, 174:11,<br/>211:6, 212:9,<br/>219:19, 220:2,<br/>274:22, 275:6<br/><b>energy</b><br/>50:21</p> | <p><b>enough</b><br/>107:11, 278:14,<br/>278:18<br/><b>enthusiasm</b><br/>102:21<br/><b>entirely</b><br/>149:1<br/><b>entitled</b><br/>78:15, 118:13,<br/>118:14, 157:19,<br/>205:11, 207:6,<br/>211:9<br/><b>entity</b><br/>96:20<br/><b>environment</b><br/>144:22, 145:7,<br/>145:13, 145:22,<br/>146:5, 147:15<br/><b>environmental</b><br/>102:19<br/><b>equal</b><br/>263:19, 264:13,<br/>264:21, 265:9<br/><b>equals</b><br/>73:1, 73:20,<br/>87:1, 139:2,<br/>140:12, 179:15<br/><b>equation</b><br/>24:12, 73:1,<br/>179:13<br/><b>equilibrium</b><br/>14:21, 24:7,<br/>24:15, 24:19,<br/>25:9, 25:12,<br/>26:4, 27:9,<br/>27:15, 27:16,<br/>29:15, 29:16,<br/>40:18, 40:21,<br/>49:4, 55:22,<br/>56:1, 59:14,<br/>63:11, 69:9,<br/>69:10, 69:15,<br/>69:16, 69:19,<br/>70:1, 70:4,<br/>70:11, 70:14,<br/>70:21, 71:3,<br/>73:4, 152:4,<br/>152:14, 162:12,</p> | <p>162:14, 171:19,<br/>172:5, 174:11,<br/>176:19, 186:9,<br/>196:7, 196:17,<br/>197:5, 198:15,<br/>199:20, 200:13,<br/>201:1, 201:15,<br/>201:16, 202:6,<br/>202:8, 273:14,<br/>273:16, 273:18,<br/>274:3, 274:4,<br/>274:9, 274:15,<br/>274:16, 274:21<br/><b>equivalent</b><br/>15:4, 56:19,<br/>152:14<br/><b>error</b><br/>171:1, 179:19<br/><b>errors</b><br/>220:20<br/><b>esquire</b><br/>3:3, 3:15<br/><b>essentially</b><br/>19:9, 38:1,<br/>95:14<br/><b>estimate</b><br/>183:6<br/><b>eta</b><br/>73:1, 73:2<br/><b>even</b><br/>103:11, 175:18,<br/>177:20, 194:1,<br/>195:4, 199:2,<br/>219:9<br/><b>event</b><br/>148:21<br/><b>ever</b><br/>7:13<br/><b>every</b><br/>77:13, 82:17,<br/>141:18, 246:17<br/><b>everything</b><br/>8:3, 117:4<br/><b>evidence</b><br/>68:2, 68:8,<br/>68:9, 68:18,<br/>69:3, 72:9,<br/>73:10, 73:14,</p> |
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| 74:2, 99:17,<br>122:18, 218:8,<br>218:18<br><b>exact</b><br>182:18<br><b>exactly</b><br>101:2, 215:15<br><b>examination</b><br>4:7, 4:8, 4:9,<br>7:9, 267:5,<br>272:14, 273:12,<br>279:12<br><b>examiner</b><br>61:2, 61:8,<br>61:15, 62:9,<br>62:20, 63:3,<br>63:16, 63:22,<br>64:3, 64:9,<br>64:21, 65:11,<br>88:17, 98:4<br><b>examiner's</b><br>61:22, 100:14<br><b>example</b><br>15:2, 19:18,<br>50:19, 62:18,<br>81:10, 126:2,<br>126:10, 127:3,<br>154:3, 215:12,<br>216:6, 217:14,<br>217:20, 218:3,<br>218:7, 218:8,<br>222:10, 222:14,<br>224:18, 225:10,<br>239:14, 240:14,<br>240:16, 240:19,<br>241:3, 241:5,<br>241:16, 243:20,<br>244:21, 245:6,<br>245:12, 245:15,<br>246:1, 246:2,<br>246:6, 246:13,<br>246:14, 246:17,<br>247:2, 247:6,<br>248:3, 248:15,<br>248:19, 249:2,<br>257:6, 277:6<br><b>examples</b><br>109:16, 179:11, | 180:6, 181:22,<br>214:18, 215:3,<br>222:17, 224:8,<br>224:15, 224:16,<br>225:21, 226:9,<br>226:16, 229:14,<br>229:19, 236:8,<br>240:10, 240:11,<br>240:16, 240:17,<br>241:4, 241:8,<br>241:9, 241:20,<br>242:1, 242:21,<br>243:4, 244:6,<br>244:11, 244:22,<br>245:9, 245:13,<br>245:18, 246:13,<br>248:16, 250:2,<br>250:21, 277:7<br><b>exceed</b><br>53:10, 268:20<br><b>exceeds</b><br>170:1, 170:16<br><b>except</b><br>39:18, 272:5<br><b>exchange</b><br>214:11<br><b>exhaustive</b><br>277:19<br><b>exhibit</b><br>4:15, 4:19,<br>4:21, 5:4, 5:6,<br>5:7, 5:8, 10:14,<br>12:10, 12:12,<br>13:6, 13:9,<br>13:11, 17:13,<br>18:5, 19:16,<br>21:13, 25:18,<br>26:7, 26:22,<br>32:1, 32:2,<br>37:11, 37:13,<br>38:15, 38:16,<br>38:17, 38:18,<br>38:20, 39:3,<br>39:10, 39:16,<br>56:4, 56:5,<br>56:6, 57:16,<br>59:18, 60:5,<br>62:2, 64:12, | 64:14, 75:18,<br>85:6, 85:7,<br>85:8, 85:21,<br>86:1, 86:2,<br>86:6, 90:6,<br>97:10, 104:5,<br>112:7, 114:9,<br>116:17, 120:12,<br>128:19, 131:22,<br>137:2, 149:17,<br>157:1, 157:11,<br>157:12, 157:17,<br>165:6, 192:6,<br>192:10, 194:8,<br>213:13, 217:10,<br>222:14, 257:7,<br>257:14, 270:1,<br>270:21, 279:14<br><b>exhibits</b><br>4:12, 5:1, 9:4,<br>114:12, 222:12<br><b>existing</b><br>53:7<br><b>expect</b><br>212:12, 241:3<br><b>expense</b><br>212:4<br><b>experiment</b><br>142:16, 142:17,<br>213:5, 239:18,<br>250:16, 250:17,<br>251:17<br><b>experimental</b><br>125:20, 141:7,<br>158:21, 159:16,<br>171:1, 179:18,<br>220:1, 221:4,<br>221:6, 221:22,<br>222:21, 223:6,<br>223:18, 223:19,<br>223:21, 224:2,<br>224:4<br><b>experimentally</b><br>167:10, 168:5,<br>172:1, 221:12,<br>221:17, 223:11<br><b>experimentation</b><br>239:8, 239:9, | 240:3<br><b>experiments</b><br>141:3, 141:11,<br>142:1, 142:9,<br>142:13, 237:15,<br>251:15, 279:8<br><b>expert</b><br>11:6, 37:1<br><b>expiration</b><br>282:6<br><b>explain</b><br>7:15, 42:13,<br>47:9, 50:9,<br>51:20, 200:12<br><b>explained</b><br>88:17, 164:21,<br>171:22, 176:18<br><b>explains</b><br>93:4, 271:13<br><b>explanation</b><br>164:17, 240:13<br><b>explicitly</b><br>227:22<br><b>explore</b><br>247:17<br><b>expressed</b><br>24:11, 72:22<br><b>extend</b><br>106:19<br><b>extent</b><br>54:4, 74:6<br><b>external</b><br>34:8, 74:13,<br>74:14<br><b>extra</b><br>117:19, 117:21<br><b>extracted</b><br>138:8, 139:1,<br>140:21, 141:9<br><b>extraction</b><br>138:6, 172:3<br><b>extremely</b><br>247:5, 247:16,<br>248:7, 249:1<br><b>extrinsic</b><br>65:22, 66:7<br><hr/> <b>F</b> <hr/> <b>fabricated</b><br>268:22 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>fabrication</b><br>221:21, 243:14<br><b>fact</b><br>39:18, 49:14,<br>49:22, 52:21,<br>96:20, 106:20,<br>145:4, 145:10,<br>146:2, 146:22,<br>166:11, 169:6,<br>180:2, 190:7,<br>229:8, 240:12,<br>252:3, 252:12,<br>252:17, 253:3,<br>253:10, 253:17,<br>254:4, 254:10,<br>254:20<br><b>factor</b><br>48:21, 141:12,<br>142:8, 142:12<br><b>factories</b><br>108:9<br><b>factors</b><br>74:14, 154:2,<br>197:18, 197:19,<br>198:17<br><b>failed</b><br>155:8, 218:7,<br>218:17, 251:6,<br>252:13<br><b>failure</b><br>51:8, 102:8,<br>251:8<br><b>fair</b><br>277:21<br><b>fake</b><br>219:15<br><b>fall</b><br>124:13<br><b>falling</b><br>236:8<br><b>falls</b><br>225:13, 225:16,<br>225:18, 225:22,<br>231:8<br><b>familiarize</b><br>270:6<br><b>far</b><br>161:3, 177:11, | 211:1<br><b>fashion</b><br>136:4<br><b>fast</b><br>169:8, 275:4<br><b>faster</b><br>15:16, 171:13,<br>275:10<br><b>fax</b><br>282:12<br><b>feel</b><br>143:3<br><b>few</b><br>183:15, 207:15,<br>232:14, 256:20,<br>267:7<br><b>fiber</b><br>258:15, 260:20<br><b>field</b><br>130:4, 141:17,<br>141:22, 179:20<br><b>fifth</b><br>107:10, 107:13,<br>111:10<br><b>figure</b><br>142:12, 164:8,<br>165:12, 165:21,<br>166:3, 167:2,<br>169:6, 169:21,<br>183:17, 184:3,<br>184:8, 219:14,<br>220:5, 220:12,<br>221:4, 222:9,<br>222:16, 223:22,<br>224:2, 225:3,<br>225:21, 232:10,<br>232:17, 234:15,<br>236:12, 236:16,<br>236:21, 245:10,<br>246:5<br><b>file</b><br>32:16, 59:19,<br>60:6, 124:18<br><b>finally</b><br>272:4<br><b>financially</b><br>281:21<br><b>find</b><br>83:2, 115:9, | 160:1, 187:9,<br>194:2, 195:5,<br>252:15, 264:2<br><b>finding</b><br>99:11, 100:15,<br>115:17<br><b>findings</b><br>113:20<br><b>finds</b><br>186:16, 187:2,<br>187:15, 188:7,<br>188:19, 189:8,<br>189:16, 190:14,<br>191:15, 226:7,<br>226:14<br><b>finish</b><br>118:13<br><b>finished</b><br>118:8<br><b>firm</b><br>282:7<br><b>first</b><br>7:6, 9:11,<br>47:2, 95:7,<br>107:9, 107:13,<br>107:15, 107:16,<br>109:3, 111:9,<br>111:10, 111:14,<br>112:9, 112:15,<br>112:22, 115:10,<br>128:19, 137:1,<br>155:16, 159:15,<br>160:2, 166:5,<br>169:4, 180:22,<br>181:7, 193:15,<br>205:16, 205:21,<br>207:3, 224:11,<br>250:17, 257:18<br><b>fit</b><br>191:9<br><b>five</b><br>9:15, 22:5,<br>106:22, 107:15,<br>108:1, 108:11,<br>250:10<br><b>five-hour</b><br>252:3<br><b>fix</b><br>87:17 | <b>fixed</b><br>105:7, 230:13<br><b>floor</b><br>3:18<br><b>focus</b><br>27:12, 29:7,<br>42:15, 254:1<br><b>focused</b><br>42:14, 271:22<br><b>focusing</b><br>229:18<br><b>follow</b><br>180:1, 181:6,<br>183:7, 215:15<br><b>followed</b><br>252:9<br><b>following</b><br>24:12, 72:22,<br>179:10, 217:14,<br>217:21, 218:4<br><b>follows</b><br>7:8, 86:22,<br>181:3<br><b>footnote</b><br>149:12, 149:18,<br>157:2, 157:3,<br>169:20, 221:13<br><b>footnotes</b><br>160:13<br><b>formation</b><br>107:17, 107:20,<br>108:8, 108:11,<br>108:12, 111:9,<br>111:14, 112:15,<br>113:1<br><b>formed</b><br>52:16, 270:14,<br>278:4<br><b>formula</b><br>138:9<br><b>forth</b><br>67:14, 281:7<br><b>forwarding</b><br>119:19<br><b>found</b><br>174:16, 222:13<br><b>four</b><br>194:20, 258:7 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>friendliness</b><br>102:19<br><b>front</b><br>10:13, 16:8,<br>16:10, 35:22,<br>120:13, 156:21,<br>157:5<br><b>full</b><br>17:22, 80:14,<br>80:18, 81:1,<br>81:8, 81:9,<br>82:2, 82:7,<br>82:13, 83:4,<br>83:10, 83:16,<br>84:6, 84:19,<br>95:9, 166:5,<br>175:5, 176:6,<br>195:1<br><b>full-cell</b><br>69:4, 85:1,<br>85:3, 95:21,<br>154:3, 162:7,<br>162:9, 169:11,<br>175:11, 175:20<br><b>fully</b><br>14:22, 15:5,<br>17:19, 18:19,<br>19:3, 40:8,<br>43:6, 56:1,<br>177:16, 190:5,<br>197:9, 199:4,<br>200:22, 201:14,<br>274:1, 274:7,<br>274:10, 274:13,<br>274:20, 275:11,<br>275:12<br><b>functions"</b><br>137:21<br><b>further</b><br>4:9, 65:20,<br>239:13, 240:1,<br>240:16, 279:10,<br>279:20, 279:22,<br>281:11, 281:14,<br>281:17<br><b>further</b><br>150:12<br><hr/> <b>G</b><br><hr/> <b>gave</b><br>213:3 | <b>general</b><br>29:21, 75:15,<br>134:8, 178:22,<br>214:13, 271:4<br><b>generally</b><br>272:1<br><b>generate</b><br>219:22<br><b>generated</b><br>211:13, 212:6<br><b>genuine</b><br>179:18<br><b>george</b><br>3:9, 6:19, 10:1<br><b>give</b><br>8:11, 41:8,<br>54:10, 104:4,<br>114:10, 202:7,<br>216:10, 216:12,<br>217:8, 224:20,<br>254:17, 257:6<br><b>given</b><br>211:13, 272:22,<br>281:10<br><b>gives</b><br>224:18, 224:19<br><b>giving</b><br>148:19<br><b>go</b><br>8:16, 54:2,<br>75:16, 77:17,<br>85:4, 93:4,<br>97:16, 143:4,<br>150:19, 161:12,<br>192:6, 192:8,<br>203:21, 206:1,<br>210:11, 211:20,<br>221:15, 242:4,<br>242:7, 242:19<br><b>goes</b><br>74:18, 87:8,<br>98:4, 108:7,<br>150:4, 150:13,<br>160:18, 168:12,<br>175:16, 228:6<br><b>going</b><br>7:15, 7:16,<br>7:17, 7:19,<br>8:14, 26:6,<br>43:20, 53:16,<br>53:17, 54:4,<br>54:8, 60:14,<br>73:6, 82:18,<br>107:14, 117:19,<br>117:22, 118:12,<br>142:20, 167:4,<br>175:1, 186:8,<br>203:19, 242:15,<br>257:15, 266:16<br><b>good</b><br>7:11, 7:12,<br>53:22, 89:14,<br>89:15, 105:9,<br>142:22, 229:2,<br>238:19<br><b>gram</b><br>87:4, 124:6,<br>124:7, 125:3,<br>126:17, 140:6,<br>140:17, 166:13,<br>166:22, 167:1,<br>167:7, 167:16,<br>168:4, 168:15,<br>169:2, 169:14,<br>169:15, 170:2,<br>170:3, 170:9,<br>170:16, 171:10,<br>171:12, 172:21,<br>173:7, 173:8,<br>177:19, 179:15,<br>180:14, 181:19,<br>183:17, 184:10<br><b>graphite</b><br>259:20, 259:21,<br>260:9<br><b>graphitized</b><br>260:22, 262:8<br><b>great</b><br>54:21, 90:13,<br>266:21<br><b>greater</b><br>95:8, 258:1<br><b>greenberg</b><br>2:17, 3:4, 6:17<br><b>groups</b><br>155:6 | <b>growth</b><br>261:1<br><b>guide</b><br>177:10<br><b>guyomard</b><br>97:2, 98:9,<br>103:19, 104:6,<br>104:15, 104:19,<br>104:20, 105:5,<br>105:11, 105:17,<br>105:20, 106:2,<br>106:6, 106:15,<br>107:7, 109:9,<br>109:20, 110:3,<br>111:11, 164:14<br><b>guyomard's</b><br>100:20, 104:3<br><hr/> <b>H</b><br><hr/> <b>half</b><br>79:13, 79:22,<br>80:3, 80:8,<br>80:22, 94:20,<br>95:2, 95:16,<br>96:5, 124:8,<br>138:22, 140:21,<br>142:21, 169:15,<br>174:13<br><b>half-cell</b><br>162:7, 169:10,<br>176:8, 260:11,<br>262:10<br><b>handout</b><br>246:11<br><b>happen</b><br>7:16<br><b>happy</b><br>205:7, 205:16<br><b>hard</b><br>123:5, 186:14,<br>251:12<br><b>he'll</b><br>54:10<br><b>head</b><br>8:4<br><b>hear</b><br>34:4<br><b>hearing</b><br>186:14 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>help</b><br>8:9, 23:14,<br>23:16, 35:3,<br>37:9<br><b>helpful</b><br>35:19<br><b>here</b><br>6:2, 8:3, 20:3,<br>24:2, 24:6,<br>24:20, 27:15,<br>35:21, 37:22,<br>38:6, 45:5,<br>46:9, 46:16,<br>50:6, 50:14,<br>52:2, 53:5,<br>53:16, 62:20,<br>66:14, 67:10,<br>74:10, 81:5,<br>81:14, 81:21,<br>83:1, 83:6,<br>83:9, 84:21,<br>85:3, 85:18,<br>99:16, 99:22,<br>102:18, 110:2,<br>116:20, 125:17,<br>129:11, 132:10,<br>134:8, 137:8,<br>137:16, 139:13,<br>140:8, 140:13,<br>147:6, 153:14,<br>153:22, 154:17,<br>155:14, 156:3,<br>156:6, 156:20,<br>160:3, 162:2,<br>162:12, 169:10,<br>171:6, 173:22,<br>174:8, 176:11,<br>179:9, 179:16,<br>181:12, 183:8,<br>189:5, 189:14,<br>190:2, 194:18,<br>207:19, 208:21,<br>209:10, 222:21,<br>234:3, 234:12,<br>235:19, 236:13,<br>240:14, 245:5,<br>251:10, 256:6,<br>260:22, 262:9, | 262:13, 263:1,<br>278:14<br><b>hereby</b><br>281:5<br><b>hereinbefore</b><br>281:6<br><b>high</b><br>50:21, 106:17,<br>152:13, 186:2,<br>186:8, 247:3<br><b>high-potential</b><br>161:14<br><b>high-voltage</b><br>157:20, 159:17,<br>160:10, 161:4,<br>163:16<br><b>higher</b><br>18:2, 25:11,<br>51:3, 102:4,<br>102:9, 102:12,<br>102:13, 105:3,<br>147:9, 150:6,<br>168:13, 172:4,<br>198:12, 247:11,<br>248:20, 254:17,<br>254:18<br><b>highest</b><br>245:8, 246:7,<br>246:8<br><b>highlight</b><br>236:10<br><b>highlighted</b><br>38:21<br><b>highlighting</b><br>38:21<br><b>highly</b><br>219:20<br><b>history</b><br>32:16, 32:20,<br>32:22, 33:4,<br>59:19, 60:6,<br>85:10, 87:19,<br>88:6, 88:16,<br>97:1, 97:5,<br>97:7, 97:11,<br>99:4, 99:8<br><b>hit</b><br>199:10 | <b>hkri</b><br>3:17<br><b>hm-hm</b><br>11:13, 22:1,<br>22:8, 26:14,<br>44:4, 46:15,<br>117:6, 160:6,<br>187:14, 258:8<br><b>hold</b><br>188:14<br><b>honest</b><br>217:2<br><b>hope</b><br>164:13<br><b>horn</b><br>132:1<br><b>hour</b><br>8:15, 142:21,<br>171:8, 181:4,<br>196:6<br><b>hourly</b><br>195:16<br><b>hours</b><br>9:19, 15:3,<br>15:13, 194:20,<br>250:10, 250:11,<br>256:22, 257:4<br><b>houston</b><br>2:18<br><b>however</b><br>102:21<br><b>hui</b><br>3:17<br><b>hundred</b><br>15:13, 219:8,<br>219:9<br><b>hundreds</b><br>279:2<br><b>hungerford</b><br>282:8<br><b>hydrocarbon</b><br>227:18<br><b>hypothesis</b><br>69:20<br><b>hypothetic</b><br>189:4<br><b>hypothetical</b><br>186:22, 187:8, | 189:14, 194:1,<br>219:9<br><b>hypotheticals</b><br>187:11<br><hr/> <b>I</b><br><hr/> <b>identified</b><br>75:4, 75:10<br><b>identify</b><br>6:15<br><b>ignore</b><br>247:15<br><b>ignored</b><br>181:21<br><b>imagine</b><br>133:5<br><b>impeding</b><br>191:5<br><b>implement</b><br>14:12, 14:16,<br>15:8, 15:21<br><b>implementing</b><br>66:2<br><b>important</b><br>77:15<br><b>impossible</b><br>179:19, 219:21<br><b>improbable</b><br>219:21<br><b>improper</b><br>21:10, 54:20,<br>149:2, 187:22,<br>191:2, 191:13,<br>207:8<br><b>improve</b><br>147:7<br><b>improved</b><br>53:6<br><b>improvement</b><br>240:1<br><b>improvements</b><br>239:13<br><b>impure</b><br>227:10<br><b>inactive</b><br>135:2, 135:8,<br>135:12, 135:18,<br>136:2, 136:6, |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 136:8, 136:12,<br>137:6, 137:9,<br>137:11, 137:13,<br>137:16, 137:18,<br>226:22, 227:1,<br>227:3, 279:3<br><b>inappropriate</b><br>188:5, 242:17<br><b>include</b><br>58:9, 116:5,<br>116:12, 118:20,<br>121:12, 131:6,<br>133:18, 137:16,<br>137:17, 176:14,<br>226:22, 258:3<br><b>included</b><br>131:17, 132:21,<br>156:11, 238:4<br><b>includes</b><br>48:2<br><b>including</b><br>197:19, 277:12<br><b>income</b><br>210:21, 211:1<br><b>inconsistency</b><br>176:11<br><b>inconsistent</b><br>27:11, 179:21<br><b>incorrect</b><br>169:4, 235:14<br><b>increase</b><br>37:16, 42:2,<br>42:5, 42:6,<br>49:3, 100:6,<br>100:8, 103:6,<br>103:15, 228:19,<br>229:10<br><b>increases</b><br>60:20<br><b>increasing</b><br>37:14, 37:19,<br>38:7, 42:1<br><b>indeed</b><br>105:19, 219:21<br><b>independent</b><br>48:2<br><b>indicate</b><br>18:5, 19:18, | 21:21, 34:10,<br>48:20, 56:13,<br>57:17, 71:16,<br>74:12, 79:12,<br>79:21, 80:7,<br>87:8, 90:1,<br>93:10, 96:11,<br>135:2, 175:9,<br>208:9, 213:15,<br>221:9, 232:9,<br>248:20, 249:15,<br>249:22, 250:19,<br>251:18, 256:2,<br>263:11, 265:1<br><b>indicated</b><br>86:15, 87:19,<br>88:8, 105:8,<br>115:11, 140:12,<br>173:18, 196:9,<br>244:20<br><b>indicates</b><br>22:6, 33:22,<br>48:4, 48:10,<br>48:13, 49:15,<br>50:1, 51:14,<br>52:11, 52:21,<br>76:14, 77:19,<br>78:19, 106:15,<br>124:22, 149:20,<br>154:21, 155:19,<br>158:9, 158:22,<br>164:10, 167:6,<br>173:17, 216:2,<br>230:12, 251:13<br><b>indicating</b><br>71:4, 77:7,<br>79:2, 197:8<br><b>individual</b><br>194:13<br><b>industry</b><br>57:19, 58:5,<br>62:18, 68:6<br><b>inert</b><br>137:11, 137:13,<br>137:16, 137:17,<br>137:20<br><b>information</b><br>32:13, 107:12, | 154:5, 154:16,<br>156:4, 156:11,<br>159:7, 198:5,<br>198:14, 203:20,<br>204:2, 208:18,<br>211:18<br><b>initial</b><br>111:21, 112:2,<br>112:4, 112:8,<br>112:14, 112:21,<br>166:12, 167:6,<br>173:6, 173:7<br><b>innovative</b><br>240:18<br><b>instance</b><br>2:11<br><b>instances</b><br>56:13, 57:12<br><b>instead</b><br>119:21, 147:13,<br>215:19<br><b>institution</b><br>113:8, 113:20,<br>114:6, 114:17,<br>114:19, 115:5,<br>115:18, 115:21<br><b>instruct</b><br>244:2, 244:10,<br>254:16<br><b>instructed</b><br>251:16, 255:16<br><b>instruction</b><br>207:2, 246:16<br><b>intent</b><br>221:3<br><b>intentionally</b><br>261:8, 261:17,<br>262:4, 262:15,<br>263:3<br><b>inter</b><br>10:10, 11:15<br><b>intercalation</b><br>135:3, 135:20,<br>136:3, 229:10<br><b>interchangeably</b><br>33:11, 34:13,<br>43:11, 43:16<br><b>interest</b><br>166:9, 166:10 | <b>interested</b><br>281:21<br><b>internal</b><br>33:21, 33:22,<br>34:7, 41:15,<br>41:18, 49:1,<br>79:10<br><b>interpretation</b><br>53:13, 201:13<br><b>interrupt</b><br>117:9, 117:14,<br>118:12, 118:13,<br>142:20<br><b>interrupted</b><br>190:21, 191:4<br><b>intimidate</b><br>54:8, 54:18<br><b>intrinsic</b><br>68:1, 68:8,<br>68:9, 68:18,<br>69:3, 72:14,<br>122:18<br><b>introduce</b><br>21:12, 60:4,<br>97:9, 114:15,<br>149:16, 165:5<br><b>introduced</b><br>157:11<br><b>invalidity</b><br>233:5, 233:12<br><b>invention</b><br>76:8, 222:14,<br>257:21, 271:22<br><b>inventors</b><br>53:6, 85:10,<br>86:14, 86:17,<br>87:16, 87:18,<br>88:6, 88:16,<br>268:18<br><b>investigated</b><br>160:12, 163:18<br><b>investigated"</b><br>159:19<br><b>invite</b><br>269:21, 270:3,<br>270:4<br><b>involved</b><br>11:18 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>involves</b><br>20:11, 189:17,<br>190:16, 191:16<br><b>ion</b><br>14:8, 76:9,<br>76:11, 77:3,<br>77:19, 87:3,<br>90:2, 90:12,<br>90:18, 91:20,<br>92:11, 92:19,<br>93:7, 124:4,<br>140:4, 143:18,<br>143:19, 144:1,<br>144:2, 161:15,<br>214:11, 239:16,<br>273:7<br><b>ion-exchange</b><br>213:20<br><b>ion-exchanged</b><br>164:9<br><b>ions</b><br>138:8, 139:1,<br>160:20, 160:22,<br>163:21, 163:22<br><b>ip</b><br>37:11<br><b>ipr</b><br>1:10, 6:7,<br>10:6, 10:9,<br>16:12, 21:17,<br>22:2, 22:16,<br>23:2, 23:18,<br>33:10, 38:2,<br>38:19, 39:15,<br>40:22, 42:10,<br>42:15, 42:18,<br>42:20, 43:2,<br>43:6, 45:2,<br>47:16, 47:20,<br>52:15, 52:16,<br>56:2, 66:19,<br>67:15, 67:20,<br>68:20, 70:5,<br>76:20, 76:21,<br>78:4, 78:18,<br>79:16, 79:22,<br>80:8, 80:16,<br>81:6, 82:1, | 82:12, 83:3,<br>83:14, 84:4,<br>85:5, 89:19,<br>96:11, 99:3,<br>104:7, 112:12,<br>112:20, 113:7,<br>113:19, 113:21,<br>119:12, 121:16,<br>121:22, 122:3,<br>122:19, 129:19,<br>135:2, 137:1,<br>138:2, 151:7,<br>165:1, 180:22,<br>193:7, 193:16,<br>197:15, 204:21,<br>204:22, 206:9,<br>208:9, 239:7,<br>267:12, 268:8,<br>268:10, 273:4,<br>279:15<br><b>iron</b><br>180:9<br><b>irreversibility</b><br>246:9<br><b>irreversible</b><br>51:5, 102:5,<br>135:13, 135:19,<br>136:6, 136:13,<br>136:16, 222:11,<br>227:8, 227:14,<br>228:14, 228:20,<br>229:20, 240:22,<br>245:6, 245:16,<br>245:19, 247:3,<br>247:6, 247:11,<br>247:16, 248:4,<br>248:7, 248:20,<br>249:1<br><b>isometry</b><br>256:2<br><b>issue</b><br>26:18, 205:19,<br>211:22, 268:8,<br>273:4<br><b>issues</b><br>103:4, 198:22,<br>267:12, 267:20<br><b>italicized</b><br>132:14 | <b>J</b><br><b>jeff</b><br>6:16, 118:13,<br>142:20, 217:5,<br>238:16, 243:6<br><b>jeffrey</b><br>3:3<br><b>job</b><br>1:20<br><b>jp</b><br>60:18<br><b>july</b><br>13:9, 13:15,<br>14:2, 14:4,<br>158:3<br><b>june</b><br>12:13<br><b>K</b><br><b>kajiyama</b><br>5:6, 149:10,<br>149:14, 149:18,<br>149:20, 150:4,<br>150:12, 150:20,<br>152:18, 153:2,<br>154:18, 155:15,<br>156:15, 156:16,<br>156:19, 157:2,<br>157:6, 157:12,<br>157:13, 157:19,<br>158:8, 158:16,<br>158:22, 159:15,<br>161:7, 163:1,<br>163:2, 163:11,<br>163:15, 164:18<br><b>kajiyama's</b><br>151:16<br><b>keep</b><br>53:18, 117:1,<br>257:14<br><b>keeps</b><br>117:19<br><b>key</b><br>197:18, 271:14<br><b>kim</b><br>3:10, 3:16,<br>6:20 | <b>kind</b><br>97:17<br><b>kislingbury</b><br>1:22, 2:15,<br>7:2, 281:3,<br>282:5<br><b>knowledge</b><br>70:18, 72:6,<br>73:19, 130:3,<br>136:22, 141:17,<br>141:19<br><b>known</b><br>71:9, 96:20,<br>100:15, 103:5,<br>130:6, 138:22,<br>140:21, 152:18,<br>153:3, 161:19<br><b>kobre</b><br>3:10, 3:16,<br>6:20<br><b>L</b><br><b>label</b><br>166:3<br><b>labeled</b><br>97:13, 97:17<br><b>laboratories</b><br>101:16<br><b>laboratory</b><br>19:18, 192:16<br><b>laid</b><br>182:5<br><b>language</b><br>25:19, 45:18,<br>46:19, 48:19,<br>49:22, 51:14,<br>52:10, 52:21,<br>92:21, 122:15,<br>261:16, 262:3,<br>262:14, 263:2<br><b>largely</b><br>117:12<br><b>last</b><br>9:8, 9:12,<br>9:15, 30:7,<br>34:4, 43:22,<br>56:12, 84:1,<br>92:8, 96:12, |
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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 107:22, 150:19,<br>161:13, 166:19,<br>173:12, 181:3,<br>194:19, 222:5,<br>232:14, 233:8,<br>273:9, 279:1<br><b>later</b><br>50:13, 95:11,<br>161:6, 169:8,<br>180:2, 180:4<br><b>lawful</b><br>7:6<br><b>lawyer</b><br>205:4<br><b>layer</b><br>145:17, 164:11<br><b>layered</b><br>147:8, 149:20,<br>157:19, 161:5,<br>163:11, 164:9,<br>164:11, 164:19,<br>169:22, 170:15,<br>174:3, 174:14,<br>213:19, 214:15,<br>216:4, 219:5,<br>256:15, 257:3<br><b>lead</b><br>102:10, 103:13,<br>214:14, 216:3,<br>219:7, 219:10,<br>252:22, 253:22<br><b>leading</b><br>222:20, 267:22,<br>270:10, 270:16,<br>271:10, 276:12,<br>276:18<br><b>least</b><br>136:4, 173:20<br><b>led</b><br>103:4<br><b>lee</b><br>210:19, 210:22<br><b>left</b><br>257:17, 258:13,<br>258:16, 260:4,<br>261:8<br><b>length</b><br>69:14 | <b>less</b><br>90:14, 95:8,<br>106:22, 107:5,<br>145:6, 145:12,<br>146:4, 230:22,<br>263:19, 264:12,<br>264:21, 265:8<br><b>let's</b><br>12:9, 13:8,<br>56:3, 64:11,<br>66:13, 85:4,<br>85:20, 89:7,<br>143:4, 149:16,<br>165:5, 184:13,<br>192:6, 192:8,<br>205:21, 206:1,<br>220:3, 244:14,<br>266:7<br><b>level</b><br>18:2<br><b>levels</b><br>254:18<br><b>liang</b><br>203:17, 204:4,<br>204:5, 204:13,<br>204:18, 205:3,<br>205:9, 206:10,<br>206:12, 206:14,<br>206:18, 207:10,<br>207:14, 207:20,<br>208:2, 208:10,<br>208:14, 208:19,<br>209:6, 209:20,<br>209:22, 210:4,<br>210:7, 210:15,<br>212:14, 212:20,<br>213:3, 213:6,<br>213:15, 213:18,<br>214:18, 215:3,<br>215:11, 215:15,<br>216:6, 217:11,<br>217:13, 217:20,<br>218:2, 237:5,<br>237:14, 237:21,<br>238:3, 239:21,<br>244:10, 246:17,<br>249:14, 249:16,<br>250:1, 250:8, | 250:14, 250:20,<br>251:7, 251:13,<br>252:3, 252:9,<br>252:13, 252:17,<br>253:3, 253:10,<br>253:16, 253:17,<br>254:4, 254:10,<br>254:20, 255:17,<br>256:2, 256:7,<br>256:11, 277:14<br><b>liang's</b><br>203:13, 209:8,<br>209:13, 209:16,<br>211:11, 218:11,<br>238:9<br><b>libeyond</b><br>210:3, 210:6,<br>210:10, 210:14,<br>210:21, 211:4,<br>211:12, 211:17,<br>212:7<br><b>life</b><br>60:18, 103:5,<br>106:19, 223:5,<br>223:6, 223:7,<br>240:15, 241:10,<br>245:8, 246:6,<br>246:8, 246:10,<br>247:12<br><b>lifetime</b><br>222:17<br><b>likely</b><br>128:6, 170:1,<br>170:16, 170:22,<br>275:11<br><b>limit</b><br>50:17, 58:10,<br>58:16, 58:22,<br>62:19, 62:21,<br>65:22, 66:8,<br>96:13, 100:1,<br>100:2<br><b>limitation</b><br>44:1, 44:5,<br>44:6, 84:22,<br>90:11, 90:20,<br>91:4, 91:5,<br>91:8, 91:10, | 91:11, 91:17,<br>91:18, 92:5,<br>92:8, 95:20,<br>96:3, 116:14,<br>118:22, 119:7,<br>119:14, 120:20,<br>121:12, 123:2,<br>124:14, 151:19,<br>153:19, 159:9,<br>175:2, 186:19,<br>187:4, 187:17,<br>188:9, 188:22,<br>189:20, 190:19,<br>191:18, 191:19,<br>193:12, 193:20,<br>193:21, 194:10,<br>196:5, 196:11,<br>196:20, 197:9,<br>199:10, 226:8,<br>226:15<br><b>limitation"</b><br>92:12<br><b>limited</b><br>6:18, 44:2,<br>44:10, 51:2,<br>93:8, 102:2,<br>125:1, 133:9,<br>140:5, 226:8,<br>226:15, 228:1,<br>266:17<br><b>line</b><br>19:17, 64:18,<br>76:3, 77:18,<br>192:20, 209:3,<br>238:17, 264:6,<br>264:8<br><b>lines</b><br>22:5, 65:21,<br>66:6, 75:17,<br>75:20, 77:1,<br>77:18, 78:17,<br>93:15, 93:21,<br>94:7, 95:2,<br>95:3, 104:15,<br>107:1, 122:10,<br>123:20, 123:22,<br>124:21, 129:8,<br>129:15, 140:1 |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| <b>list</b><br>180:22, 181:9,<br>198:17, 277:19<br><b>literature</b><br>136:19, 141:16,<br>179:22, 214:2,<br>214:13, 252:11,<br>256:12, 256:13,<br>257:2<br><b>lithium"</b><br>165:15<br><b>litigation</b><br>11:8, 11:12,<br>11:16, 11:19,<br>11:22, 12:4,<br>12:14, 13:15,<br>21:15, 69:18,<br>116:5, 116:11,<br>118:22, 119:4,<br>119:7, 269:19,<br>269:22<br><b>little</b><br>37:10, 128:8,<br>144:11, 186:13,<br>186:14, 192:1,<br>209:2, 245:19,<br>257:16<br><b>llc</b><br>1:7, 6:5,<br>281:12<br><b>llc's</b><br>4:17, 64:16<br><b>llp</b><br>2:17, 3:4<br><b>loading</b><br>254:21, 255:3,<br>255:11<br><b>location</b><br>22:21, 34:18,<br>35:4, 146:10<br><b>lodge</b><br>26:17<br><b>long</b><br>9:18, 60:3,<br>117:11, 191:22,<br>192:2, 248:11,<br>256:19, 257:2,<br>267:17 | <b>look</b><br>31:21, 35:8,<br>35:9, 91:2,<br>158:21, 159:14,<br>194:13, 197:3,<br>198:21, 216:13,<br>224:17, 229:21,<br>255:5<br><b>looked</b><br>25:17<br><b>looking</b><br>23:9, 23:15,<br>30:6, 38:19,<br>78:14, 104:18,<br>104:19, 154:18,<br>155:15, 156:20,<br>217:9, 257:8<br><b>loss</b><br>51:5, 53:11,<br>102:6, 102:11,<br>105:7, 106:16,<br>107:4, 109:4,<br>111:5, 212:12,<br>268:21<br><b>lot</b><br>81:19, 238:17<br><b>louisiana</b><br>2:18, 6:12<br><b>low</b><br>102:18, 229:19,<br>247:5, 247:16,<br>248:7, 249:1,<br>255:15<br><b>lower</b><br>50:18, 128:3,<br>128:6, 150:13,<br>171:17, 186:10,<br>199:21, 200:8,<br>246:8, 246:10<br><b>lower"</b><br>96:14<br><b>lunch</b><br>89:10<br><hr/> <b>M</b><br><hr/> <b>machine</b><br>238:8<br><b>made</b><br>85:9, 89:1, | 212:20, 213:15,<br>214:6, 215:18,<br>219:13, 219:14,<br>222:18, 239:21,<br>241:20, 242:1,<br>242:22, 243:5<br><b>mainly</b><br>10:2, 27:12,<br>33:21, 34:8,<br>155:5<br><b>majorities</b><br>229:4<br><b>make</b><br>148:8, 148:17,<br>192:13, 213:6,<br>218:7, 218:14,<br>218:15, 239:12,<br>239:14, 253:7<br><b>making</b><br>113:16, 223:1,<br>223:9, 223:16,<br>237:5<br><b>manganese</b><br>99:19, 100:1,<br>100:3, 102:15,<br>102:19, 103:3,<br>145:18, 147:13,<br>147:20, 149:21,<br>150:6, 150:8,<br>150:15, 151:8,<br>152:19, 153:4,<br>153:5, 153:16,<br>155:7, 155:20,<br>157:20, 158:9,<br>160:20, 160:22,<br>163:3, 163:11,<br>163:21, 164:18,<br>165:14, 169:1,<br>170:15, 171:11,<br>174:3, 174:14,<br>176:1, 179:3,<br>179:5, 180:8,<br>180:9, 180:10,<br>213:19, 214:15,<br>219:5, 240:20,<br>256:15, 257:3<br><b>manufacturer</b><br>111:20 | <b>manufacturers</b><br>108:18<br><b>manuscript</b><br>158:2<br><b>many</b><br>19:18, 65:1,<br>65:13, 65:18,<br>93:9, 123:4,<br>145:16, 154:2,<br>156:4, 192:16,<br>197:18, 214:17,<br>215:2, 215:7,<br>218:13, 218:16,<br>219:3, 219:6,<br>256:21<br><b>mark</b><br>1:22, 2:14,<br>7:2, 12:9, 13:8,<br>38:14, 64:11,<br>85:20, 217:6,<br>281:3, 282:5<br><b>marked</b><br>10:13, 12:10,<br>12:12, 13:11,<br>21:17, 21:21,<br>38:16, 60:5,<br>64:14, 86:1,<br>86:8, 97:10,<br>104:5, 114:16,<br>120:12, 131:21,<br>149:17, 157:17,<br>165:6, 217:10,<br>269:22<br><b>marriage</b><br>281:19<br><b>mass</b><br>84:12, 84:13,<br>84:15, 84:16,<br>121:4, 121:5,<br>121:7, 121:8,<br>133:15<br><b>master's</b><br>143:14<br><b>material</b><br>50:20, 79:7,<br>84:12, 84:13,<br>84:14, 84:16,<br>87:2, 87:6, |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>91:19, 91:20,<br/>93:6, 99:20,<br/>102:20, 103:16,<br/>120:5, 121:3,<br/>121:5, 121:7,<br/>121:8, 124:4,<br/>124:12, 126:3,<br/>126:11, 127:4,<br/>128:5, 128:7,<br/>133:15, 136:2,<br/>136:8, 139:1,<br/>140:3, 141:6,<br/>141:10, 142:6,<br/>142:7, 142:8,<br/>142:11, 145:17,<br/>146:13, 147:8,<br/>147:10, 152:8,<br/>154:13, 156:5,<br/>156:10, 157:21,<br/>158:10, 161:15,<br/>163:13, 167:6,<br/>170:8, 174:3,<br/>182:18, 197:20,<br/>213:21, 214:15,<br/>218:13, 218:16,<br/>218:18, 219:5,<br/>219:11, 221:11,<br/>227:1, 227:4,<br/>227:9, 227:11,<br/>227:12, 227:17,<br/>227:19, 228:1,<br/>228:2, 228:4,<br/>228:6, 228:9,<br/>228:12, 228:13,<br/>228:16, 229:5,<br/>229:17, 230:18,<br/>230:19, 231:4,<br/>231:5, 240:21,<br/>240:22, 241:5,<br/>241:16, 241:19,<br/>248:3, 254:1,<br/>255:12, 259:20,<br/>260:11, 262:19,<br/>271:18, 271:19<br/><b>material's</b><br/>51:6, 102:6,<br/>102:22<br/><b>materially</b><br/>176:22, 255:8,</p> | <p>278:15, 279:7<br/><b>materials</b><br/>53:6, 53:7,<br/>91:9, 101:8,<br/>101:17, 135:3,<br/>136:12, 159:17,<br/>160:10, 161:4,<br/>161:21, 163:3,<br/>163:17, 177:20,<br/>179:13, 180:13,<br/>183:10, 215:18,<br/>228:3, 229:4,<br/>229:6, 235:16,<br/>236:21, 237:5,<br/>240:11, 241:1,<br/>243:20, 245:5,<br/>248:5, 248:21<br/><b>math</b><br/>112:1<br/><b>matt</b><br/>210:19, 210:22<br/><b>matter</b><br/>6:4, 27:13,<br/>29:6, 29:21,<br/>42:21, 125:20,<br/>159:13, 178:22,<br/>180:8, 195:15,<br/>218:13, 218:16,<br/>277:1, 281:22<br/><b>maximum</b><br/>17:16, 18:8,<br/>18:15, 19:8,<br/>19:13, 24:3,<br/>27:17, 30:2,<br/>55:8, 55:12,<br/>55:15, 55:21,<br/>56:9, 56:19,<br/>58:5, 59:3,<br/>59:7, 59:12,<br/>59:16, 66:1,<br/>66:8, 69:9,<br/>69:16, 70:21,<br/>71:3, 125:15,<br/>125:22, 129:11,<br/>170:8, 171:1,<br/>171:5, 181:10,<br/>181:14, 182:5,<br/>182:8, 186:3,</p> | <p>188:14, 195:20,<br/>200:21<br/><b>maximum"</b><br/>56:15, 57:14<br/><b>maybe</b><br/>9:12, 37:9,<br/>51:19, 82:21,<br/>107:14, 257:4<br/><b>md</b><br/>282:10<br/><b>mean</b><br/>13:5, 41:11,<br/>45:20, 46:1,<br/>49:6, 70:5,<br/>110:2, 110:9,<br/>129:2, 130:8,<br/>130:14, 130:19,<br/>171:1, 196:11,<br/>254:14<br/><b>meaning</b><br/>19:10, 34:3,<br/>44:15, 44:20,<br/>45:11, 46:4,<br/>116:20<br/><b>means</b><br/>103:10, 132:13,<br/>134:5, 137:11,<br/>137:13, 196:6,<br/>200:13, 201:14,<br/>239:19, 273:18<br/><b>meantime</b><br/>118:3<br/><b>measure</b><br/>49:10, 80:4,<br/>111:10, 116:3,<br/>141:5, 196:16,<br/>200:7, 202:5,<br/>223:6, 274:3,<br/>274:7, 274:8,<br/>274:15, 275:1,<br/>275:3<br/><b>measured</b><br/>48:22, 49:9,<br/>55:16, 108:15,<br/>112:14, 112:22,<br/>122:22, 123:3,<br/>123:7, 166:12,<br/>167:7, 167:10,</p> | <p>176:14, 176:18,<br/>177:3, 177:7,<br/>177:11, 195:18,<br/>223:4, 223:11,<br/>224:21<br/><b>measurement</b><br/>197:8, 275:13<br/><b>measurements</b><br/>168:13, 275:16<br/><b>measuring</b><br/>128:11<br/><b>media</b><br/>6:3<br/><b>medium</b><br/>15:15, 25:11,<br/>126:16, 126:17,<br/>194:21<br/><b>meet</b><br/>9:18, 9:21,<br/>134:18, 196:20,<br/>197:9<br/><b>meetings</b><br/>9:11<br/><b>meets</b><br/>18:19, 19:4,<br/>153:18, 175:2<br/><b>memorized</b><br/>267:16<br/><b>memory</b><br/>178:14, 207:18<br/><b>mention</b><br/>32:17, 54:6,<br/>54:7, 69:9,<br/>69:15, 69:19,<br/>95:5, 95:6,<br/>116:1, 163:9,<br/>231:20, 232:1<br/><b>mentioned</b><br/>15:12, 38:2,<br/>41:2, 71:11,<br/>86:21, 163:6,<br/>168:1, 171:6,<br/>228:16, 273:12<br/><b>merely</b><br/>124:6<br/><b>met</b><br/>9:14, 9:17,<br/>10:1</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>metal</b><br>80:6, 87:7,<br>87:10, 87:22,<br>88:10, 95:17,<br>160:21, 162:2,<br>163:22, 175:12,<br>175:21, 176:9,<br>213:22, 222:11<br><b>metallic</b><br>93:12, 93:18,<br>94:4, 94:17,<br>94:19<br><b>method</b><br>22:10, 107:8,<br>213:20, 214:7,<br>214:8, 214:11,<br>214:13, 216:2,<br>218:14, 219:4,<br>219:6, 241:21,<br>242:2, 242:22,<br>243:8, 243:22,<br>244:1, 274:20<br><b>methodology</b><br>183:7<br><b>methods</b><br>221:21, 243:14,<br>244:6, 244:13<br><b>microamp</b><br>167:21, 168:5,<br>171:17<br><b>middle</b><br>97:18, 258:6,<br>264:4, 264:9<br><b>might</b><br>23:9, 23:14,<br>23:16, 186:13<br><b>milliamp</b><br>154:4, 171:7,<br>172:4, 181:4,<br>222:2<br><b>milliamp-hour</b><br>140:6, 140:10,<br>167:5, 167:16,<br>168:4, 169:14,<br>171:12, 176:10,<br>177:19, 245:17,<br>246:9<br><b>milliamp-hours</b><br>124:5, 124:7, | 125:2, 139:5,<br>140:16, 166:22,<br>167:1, 168:15,<br>169:2, 170:9,<br>170:16, 171:10,<br>172:21, 173:6,<br>173:7, 179:15,<br>180:14, 181:19,<br>183:17, 184:10<br><b>milliampere</b><br>170:3<br><b>milliamps</b><br>150:22, 151:17,<br>153:17, 155:21,<br>159:2, 165:20,<br>167:18, 168:14,<br>185:10, 190:8<br><b>milliamps-hour</b><br>166:13, 167:7,<br>185:20<br><b>million</b><br>170:1<br><b>mind</b><br>148:19<br><b>minimize</b><br>108:10<br><b>minute</b><br>39:2<br><b>minutes</b><br>266:16<br><b>missing</b><br>141:5<br><b>misstates</b><br>277:16<br><b>mistakes</b><br>11:3, 13:1,<br>14:1<br><b>mixing</b><br>243:8<br><b>mixture</b><br>250:9<br><b>modifications</b><br>250:14<br><b>modify</b><br>250:8<br><b>molar</b><br>182:17, 184:9,<br>220:15 | <b>molecular</b><br>181:11<br><b>molybdenum</b><br>253:3<br><b>moment</b><br>270:5<br><b>monitor</b><br>6:9<br><b>monitoring</b><br>223:16<br><b>month</b><br>9:8<br><b>months</b><br>207:15, 256:20<br><b>more</b><br>9:9, 36:12,<br>42:18, 42:21,<br>103:13, 110:5,<br>138:7, 143:22,<br>144:10, 149:12,<br>154:5, 161:21,<br>166:22, 167:22,<br>171:18, 171:19,<br>172:8, 172:16,<br>178:9, 198:14,<br>227:10, 227:11,<br>238:17, 240:22,<br>245:6, 247:4,<br>248:4, 261:14,<br>263:18, 264:12,<br>264:20, 265:8<br><b>moreover</b><br>60:18<br><b>morning</b><br>7:11, 7:12,<br>69:15, 71:12,<br>71:20, 90:10<br><b>most</b><br>33:15, 80:21,<br>93:6, 140:3,<br>160:19, 163:19,<br>275:10<br><b>motivated</b><br>162:20, 164:3<br><b>motivation</b><br>100:5, 103:14,<br>147:21<br><b>move</b><br>53:17, 54:5, | 54:11, 73:6,<br>73:21, 81:12,<br>81:19, 82:9,<br>82:16, 100:10,<br>117:15, 155:11,<br>190:11, 202:11,<br>205:20, 246:21<br><b>moving</b><br>74:7<br><b>much</b><br>111:21, 141:5,<br>147:9, 168:13,<br>172:4, 172:16,<br>197:3, 207:17,<br>239:8, 240:2,<br>256:21<br><b>multiple</b><br>209:19, 215:8,<br>215:11, 239:13,<br>245:18, 271:11<br><b>multiplied</b><br>180:7, 183:16,<br>184:9<br><b>multiply</b><br>181:18, 182:16<br><b>multiplying</b><br>220:14<br><b>must</b><br>198:5, 201:4,<br>203:2, 203:3,<br>203:6, 203:7,<br>223:6<br><hr/> <p style="text-align: center;"><b>N</b></p> <hr/> <b>n-e-g</b><br>73:2<br><b>namely</b><br>240:18<br><b>necessary</b><br>137:20, 274:3,<br>274:8, 274:14,<br>274:22, 275:2,<br>275:15<br><b>need</b><br>8:15, 71:8,<br>117:19, 133:3,<br>141:12, 141:18,<br>142:16, 148:1, |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| 148:22, 152:13,<br>154:2, 154:5,<br>154:12, 154:13,<br>158:19, 175:7,<br>191:6, 194:13,<br>197:3, 198:14,<br>211:19, 217:7,<br>242:11, 242:15,<br>247:13<br><b>needed</b><br>74:10<br><b>needs</b><br>71:5, 125:11,<br>174:22, 197:7<br><b>negative</b><br>86:20, 87:1,<br>87:9, 87:20,<br>88:9, 91:19,<br>122:11, 132:13,<br>132:15, 134:4,<br>146:12, 209:1,<br>222:12, 225:7,<br>227:17, 227:22,<br>228:4, 228:5,<br>228:12, 228:17,<br>229:3, 229:4,<br>229:15, 230:18,<br>230:20, 231:1,<br>231:4, 248:11,<br>257:21, 258:1,<br>258:15, 260:21,<br>271:19<br><b>net</b><br>212:13<br><b>never</b><br>203:16, 204:12,<br>237:5, 255:17<br><b>new</b><br>3:6, 3:12,<br>13:8, 38:15,<br>40:21, 53:5,<br>64:11, 142:7,<br>161:15<br><b>next</b><br>85:21, 91:4,<br>91:10, 157:11,<br>168:12<br><b>next-to-last</b><br>120:15 | <b>nitride</b><br>228:3, 228:15,<br>229:3, 229:17<br><b>nitrides</b><br>227:16, 228:8,<br>228:19, 229:9,<br>230:3<br><b>nod</b><br>8:4<br><b>non</b><br>207:5<br><b>nonaqueous</b><br>257:19, 263:16<br><b>noncarbon</b><br>227:10, 227:13,<br>227:19<br><b>nonenablement</b><br>218:8, 218:19<br><b>nonreaction</b><br>137:20<br><b>nonresponsive</b><br>73:7, 73:22,<br>81:13, 81:20,<br>82:10, 117:11,<br>155:11, 190:12,<br>246:22<br><b>normal</b><br>271:3, 271:6<br><b>notary</b><br>281:4<br><b>note</b><br>38:22, 50:13,<br>144:20, 150:5,<br>152:16, 179:16,<br>190:7, 190:21,<br>194:19, 214:16<br><b>noted</b><br>54:20, 228:11<br><b>nothing</b><br>40:19, 60:16,<br>69:22, 70:19,<br>71:4, 126:1,<br>242:10<br><b>notice</b><br>2:19, 60:1,<br>60:10, 61:1,<br>61:17, 62:4,<br>62:11, 63:4, | 63:18<br><b>nowhere</b><br>29:17<br><b>number</b><br>4:3, 4:14, 5:3,<br>6:3, 6:7, 32:2,<br>77:15, 86:4,<br>97:11, 114:16,<br>120:21, 138:7,<br>138:10, 156:17,<br>157:2, 157:3,<br>157:15, 162:9,<br>162:10, 166:17,<br>167:11, 167:16,<br>170:4, 170:20,<br>171:20, 176:21,<br>176:22, 210:1,<br>218:22, 222:17,<br>246:6, 264:11,<br>267:10, 267:12,<br>277:11<br><b>numbered</b><br>2:13<br><b>numbers</b><br>177:14, 264:9<br><b>numerous</b><br>71:11, 71:19<br><hr/> <b>O</b><br><b>o-f-f</b><br>17:12<br><b>o2</b><br>213:19<br><b>oath</b><br>8:19<br><b>objection</b><br>15:11, 16:2,<br>17:10, 19:6,<br>21:2, 21:7,<br>21:10, 22:20,<br>23:7, 26:17,<br>27:5, 31:12,<br>31:17, 36:4,<br>43:19, 46:7,<br>61:20, 63:20,<br>74:6, 75:14,<br>82:16, 83:8,<br>84:8, 99:6, | 99:15, 100:18,<br>110:21, 116:16,<br>132:9, 148:9,<br>149:6, 153:8,<br>171:3, 173:10,<br>180:20, 188:1,<br>188:11, 213:1,<br>217:1, 234:18,<br>235:11, 243:10,<br>247:19, 250:6,<br>254:7, 254:13,<br>262:6, 267:13,<br>267:21, 268:9,<br>269:9, 269:15,<br>270:10, 270:16,<br>271:10, 273:6,<br>273:17, 274:5,<br>274:17, 275:7,<br>275:20, 276:5,<br>276:11, 276:17,<br>277:8, 277:22,<br>278:5, 278:11,<br>278:20<br><b>objections</b><br>54:10, 62:14,<br>63:7, 65:16,<br>66:11, 71:1,<br>82:5, 148:18,<br>148:20, 149:1,<br>191:2, 191:13<br><b>obtain</b><br>172:8, 172:20<br><b>obtained</b><br>164:8, 168:16,<br>169:15, 171:13<br><b>obtains</b><br>173:6<br><b>obvious</b><br>120:8, 232:6<br><b>occurred</b><br>281:15<br><b>offer</b><br>156:4<br><b>offered</b><br>268:11<br><b>office</b><br>1:1, 6:6,<br>96:21, 97:21, |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>98:15<br/><b>office's</b><br/>99:11<br/><b>offices</b><br/>2:17<br/><b>oh</b><br/>57:3, 60:8,<br/>94:9<br/><b>omega</b><br/>73:1<br/><b>once</b><br/>8:15, 19:21,<br/>26:10, 27:16,<br/>28:13, 29:13,<br/>193:1, 200:22,<br/>216:15<br/><b>one</b><br/>3:5, 3:17,<br/>9:19, 12:6,<br/>12:7, 36:12,<br/>52:18, 66:4,<br/>73:19, 73:20,<br/>84:18, 94:6,<br/>95:5, 95:7,<br/>101:7, 107:21,<br/>108:8, 117:2,<br/>128:19, 140:10,<br/>161:6, 162:9,<br/>176:5, 197:18,<br/>204:18, 216:7,<br/>217:4, 217:9,<br/>217:14, 217:21,<br/>218:3, 218:7,<br/>218:17, 219:19,<br/>224:13, 232:11,<br/>232:19, 233:4,<br/>233:12, 233:22,<br/>234:5, 234:15,<br/>234:20, 239:21,<br/>239:22, 241:13,<br/>246:7, 246:18,<br/>251:15, 261:13,<br/>276:4, 276:10<br/><b>one-word</b><br/>149:6<br/><b>ones</b><br/>166:8<br/><b>only</b><br/>51:6, 68:9,</p> | <p>68:18, 102:6,<br/>103:13, 105:20,<br/>106:21, 107:5,<br/>122:6, 133:14,<br/>137:17, 145:5,<br/>145:11, 146:3,<br/>162:12, 175:11,<br/>175:20, 190:3,<br/>195:1, 209:12,<br/>216:15, 217:13,<br/>217:20, 218:3,<br/>222:12, 229:18,<br/>229:21, 241:8,<br/>244:10<br/><b>open</b><br/>200:7, 200:11,<br/>200:16, 202:5<br/><b>opening</b><br/>4:21, 64:16<br/><b>operated</b><br/>144:22, 146:1,<br/>147:15<br/><b>operating</b><br/>159:18, 160:11,<br/>163:17, 271:3,<br/>271:6<br/><b>operation</b><br/>103:4<br/><b>opine</b><br/>22:16, 44:13,<br/>44:18, 45:10,<br/>46:2<br/><b>opining</b><br/>256:6<br/><b>opinions</b><br/>16:5, 16:11,<br/>16:16, 32:21,<br/>46:13, 46:17,<br/>49:13, 49:21,<br/>51:13, 52:9,<br/>52:20, 67:17,<br/>67:18, 68:2,<br/>78:3, 78:14,<br/>78:17, 78:21,<br/>82:12, 83:2,<br/>98:14, 99:3,<br/>100:13, 101:4,<br/>111:12, 112:13,</p> | <p>112:21, 113:7,<br/>113:13, 114:18,<br/>115:16, 117:4,<br/>121:21, 126:21,<br/>194:7, 202:22,<br/>203:1, 205:19,<br/>208:21, 209:10,<br/>209:13, 229:8,<br/>230:1, 261:15,<br/>262:2, 267:11,<br/>267:19, 268:7,<br/>270:14, 276:4,<br/>276:10, 278:4,<br/>278:10, 279:15<br/><b>oppose</b><br/>74:6, 74:7,<br/>81:16, 82:16,<br/>82:17, 117:22<br/><b>opposed</b><br/>171:12<br/><b>opposite</b><br/>132:11, 134:2<br/><b>oral</b><br/>2:10<br/><b>order</b><br/>20:18, 20:22,<br/>21:8, 21:13,<br/>21:17, 22:6,<br/>120:11, 133:13,<br/>198:10, 198:13,<br/>198:14, 275:5<br/><b>ordinary</b><br/>133:10, 144:8,<br/>144:13, 162:19,<br/>164:3, 272:16,<br/>272:19, 273:1,<br/>273:3, 273:22,<br/>274:12<br/><b>other</b><br/>10:2, 26:18,<br/>39:17, 50:11,<br/>52:3, 54:5,<br/>57:18, 57:22,<br/>58:4, 62:18,<br/>111:4, 122:17,<br/>146:10, 153:11,<br/>156:10, 157:13,<br/>160:21, 163:21,</p> | <p>176:7, 194:3,<br/>197:19, 198:22,<br/>203:14, 222:6,<br/>227:12, 236:10,<br/>241:9, 241:13,<br/>241:15, 244:22,<br/>249:10, 276:4,<br/>276:10, 277:7,<br/>279:3<br/><b>otherwise</b><br/>281:21<br/><b>out</b><br/>8:3, 35:4,<br/>104:2, 138:18,<br/>142:12, 182:5,<br/>198:17, 219:2,<br/>222:13, 238:9,<br/>256:14, 257:14,<br/>257:17, 258:9,<br/>258:13, 258:16,<br/>258:19, 259:7,<br/>259:14, 260:4,<br/>261:8, 262:15,<br/>263:4<br/><b>outcome</b><br/>281:22<br/><b>outside</b><br/>54:7, 236:8,<br/>270:11, 270:17,<br/>270:18, 271:3,<br/>274:6, 274:18,<br/>276:6, 278:6<br/><b>over</b><br/>9:15, 54:19,<br/>93:11, 93:17,<br/>94:3, 94:16,<br/>102:21, 104:21,<br/>105:12, 129:17,<br/>144:3, 159:18,<br/>160:11, 163:17,<br/>196:6<br/><b>overcharged</b><br/>18:2<br/><b>own</b><br/>54:14, 100:2,<br/>104:7, 104:18,<br/>117:2, 164:17,<br/>190:7, 192:7,</p> |
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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>250:14<br/><b>owner</b><br/>1:8, 3:8, 6:21<br/><b>owners</b><br/>212:10<br/><b>ownership</b><br/>211:16<br/><b>oxidation</b><br/>103:7<br/><b>oxide</b><br/>50:19, 51:2,<br/>51:4, 93:5,<br/>99:19, 100:1,<br/>100:3, 102:1,<br/>102:2, 102:4,<br/>102:15, 102:17,<br/>102:20, 126:16,<br/>138:22, 139:5,<br/>139:13, 140:2,<br/>141:5, 144:21,<br/>145:6, 145:12,<br/>145:18, 145:19,<br/>145:22, 146:4,<br/>146:12, 146:22,<br/>147:6, 147:8,<br/>147:10, 147:13,<br/>147:14, 147:17,<br/>147:20, 149:21,<br/>150:6, 150:7,<br/>150:8, 150:15,<br/>151:8, 153:5,<br/>153:17, 155:7,<br/>155:20, 157:20,<br/>158:10, 163:3,<br/>163:12, 164:9,<br/>164:11, 164:19,<br/>169:1, 169:22,<br/>170:15, 171:11,<br/>174:3, 174:15,<br/>176:1, 179:3,<br/>179:5, 180:9,<br/>180:10, 214:15,<br/>215:22, 216:4,<br/>219:5, 227:16,<br/>228:2, 228:7,<br/>228:15, 228:19,<br/>229:3, 229:17,<br/>240:20, 256:15,</p> | <p>257:3<br/><b>oxide"</b><br/>160:22<br/><b>oxides</b><br/>124:3, 229:9,<br/>230:3<br/><b>oxygen</b><br/>51:5, 102:5,<br/>102:11</p> <hr/> <p><b>P</b></p> <hr/> <p><b>p-o-s</b><br/>73:2<br/><b>page</b><br/>4:2, 4:14, 5:3,<br/>10:16, 12:17,<br/>13:18, 21:20,<br/>21:21, 22:2,<br/>50:6, 56:5,<br/>60:8, 60:14,<br/>60:15, 62:1,<br/>64:18, 66:5,<br/>66:6, 66:13,<br/>72:5, 75:19,<br/>86:8, 94:13,<br/>97:13, 97:18,<br/>99:21, 100:22,<br/>104:15, 107:1,<br/>111:18, 115:9,<br/>120:15, 120:16,<br/>120:18, 147:4,<br/>164:7, 165:12,<br/>166:5, 166:6,<br/>175:15, 175:16,<br/>180:22, 181:8,<br/>181:13, 182:4,<br/>185:2, 190:7,<br/>193:17, 194:18,<br/>221:7, 226:21,<br/>229:21, 258:5,<br/>264:3, 264:9,<br/>270:4<br/><b>pages</b><br/>1:21<br/><b>paper</b><br/>114:16, 151:5,<br/>151:6, 168:20<br/><b>papers</b><br/>101:16</p> | <p><b>paragraphs</b><br/>4:19, 23:9,<br/>23:16, 38:22,<br/>41:5, 41:11,<br/>41:21, 51:22,<br/>67:14, 67:20,<br/>68:2, 79:12,<br/>79:21, 101:1,<br/>119:19, 121:20,<br/>159:15, 203:14,<br/>223:10, 228:8,<br/>243:1, 243:8,<br/>260:1, 260:14,<br/>261:5<br/><b>parallel</b><br/>269:18<br/><b>parameter</b><br/>50:8, 77:15<br/><b>parameters</b><br/>272:6, 272:11<br/><b>parens</b><br/>87:6<br/><b>parentheses</b><br/>19:22, 87:4,<br/>263:18<br/><b>parity</b><br/>126:15<br/><b>part</b><br/>35:20, 94:7,<br/>181:7, 181:8,<br/>259:1<br/><b>parte</b><br/>11:15<br/><b>partes</b><br/>10:10<br/><b>partially</b><br/>160:21, 163:21,<br/>210:11<br/><b>participate</b><br/>135:3, 136:3<br/><b>participating</b><br/>135:20<br/><b>particle</b><br/>197:20<br/><b>particular</b><br/>31:15, 32:4,<br/>32:17, 65:1,<br/>65:12, 66:2,</p> | <p>71:6, 194:17,<br/>195:2, 265:12,<br/>275:18<br/><b>particularly</b><br/>97:7, 198:22<br/><b>parties</b><br/>27:8, 29:12,<br/>29:13, 29:14,<br/>69:21, 281:18,<br/>281:20<br/><b>parts</b><br/>50:13, 264:2<br/><b>party</b><br/>281:11<br/><b>pass</b><br/>266:13, 279:11<br/><b>past</b><br/>26:18, 212:11<br/><b>patent"</b><br/>85:15, 89:3<br/><b>patent's</b><br/>56:7, 269:3,<br/>270:14<br/><b>patented</b><br/>224:5<br/><b>patents</b><br/>210:1<br/><b>pattern</b><br/>164:8<br/><b>pay</b><br/>97:5<br/><b>penalty</b><br/>10:20, 12:20,<br/>13:21<br/><b>pending</b><br/>8:17, 242:7<br/><b>people</b><br/>141:3, 141:16,<br/>141:22, 142:16,<br/>219:6<br/><b>people's</b><br/>3:20<br/><b>percent</b><br/>106:22, 107:5,<br/>125:3, 140:7,<br/>140:12, 141:8,<br/>141:9<br/><b>percentage</b><br/>109:4, 211:16</p> |
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| <p><b>perform</b><br/>137:20, 141:3,<br/>247:13, 256:13</p> <p><b>performance</b><br/>50:22, 53:11,<br/>105:5, 105:9,<br/>105:18, 107:6,<br/>239:17, 268:21</p> <p><b>performed</b><br/>11:14, 104:12,<br/>141:12, 185:9,<br/>203:17, 204:5,<br/>210:7, 222:1,<br/>255:17, 256:17</p> <p><b>performing</b><br/>141:22</p> <p><b>perjury</b><br/>10:20, 12:21,<br/>13:21</p> <p><b>person</b><br/>133:9, 144:7,<br/>144:10, 144:13,<br/>162:19, 164:2,<br/>272:15, 272:19,<br/>272:22, 273:3,<br/>273:21, 274:11</p> <p><b>persuaded</b><br/>115:12</p> <p><b>petition</b><br/>97:3, 98:10</p> <p><b>petitioner</b><br/>1:5, 2:12, 3:2,<br/>6:17</p> <p><b>phase</b><br/>163:12, 164:11,<br/>164:12, 164:13,<br/>190:5, 215:21,<br/>243:7</p> <p><b>phd</b><br/>1:14, 2:1,<br/>2:11, 4:6, 7:5,<br/>281:5, 281:15</p> <p><b>phone</b><br/>282:11</p> <p><b>phrase</b><br/>47:6, 95:1</p> <p><b>physical</b><br/>211:6</p> | <p><b>pick</b><br/>171:9, 246:18</p> <p><b>picked</b><br/>171:16</p> <p><b>pictures</b><br/>237:14, 237:20</p> <p><b>place</b><br/>6:12, 95:7,<br/>124:17</p> <p><b>places</b><br/>16:15, 57:5,<br/>57:9, 119:22,<br/>178:12</p> <p><b>plaintiff</b><br/>4:16, 64:15</p> <p><b>plan</b><br/>181:4</p> <p><b>planet</b><br/>6:11, 7:3</p> <p><b>plate</b><br/>222:11</p> <p><b>plates</b><br/>228:21</p> <p><b>play</b><br/>197:19, 279:5</p> <p><b>please</b><br/>6:14, 7:4, 8:6,<br/>90:7, 117:3,<br/>117:7, 117:8,<br/>117:14, 128:19,<br/>149:8, 186:12,<br/>191:12, 203:21,<br/>216:10, 242:18</p> <p><b>plenty</b><br/>202:22</p> <p><b>plus</b><br/>73:1, 73:2,<br/>73:20</p> <p><b>point</b><br/>16:3, 17:17,<br/>18:9, 22:21,<br/>34:18, 35:3,<br/>49:4, 54:14,<br/>78:9, 127:15,<br/>138:18, 155:9,<br/>166:16, 177:12,<br/>178:2, 221:7,<br/>223:15, 262:12,</p> | <p>263:1</p> <p><b>pointed</b><br/>83:21, 219:2,<br/>260:2</p> <p><b>policy</b><br/>22:2</p> <p><b>porosity"</b><br/>198:2</p> <p><b>portion</b><br/>76:22, 78:4,<br/>92:3, 92:8,<br/>106:15, 122:10,<br/>133:17, 140:15,<br/>211:12, 257:10,<br/>258:9, 258:13,<br/>258:19, 259:6,<br/>259:13, 260:3,<br/>261:7</p> <p><b>portions</b><br/>269:6, 269:13</p> <p><b>posa</b><br/>70:18, 71:10,<br/>72:7, 96:20,<br/>120:4, 120:7,<br/>123:5, 130:4,<br/>130:6, 133:12,<br/>136:22, 144:10,<br/>179:17, 219:20,<br/>241:2, 246:11,<br/>265:18, 270:22,<br/>275:16</p> <p><b>pose</b><br/>51:7</p> <p><b>poses</b><br/>102:7</p> <p><b>posita</b><br/>100:5, 144:15,<br/>162:5, 189:16,<br/>190:15, 191:15,<br/>193:7</p> <p><b>position</b><br/>52:15, 54:20,<br/>62:9, 72:9,<br/>73:15, 74:3,<br/>74:19, 151:15,<br/>161:18, 226:7</p> <p><b>positive</b><br/>86:20, 87:1,</p> | <p>87:2, 87:20,<br/>88:8, 91:9,<br/>91:19, 93:6,<br/>124:3, 129:2,<br/>129:3, 130:13,<br/>130:14, 130:20,<br/>132:12, 132:15,<br/>134:4, 140:3,<br/>157:20, 159:17,<br/>160:10, 160:19,<br/>161:4, 161:15,<br/>163:16, 163:19,<br/>225:7, 230:19,<br/>230:20, 230:22,<br/>231:4, 231:5,<br/>248:12, 263:20,<br/>264:14, 264:22,<br/>265:10, 271:18</p> <p><b>possible</b><br/>172:8, 172:14,<br/>254:17</p> <p><b>possibly</b><br/>23:12, 56:19</p> <p><b>postdoc</b><br/>209:16</p> <p><b>postformation</b><br/>108:15, 108:19</p> <p><b>potential</b><br/>58:21, 69:9,<br/>69:10, 69:15,<br/>69:16, 70:1,<br/>70:4, 70:11,<br/>70:14, 70:21,<br/>71:3, 87:7,<br/>87:10, 87:21,<br/>88:10, 149:21,<br/>150:5, 150:7,<br/>158:10, 168:16,<br/>169:3, 169:10,<br/>175:7, 198:12,<br/>198:22, 199:20,<br/>202:8</p> <p><b>potentially</b><br/>15:14, 211:22</p> <p><b>potentials</b><br/>24:10, 72:20,<br/>169:16</p> <p><b>power</b><br/>126:17</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>practical</b><br/>125:16, 125:19,<br/>134:14, 134:17,<br/>172:14, 177:11,<br/>224:12, 232:1</p> <p><b>prc</b><br/>3:20</p> <p><b>pre-annealing</b><br/>252:4</p> <p><b>precycled</b><br/>248:6, 248:22</p> <p><b>predetermined</b><br/>19:21, 20:6,<br/>26:11, 27:2,<br/>27:18, 27:22,<br/>28:14, 193:1,<br/>193:9, 194:15,<br/>258:14, 260:19</p> <p><b>predict</b><br/>142:18, 223:7</p> <p><b>preformation</b><br/>108:15</p> <p><b>preliminary</b><br/>168:12, 173:13</p> <p><b>premarked</b><br/>21:13, 32:1</p> <p><b>prepare</b><br/>8:22, 9:2, 9:5,<br/>271:13</p> <p><b>prepared</b><br/>46:10, 243:21,<br/>278:8</p> <p><b>prescribe</b><br/>213:4</p> <p><b>prescribed</b><br/>215:17, 244:1</p> <p><b>presence</b><br/>54:8, 204:19,<br/>206:13</p> <p><b>present</b><br/>3:22, 76:7,<br/>221:3, 222:14,<br/>224:1, 224:3,<br/>249:5, 257:20</p> <p><b>presented</b><br/>156:6, 222:21</p> <p><b>presents</b><br/>29:7</p> | <p><b>pressure</b><br/>252:13, 277:13</p> <p><b>pretty</b><br/>25:10, 251:12</p> <p><b>prevented</b><br/>194:3</p> <p><b>prevents</b><br/>18:1</p> <p><b>previous</b><br/>69:16, 173:17,<br/>190:21, 276:13</p> <p><b>previously</b><br/>60:5, 104:5,<br/>137:5, 158:19,<br/>177:17</p> <p><b>primarily</b><br/>50:21</p> <p><b>principle</b><br/>273:8</p> <p><b>prior</b><br/>60:16, 101:7,<br/>101:18, 114:5,<br/>115:4, 115:12,<br/>161:19, 237:4,<br/>237:22, 238:4</p> <p><b>priority</b><br/>272:17, 272:20,<br/>273:1, 273:5</p> <p><b>privilege</b><br/>206:17</p> <p><b>privileged</b><br/>203:20, 203:21,<br/>204:2, 205:6</p> <p><b>probably</b><br/>9:8</p> <p><b>problem</b><br/>148:17</p> <p><b>procedure</b><br/>219:1</p> <p><b>procedures</b><br/>239:22, 249:13,<br/>249:16, 250:2,<br/>250:20, 251:20</p> <p><b>proceed</b><br/>188:3</p> <p><b>proceeding</b><br/>10:7, 11:16,<br/>22:16, 23:2,</p> | <p>23:18, 37:2,<br/>210:8</p> <p><b>proceedings</b><br/>50:12, 113:21</p> <p><b>process</b><br/>108:11, 108:12,<br/>239:17, 250:8,<br/>272:5</p> <p><b>produce</b><br/>215:17</p> <p><b>produced</b><br/>2:11, 238:9</p> <p><b>product</b><br/>84:11, 84:14,<br/>87:1, 121:2,<br/>121:6</p> <p><b>professor</b><br/>144:4</p> <p><b>profit</b><br/>212:13</p> <p><b>promising</b><br/>102:20, 161:14</p> <p><b>promptly</b><br/>242:15</p> <p><b>proper</b><br/>182:20, 255:19,<br/>256:9</p> <p><b>properties</b><br/>79:10</p> <p><b>property</b><br/>24:5, 36:19,<br/>38:3, 41:16,<br/>41:18, 49:1,<br/>59:13, 60:18,<br/>63:13, 71:13,<br/>71:17, 71:21,<br/>72:10, 73:16,<br/>74:4, 77:11,<br/>77:13, 202:4,<br/>276:16, 276:22</p> <p><b>proportion</b><br/>211:5</p> <p><b>proportional</b><br/>227:9</p> <p><b>proposed</b><br/>116:6, 116:13,<br/>118:21, 119:6,<br/>122:18, 176:14,</p> | <p>194:2, 219:7</p> <p><b>propounded</b><br/>7:7</p> <p><b>prosecution</b><br/>32:22, 33:4,<br/>85:10, 87:18,<br/>88:6, 88:16,<br/>89:2, 96:22,<br/>97:11, 99:4,<br/>99:8</p> <p><b>protocols</b><br/>156:6</p> <p><b>provide</b><br/>16:16, 31:22,<br/>32:12, 32:21,<br/>33:2, 46:12,<br/>46:17, 47:13,<br/>49:13, 49:21,<br/>51:13, 52:9,<br/>61:21, 67:18,<br/>76:8, 78:3,<br/>78:13, 78:16,<br/>78:21, 80:12,<br/>80:16, 82:11,<br/>83:14, 84:4,<br/>98:14, 99:7,<br/>100:13, 100:21,<br/>101:3, 101:21,<br/>108:13, 109:1,<br/>111:3, 111:12,<br/>111:19, 112:13,<br/>112:21, 113:6,<br/>115:21, 115:22,<br/>116:18, 118:3,<br/>121:20, 126:14,<br/>128:12, 129:17,<br/>145:3, 145:9,<br/>146:1, 146:21,<br/>147:5, 156:9,<br/>213:2, 213:12,<br/>213:13, 225:22,<br/>229:8, 229:16,<br/>230:1, 235:1,<br/>235:7, 235:12,<br/>235:20, 236:4,<br/>236:18, 237:3,<br/>237:21, 238:3,<br/>238:12, 239:7,</p> |
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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 240:2, 240:9,<br>240:13, 243:13,<br>244:5, 244:12,<br>245:22, 248:2,<br>248:18, 252:2,<br>252:12, 252:16,<br>253:2, 253:9,<br>253:16, 254:3,<br>254:9, 254:19,<br>257:1, 259:5,<br>259:13, 259:18,<br>261:6, 261:15,<br>262:1, 267:11<br><b>provided</b><br>16:5, 33:3,<br>99:2, 99:10,<br>113:13, 113:18,<br>114:18, 115:16,<br>202:22, 212:14,<br>235:15, 237:14,<br>247:1, 249:12,<br>267:19, 268:3,<br>268:7, 269:18,<br>277:5<br><b>provides</b><br>100:19, 126:9,<br>127:2, 166:12,<br>271:17<br><b>providing</b><br>81:6, 81:22,<br>107:4, 117:11,<br>126:2, 208:20,<br>209:10, 209:13,<br>279:15<br><b>public</b><br>281:4<br><b>publications</b><br>101:16, 256:14<br><b>publish</b><br>225:3<br><b>published</b><br>209:19<br><b>pure</b><br>213:18<br><b>purports</b><br>240:19<br><b>purpose</b><br>190:3, 227:13 | <b>purposely</b><br>190:3, 240:15<br><b>pursuant</b><br>2:19<br><b>put</b><br>50:6, 50:7,<br>54:2, 54:10,<br>56:2, 67:3,<br>82:18, 125:12,<br>148:18, 148:20,<br>205:16, 242:13,<br>247:4, 247:19,<br>252:8, 252:9,<br>258:10, 259:15<br><b>putting</b><br>191:3<br><b>Q</b><br><b>qualifications</b><br>144:15<br><b>questioning</b><br>54:4, 209:3,<br>212:2<br><b>questions</b><br>7:7, 7:17,<br>7:18, 53:16,<br>53:19, 54:9,<br>81:20, 117:2,<br>117:3, 117:7,<br>117:12, 118:10,<br>153:13, 187:13,<br>205:11, 207:7,<br>261:10, 267:8,<br>267:10, 273:13,<br>275:15, 277:11,<br>277:20, 279:10,<br>279:20, 280:1<br><b>quickly</b><br>17:19, 17:20<br><b>quotations</b><br>138:3<br><b>quote</b><br>104:12, 248:4,<br>257:10, 257:17,<br>258:4, 258:17,<br>259:14<br><b>quotes</b><br>104:15, 129:2 | <b>quoting</b><br>104:15<br><b>R</b><br><b>raising</b><br>114:5, 115:4<br><b>range</b><br>53:9, 151:1,<br>151:9, 151:18,<br>153:18, 154:22,<br>155:21, 155:22,<br>225:13, 225:16,<br>225:18, 226:1,<br>230:13, 231:8,<br>231:9, 232:5,<br>232:7, 233:3,<br>233:11, 234:4,<br>234:14, 236:9,<br>257:1<br><b>ranging</b><br>185:11, 222:3<br><b>rate</b><br>15:2, 15:16,<br>25:10, 25:11,<br>108:9, 172:3,<br>172:4, 194:15,<br>197:18, 222:2,<br>254:18, 255:15,<br>275:4<br><b>rates</b><br>32:13<br><b>rather</b><br>8:4, 53:5,<br>91:7, 117:2<br><b>ratio</b><br>44:1, 44:6,<br>53:8, 84:10,<br>84:22, 86:20,<br>87:1, 87:20,<br>88:8, 88:18,<br>91:3, 91:8,<br>91:11, 91:17,<br>91:19, 92:5,<br>92:8, 96:2,<br>112:1, 116:14,<br>118:22, 119:6,<br>119:14, 120:20,<br>121:2, 121:12, | 123:2, 124:14,<br>154:14, 166:21,<br>172:3, 176:7,<br>176:8, 220:6,<br>220:15, 225:11,<br>226:4, 226:8,<br>226:10, 226:15,<br>226:17, 230:13,<br>231:3, 235:22,<br>236:7, 265:2,<br>265:11, 265:17,<br>266:3, 268:13,<br>268:19, 268:20,<br>271:18<br><b>ratios</b><br>77:20, 236:8<br><b>raw</b><br>238:6, 238:7<br><b>rd</b><br>3:18, 12:13<br><b>rdr</b><br>1:22<br><b>reach</b><br>14:21, 15:4,<br>15:14, 15:16,<br>24:18, 24:20,<br>25:3, 25:4,<br>25:9, 25:12,<br>27:8, 27:9,<br>28:14, 28:20,<br>28:22, 30:2,<br>31:6, 40:18,<br>162:15, 175:7,<br>195:8, 196:17,<br>197:4, 201:1,<br>201:14, 201:16,<br>274:9<br><b>reached</b><br>25:17, 30:16,<br>190:6, 198:11<br><b>reaches</b><br>14:22, 16:22,<br>17:7, 17:16,<br>18:8, 18:15,<br>19:13, 19:21,<br>20:12, 22:11,<br>22:18, 23:4,<br>23:20, 26:11, |
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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27:1, 27:16,<br>27:22, 40:21,<br>49:3, 55:22,<br>189:18, 190:17,<br>191:17, 193:1,<br>193:9, 195:4,<br>195:10<br><b>react</b><br>136:12<br><b>reactions</b><br>279:6<br><b>read</b><br>52:1, 60:15,<br>75:22, 76:6,<br>87:14, 90:12,<br>97:4, 101:1,<br>154:5, 158:19,<br>163:14, 259:10,<br>270:5<br><b>reading</b><br>85:14, 85:19,<br>89:2, 195:19,<br>270:22<br><b>reads</b><br>44:1, 91:18<br><b>ready</b><br>156:3, 189:13<br><b>really</b><br>32:19, 32:20,<br>34:16, 49:19,<br>103:14, 207:17,<br>239:19<br><b>realtime</b><br>2:16<br><b>reason</b><br>8:11, 42:13,<br>100:8, 171:16,<br>177:9, 238:12,<br>241:7, 241:8,<br>241:13, 247:13<br><b>reasonable</b><br>194:2, 195:5,<br>253:1<br><b>reasonably</b><br>60:17, 241:2,<br>246:12<br><b>reasons</b><br>193:18, 241:14, | 241:15<br><b>recall</b><br>81:5, 81:22,<br>83:2, 99:7,<br>207:13, 267:9,<br>267:14, 268:5,<br>268:7, 272:13,<br>273:14, 275:14,<br>277:4, 277:14,<br>277:19<br><b>recalls</b><br>207:5<br><b>receive</b><br>210:16, 211:5,<br>211:12, 212:3<br><b>received</b><br>143:11, 210:10,<br>210:13, 210:21,<br>211:10, 212:8<br><b>recently</b><br>159:16, 160:5,<br>160:9, 163:16<br><b>recess</b><br>55:2, 89:10,<br>143:8, 184:16,<br>206:5, 239:3,<br>244:17, 266:10,<br>267:2<br><b>rechargeable</b><br>228:13<br><b>recipe</b><br>213:2, 213:3,<br>213:4, 244:1<br><b>recollection</b><br>13:14, 270:13<br><b>recommended</b><br>228:5<br><b>record</b><br>12:10, 21:7,<br>45:19, 52:2,<br>54:3, 54:14,<br>55:1, 55:5,<br>60:16, 74:8,<br>81:17, 82:16,<br>82:18, 89:8,<br>89:13, 113:18,<br>115:11, 117:18,<br>143:5, 143:6, | 143:10, 148:9,<br>148:11, 149:5,<br>184:14, 184:18,<br>191:4, 205:16,<br>206:2, 206:3,<br>206:7, 217:2,<br>239:1, 239:5,<br>242:5, 242:7,<br>242:13, 242:20,<br>244:15, 244:19,<br>266:8, 266:12,<br>266:22, 267:4,<br>280:5, 281:10<br><b>recreate</b><br>250:18<br><b>redirect</b><br>249:11, 266:17<br><b>reduce</b><br>108:10<br><b>refer</b><br>58:5, 59:19,<br>90:1, 90:17,<br>91:9, 114:9,<br>120:8, 124:12,<br>131:11, 138:2,<br>138:12, 138:14,<br>140:2, 193:15,<br>231:17, 232:16,<br>232:17, 261:11<br><b>reference</b><br>21:22, 64:22,<br>65:12, 71:8,<br>72:15, 74:10,<br>80:5, 95:16,<br>96:5, 97:2,<br>98:5, 98:9,<br>99:16, 99:19,<br>99:22, 100:20,<br>101:5, 104:2,<br>104:6, 109:4,<br>136:19, 149:18,<br>152:7, 153:10,<br>153:11, 153:12,<br>153:15, 154:18,<br>155:4, 155:15,<br>156:8, 156:15,<br>156:16, 156:17,<br>156:20, 157:2, | 157:6, 157:10,<br>157:12, 157:13,<br>158:16, 158:17,<br>158:18, 158:20,<br>159:8, 161:7,<br>161:10, 161:11,<br>161:13, 162:2,<br>162:3, 162:8,<br>162:17, 163:1,<br>163:10, 163:11,<br>163:15, 164:7,<br>165:3, 165:8,<br>165:10, 174:1,<br>174:22, 193:22,<br>198:5, 214:3,<br>257:6, 257:7<br><b>referenced</b><br>85:2<br><b>references</b><br>160:13, 163:19,<br>164:1, 209:19<br><b>referred</b><br>60:11, 62:20,<br>116:21, 224:12<br><b>referring</b><br>10:10, 29:14,<br>35:20, 61:2,<br>88:14, 90:10,<br>90:16, 91:12,<br>91:13, 91:18,<br>93:20, 94:2,<br>94:6, 95:9,<br>96:4, 101:3,<br>119:20, 120:6,<br>123:17, 125:17,<br>133:7, 134:9,<br>139:12, 139:14,<br>140:9, 140:15,<br>162:11, 169:12,<br>179:8, 238:6,<br>238:7, 261:2,<br>261:5<br><b>refers</b><br>44:6, 56:14,<br>56:18, 57:13,<br>59:11, 93:16,<br>94:15, 122:11,<br>127:17, 160:9, |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 162:6, 231:11,<br>231:19<br><b>refresh</b><br>13:13, 270:12<br><b>refuse</b><br>187:13<br><b>refused</b><br>187:19<br><b>refusing</b><br>28:9, 53:18,<br>83:13, 117:12,<br>261:14<br><b>regarding</b><br>21:14, 127:16,<br>243:14, 244:5<br><b>regardless</b><br>182:17<br><b>registered</b><br>2:16<br><b>registration</b><br>282:7<br><b>rejected</b><br>96:22, 114:4,<br>114:21, 115:3<br><b>relate</b><br>84:10, 101:21,<br>103:18<br><b>related</b><br>42:21, 50:15,<br>51:9, 52:17,<br>53:4, 53:12,<br>67:4, 88:7,<br>101:1, 101:4,<br>102:22, 115:22,<br>116:2, 211:7,<br>260:8, 281:17<br><b>relates</b><br>95:15<br><b>relationship</b><br>24:11, 72:22<br><b>relative</b><br>15:15, 87:7,<br>87:10, 87:21,<br>88:10, 96:5,<br>149:22, 158:11,<br>160:11, 165:15,<br>174:16, 175:12,<br>175:21, 194:21 | <b>relatively</b><br>183:5, 246:10,<br>247:3<br><b>relevant</b><br>50:11, 50:16,<br>176:9<br><b>relied</b><br>203:12, 209:12,<br>238:10<br><b>rely</b><br>20:17, 21:17,<br>142:17, 154:18,<br>155:15, 158:16,<br>161:6, 161:10,<br>163:2, 165:10,<br>166:11, 166:16,<br>208:13, 208:16,<br>208:20, 209:5,<br>237:19, 279:14<br><b>relying</b><br>161:11, 237:11<br><b>remaining</b><br>112:2, 141:9<br><b>remarkable</b><br>106:20<br><b>remedy</b><br>54:5, 54:17<br><b>remember</b><br>12:6, 12:7,<br>34:16, 78:8,<br>80:21, 82:22,<br>97:6, 206:18,<br>207:11, 207:16,<br>207:19, 256:21,<br>267:19<br><b>remembers</b><br>191:11<br><b>remotely</b><br>6:22<br><b>render</b><br>16:4, 184:4,<br>232:6<br><b>repeat</b><br>12:2, 14:14,<br>17:3, 26:20,<br>34:5, 36:6,<br>57:1, 61:13,<br>65:8, 67:16, | 71:15, 75:9,<br>79:19, 80:15,<br>84:3, 88:3,<br>98:22, 113:11,<br>126:7, 131:2,<br>133:22, 141:18,<br>145:8, 153:1,<br>173:2, 191:22,<br>214:22, 220:10,<br>226:13, 232:14,<br>233:8, 233:17,<br>235:6, 238:2,<br>241:22, 242:20,<br>246:17, 247:21,<br>249:21, 252:1,<br>254:8, 259:11,<br>261:22, 263:14,<br>265:5, 269:10,<br>276:7<br><b>repeatedly</b><br>185:9, 199:3,<br>222:1<br><b>rephrase</b><br>7:22, 23:15,<br>30:5, 43:14,<br>48:8, 52:16,<br>114:22, 116:10,<br>199:13, 209:4,<br>231:15, 248:12<br><b>replaced</b><br>39:18, 160:21,<br>163:21<br><b>replicate</b><br>251:14<br><b>reply</b><br>7:7<br><b>report</b><br>26:3, 52:1,<br>108:18, 237:19,<br>238:4, 247:7,<br>253:17, 256:2<br><b>reported</b><br>1:22, 161:5,<br>179:21, 181:2,<br>214:2<br><b>reporter</b><br>2:16, 4:11,<br>7:2, 7:3, 8:2, | 8:10, 17:12,<br>186:13, 217:6,<br>281:1, 281:3<br><b>reporting</b><br>141:16, 214:14<br><b>reports</b><br>219:3, 225:10<br><b>represent</b><br>6:15<br><b>representative</b><br>47:17, 47:22,<br>48:3, 240:10,<br>240:16, 241:9,<br>244:21, 245:9,<br>245:12, 246:1,<br>247:5, 248:5,<br>248:15, 248:22,<br>277:7<br><b>represented</b><br>281:12<br><b>representing</b><br>6:11, 6:20, 7:3<br><b>reproduce</b><br>214:18, 215:3,<br>239:16, 241:3,<br>246:12<br><b>reproduced</b><br>241:6, 246:15,<br>246:19<br><b>republic</b><br>3:20<br><b>request</b><br>117:22<br><b>require</b><br>121:17, 195:22,<br>200:11<br><b>required</b><br>109:3, 240:3<br><b>requirement</b><br>208:6<br><b>requires</b><br>166:20<br><b>research</b><br>144:1, 155:6<br><b>resistance</b><br>222:13, 222:15<br><b>resolve</b><br>205:20, 212:1, |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 242:12<br><b>respect</b><br>108:16, 246:12,<br>273:4<br><b>respective</b><br>222:13<br><b>respectively</b><br>104:14<br><b>respond</b><br>117:3, 117:7<br><b>responded</b><br>149:7<br><b>responding</b><br>100:14, 115:16<br><b>responds</b><br>149:6<br><b>response</b><br>97:17, 97:21,<br>99:10, 113:19,<br>156:11, 273:12<br><b>responsive</b><br>4:17, 100:11<br><b>restate</b><br>76:5, 191:10,<br>249:14, 265:22<br><b>result</b><br>193:21, 222:5,<br>252:9, 252:10,<br>253:8<br><b>results</b><br>204:13, 214:1,<br>219:20, 222:9,<br>224:6, 253:1,<br>279:8<br><b>retained</b><br>111:21<br><b>retaining</b><br>141:6<br><b>retention</b><br>103:5, 107:9<br><b>revenue</b><br>210:17, 211:2,<br>211:5, 211:13,<br>212:6, 212:8,<br>212:9<br><b>reversible</b><br>135:10, 136:4,<br>136:9, 168:22, | 169:5, 169:7,<br>227:11, 229:11<br><b>review</b><br>10:10, 11:15,<br>32:19, 37:7,<br>60:2, 184:8<br><b>reviewed</b><br>9:3, 97:2,<br>158:18<br><b>reviewing</b><br>220:5, 220:12<br><b>rg</b><br>6:5<br><b>right-hand</b><br>21:22<br><b>risk</b><br>100:4<br><b>risks</b><br>51:7, 102:8<br><b>rj</b><br>1:7, 4:16,<br>4:21, 6:5, 6:21,<br>11:6, 11:7,<br>11:14, 64:15,<br>64:20, 65:9,<br>65:21, 66:6,<br>114:4, 114:21,<br>115:3, 116:5,<br>116:12, 118:19,<br>119:5, 281:12<br><b>road</b><br>3:18<br><b>robert</b><br>3:15, 6:22,<br>10:1<br><b>rockville</b><br>282:10<br><b>role</b><br>279:5<br><b>room</b><br>150:22, 159:2,<br>205:10<br><b>roughly</b><br>9:19, 222:15<br><b>runaway</b><br>51:8, 102:8,<br>102:12<br><b>running</b><br>81:19 | <b>s</b><br><b>safely</b><br>53:10, 268:20<br><b>said</b><br>28:13, 31:14,<br>34:5, 50:7,<br>68:15, 76:4,<br>76:9, 80:21,<br>86:22, 124:8,<br>128:2, 133:3,<br>133:18, 138:21,<br>139:9, 148:17,<br>162:5, 164:8,<br>169:5, 169:21,<br>176:12, 183:15,<br>195:9, 196:3,<br>196:18, 215:8,<br>223:21, 230:17,<br>236:5, 259:12,<br>268:14<br><b>same</b><br>15:10, 17:9,<br>19:5, 19:7,<br>19:10, 23:6,<br>27:4, 27:17,<br>36:10, 39:16,<br>40:17, 41:7,<br>41:8, 41:11,<br>41:19, 43:18,<br>44:5, 44:12,<br>46:6, 46:14,<br>47:7, 49:5,<br>49:6, 49:7,<br>55:11, 55:21,<br>57:16, 59:12,<br>59:14, 61:19,<br>62:13, 63:6,<br>63:10, 64:21,<br>65:11, 65:15,<br>66:10, 70:22,<br>74:5, 75:13,<br>79:6, 79:7,<br>82:4, 82:15,<br>83:7, 83:8,<br>84:7, 84:13,<br>84:16, 100:17,<br>112:16, 116:2, | 116:15, 121:5,<br>121:8, 123:8,<br>139:12, 139:14,<br>140:15, 150:13,<br>153:7, 155:12,<br>173:9, 176:21,<br>176:22, 177:9,<br>177:16, 180:19,<br>181:6, 183:7,<br>188:10, 194:16,<br>212:22, 224:2,<br>228:10, 232:11,<br>233:4, 233:12,<br>233:22, 234:5,<br>234:10, 234:16,<br>234:17, 234:20,<br>235:10, 240:13,<br>244:1, 250:5,<br>254:6, 254:12,<br>258:5, 261:2,<br>262:5, 262:19,<br>262:20<br><b>same"</b><br>232:19<br><b>samsung</b><br>1:4, 6:4, 6:17,<br>119:12<br><b>satisfactory</b><br>219:20<br><b>say</b><br>8:3, 19:12,<br>22:21, 29:11,<br>30:7, 33:9,<br>34:3, 37:14,<br>45:2, 47:19,<br>53:5, 54:12,<br>58:2, 58:9,<br>67:6, 70:2,<br>82:17, 90:17,<br>91:3, 91:16,<br>92:4, 92:10,<br>92:18, 93:4,<br>95:7, 98:4,<br>101:11, 104:11,<br>123:11, 129:11,<br>130:11, 137:9,<br>137:12, 138:11,<br>143:22, 150:13, |
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| <p>151:5, 166:19,<br/>168:12, 169:4,<br/>174:10, 174:20,<br/>183:21, 186:8,<br/>197:17, 200:6,<br/>212:8, 212:18,<br/>221:5, 223:3,<br/>241:8, 245:11,<br/>246:10, 248:4,<br/>251:6, 260:9<br/><b>saying</b><br/>17:14, 38:6,<br/>40:10, 40:20,<br/>41:7, 46:14,<br/>47:2, 48:18,<br/>54:16, 91:7,<br/>92:16, 112:19,<br/>135:18, 136:16,<br/>201:3, 203:2,<br/>216:21, 219:3,<br/>245:9, 247:11,<br/>278:18<br/><b>says</b><br/>7:7, 20:3,<br/>76:4, 77:2,<br/>77:14, 92:9,<br/>92:17, 93:9,<br/>95:12, 97:21,<br/>120:1, 124:2,<br/>132:11, 132:20,<br/>134:2, 147:12,<br/>148:15, 151:12,<br/>159:16, 161:3,<br/>161:14, 163:15,<br/>167:21, 174:9,<br/>199:2, 203:3,<br/>221:16, 264:11,<br/>264:17<br/><b>scope</b><br/>37:6, 61:12,<br/>63:21, 65:7,<br/>76:18, 105:15,<br/>106:10, 111:7,<br/>159:11, 164:6,<br/>186:21, 196:14,<br/>198:8, 270:11,<br/>270:17, 270:18,<br/>274:6, 274:18,</p> | <p>276:6, 278:6,<br/>278:12, 278:21<br/><b>search</b><br/>256:14, 256:17,<br/>257:2<br/><b>second</b><br/>12:7, 13:14,<br/>26:16, 27:10,<br/>76:1, 85:4,<br/>89:22, 97:20,<br/>131:20, 148:19,<br/>164:7, 165:12,<br/>166:6, 169:8,<br/>169:9, 173:16,<br/>181:8, 193:16,<br/>220:4, 242:5,<br/>250:16, 269:22<br/><b>secondary</b><br/>76:9, 90:2,<br/>90:12, 90:18,<br/>91:20, 92:11,<br/>92:19, 124:4,<br/>239:16, 257:20,<br/>263:17, 264:19<br/><b>section</b><br/>16:13, 86:11,<br/>86:19, 97:16,<br/>122:5, 150:20,<br/>158:22, 180:3<br/><b>see</b><br/>22:12, 24:13,<br/>24:22, 37:16,<br/>40:8, 43:20,<br/>43:21, 44:3,<br/>49:11, 52:7,<br/>60:20, 65:2,<br/>76:12, 78:1,<br/>83:20, 86:11,<br/>87:11, 97:18,<br/>98:2, 98:6,<br/>115:14, 124:2,<br/>124:9, 124:17,<br/>131:2, 137:8,<br/>157:5, 159:4,<br/>159:5, 159:19,<br/>160:7, 173:14,<br/>174:18, 181:2,<br/>191:9, 192:18,</p> | <p>192:21, 201:19,<br/>202:12, 237:20,<br/>252:8, 256:14,<br/>258:7, 261:12<br/><b>seek</b><br/>54:5, 117:19,<br/>117:21<br/><b>seeking</b><br/>54:17<br/><b>seem</b><br/>46:13<br/><b>seemed</b><br/>102:20<br/><b>seems</b><br/>46:8, 99:16<br/><b>seen</b><br/>112:1, 113:14,<br/>155:17, 235:18<br/><b>sentence</b><br/>30:7, 41:5,<br/>56:12, 87:14,<br/>89:22, 96:12,<br/>97:20, 104:10,<br/>132:19, 140:1,<br/>150:13, 150:20,<br/>161:13, 166:19,<br/>168:12, 173:16,<br/>192:1, 197:17,<br/>222:5, 232:15,<br/>233:8, 257:18<br/><b>sentences</b><br/>244:2<br/><b>separate</b><br/>176:5<br/><b>separator</b><br/>253:18, 253:21,<br/>277:12<br/><b>separators</b><br/>279:3<br/><b>september</b><br/>144:8, 144:13,<br/>161:20<br/><b>series</b><br/>7:16<br/><b>set</b><br/>44:8, 48:5,<br/>48:11, 48:14,<br/>48:19, 48:21,</p> | <p>49:3, 49:5,<br/>49:16, 50:1,<br/>51:15, 52:11,<br/>52:22, 67:13,<br/>92:1, 92:9,<br/>92:17, 92:18,<br/>129:5, 130:10,<br/>130:16, 130:21,<br/>132:16, 133:4,<br/>258:6, 275:18,<br/>276:3, 276:9,<br/>276:22, 281:6<br/><b>settings</b><br/>19:19, 192:16<br/><b>seven</b><br/>160:13, 261:8<br/><b>several</b><br/>14:8, 57:18,<br/>58:4, 62:17,<br/>107:16, 108:3,<br/>119:21, 167:22,<br/>178:12, 212:11,<br/>273:10<br/><b>shanghai</b><br/>3:19<br/><b>shimen</b><br/>3:18<br/><b>short</b><br/>207:16<br/><b>shorthand</b><br/>281:1<br/><b>shortly</b><br/>8:16<br/><b>should</b><br/>44:9, 44:11,<br/>47:2, 47:3,<br/>47:11, 88:19,<br/>108:14, 112:4,<br/>112:9, 112:14,<br/>112:22, 119:10,<br/>120:8, 131:11,<br/>131:17, 132:2,<br/>132:20, 211:19,<br/>227:1, 228:11,<br/>230:13, 233:4,<br/>241:6, 246:14,<br/>264:20, 265:7,<br/>265:11</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>show</b><br/>83:20, 138:17,<br/>139:9, 152:14,<br/>166:7, 183:8,<br/>197:7, 221:16,<br/>251:10<br/><b>showed</b><br/>149:21<br/><b>showing</b><br/>138:18, 248:19<br/><b>shown</b><br/>21:8, 165:21,<br/>222:6, 222:9,<br/>236:5, 236:9,<br/>260:21, 278:14<br/><b>shows</b><br/>173:11, 181:1,<br/>181:13, 218:7,<br/>218:18<br/><b>side</b><br/>157:10, 221:10<br/><b>signature</b><br/>10:17, 12:17,<br/>13:18<br/><b>signature-plkal</b><br/>282:3<br/><b>signed</b><br/>10:6, 10:19,<br/>12:20, 13:20<br/><b>significant</b><br/>103:4, 105:4,<br/>106:16<br/><b>significantly</b><br/>107:14<br/><b>similar</b><br/>33:14, 36:20,<br/>198:15, 219:6,<br/>237:6, 253:14,<br/>259:20<br/><b>simple</b><br/>183:5, 192:13,<br/>236:20<br/><b>simply</b><br/>46:2, 51:12,<br/>52:8, 73:9,<br/>78:16, 94:1,<br/>94:14, 99:10,<br/>100:13, 114:20,</p> | <p>115:2, 127:1,<br/>180:13, 188:19,<br/>204:3, 211:11,<br/>220:14, 223:9,<br/>244:4, 247:1,<br/>248:1, 248:18,<br/>261:5<br/><b>since</b><br/>9:10, 50:15,<br/>54:3, 198:9,<br/>215:16<br/><b>single</b><br/>52:2, 76:11,<br/>77:3, 77:19,<br/>213:7, 213:16,<br/>246:17<br/><b>sir</b><br/>119:3, 128:9,<br/>136:10, 185:4,<br/>257:9, 267:15,<br/>267:20<br/><b>sit</b><br/>46:9, 153:22,<br/>156:3, 189:14<br/><b>sitting</b><br/>35:21, 81:5,<br/>81:14, 81:21,<br/>83:1, 83:6,<br/>83:9, 110:2,<br/>153:14, 154:17,<br/>155:14, 173:22,<br/>189:5, 207:19,<br/>234:3, 234:12,<br/>262:13, 263:1<br/><b>situation</b><br/>194:1<br/><b>six</b><br/>9:15<br/><b>size</b><br/>197:20<br/><b>skill</b><br/>133:10, 144:8,<br/>144:13, 162:19,<br/>164:3, 272:16,<br/>272:19, 273:1,<br/>273:3, 273:22,<br/>274:12<br/><b>slight</b><br/>42:20</p> | <p><b>slow</b><br/>15:2, 25:10,<br/>108:9, 168:9,<br/>172:3, 172:13,<br/>194:15, 254:16,<br/>274:12<br/><b>slowly</b><br/>15:13, 17:21,<br/>31:7, 172:8,<br/>274:19<br/><b>small</b><br/>278:14, 278:18,<br/>279:7<br/><b>sold</b><br/>108:3<br/><b>sole</b><br/>227:13<br/><b>solid</b><br/>243:7<br/><b>some</b><br/>9:11, 25:10,<br/>34:1, 34:3,<br/>94:20, 101:3,<br/>141:21, 142:16,<br/>158:19, 159:16,<br/>160:9, 163:16,<br/>173:13, 178:15,<br/>180:8, 180:9,<br/>180:10, 198:14,<br/>199:20, 215:18,<br/>224:3, 239:14,<br/>246:5, 266:16,<br/>273:8<br/><b>something</b><br/>25:20, 40:4,<br/>172:8, 205:16,<br/>209:8, 224:13,<br/>237:10, 238:10,<br/>242:11, 265:18<br/><b>sometimes</b><br/>25:2, 25:4,<br/>25:9, 28:19,<br/>28:21, 34:1,<br/>230:20<br/><b>somewhere</b><br/>178:10<br/><b>sorry</b><br/>26:4, 30:5,</p> | <p>52:15, 59:9,<br/>60:8, 67:6,<br/>83:8, 85:21,<br/>85:22, 87:16,<br/>92:4, 148:1,<br/>188:15, 193:6,<br/>219:19, 247:19,<br/>265:21, 280:1<br/><b>sounds</b><br/>54:3<br/><b>sources</b><br/>65:22, 66:7<br/><b>speak</b><br/>8:4, 186:12<br/><b>speaking</b><br/>21:9, 149:1,<br/>188:1<br/><b>spec</b><br/>57:9, 133:17,<br/>140:15<br/><b>specific</b><br/>9:9, 15:22,<br/>44:2, 44:9,<br/>57:22, 87:4,<br/>120:1, 125:16,<br/>125:19, 126:15,<br/>126:20, 134:14,<br/>134:18, 149:12,<br/>170:2, 171:16,<br/>176:1, 178:9,<br/>179:2, 179:11,<br/>179:14, 180:11,<br/>181:1, 212:18,<br/>232:2, 233:3,<br/>233:11, 234:5,<br/>234:15, 235:18,<br/>236:14, 265:1,<br/>269:5, 269:12<br/><b>specifically</b><br/>29:11, 59:22,<br/>72:18, 94:22,<br/>97:12, 103:2,<br/>115:17, 131:16,<br/>132:20, 174:9,<br/>221:8, 227:15,<br/>240:2, 245:11<br/><b>specification</b><br/>78:4, 93:4,</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>93:16, 94:2,<br/>94:15, 122:11,<br/>125:6, 129:10<br/><b>specify</b><br/>32:8, 105:21,<br/>110:12, 110:19,<br/>195:14<br/><b>specifying</b><br/>32:11, 109:10,<br/>110:3<br/><b>spend</b><br/>256:19, 270:5<br/><b>spent</b><br/>153:11, 257:2<br/><b>spinel</b><br/>102:15, 103:8,<br/>103:15, 160:20,<br/>160:22, 162:20,<br/>163:9, 163:20,<br/>163:22, 164:4,<br/>164:12<br/><b>spinel-type</b><br/>150:14<br/><b>spoke</b><br/>21:11<br/><b>square</b><br/>167:22<br/><b>squared</b><br/>165:20, 167:18,<br/>168:6, 168:14,<br/>171:18, 185:10,<br/>185:20, 190:9,<br/>222:2, 252:14<br/><b>stability</b><br/>51:7, 100:2,<br/>102:7, 103:1,<br/>106:17<br/><b>stable</b><br/>50:22, 147:17,<br/>173:19, 174:9,<br/>174:17, 174:18,<br/>273:18<br/><b>stage</b><br/>17:18, 17:21,<br/>26:10, 192:18<br/><b>standard</b><br/>271:6<br/><b>standing</b><br/>82:20</p> | <p><b>stanford</b><br/>143:20<br/><b>start</b><br/>26:5, 100:3,<br/>129:17, 143:17,<br/>209:7<br/><b>started</b><br/>143:19, 144:3,<br/>144:4, 144:5<br/><b>starting</b><br/>19:17, 144:6,<br/>148:20, 160:5<br/><b>starts</b><br/>166:9, 173:13,<br/>175:15<br/><b>state</b><br/>6:15, 14:22,<br/>15:4, 18:1,<br/>18:14, 19:21,<br/>24:3, 24:7,<br/>24:8, 27:9,<br/>27:16, 29:15,<br/>29:16, 40:18,<br/>48:1, 55:22,<br/>56:6, 57:4,<br/>57:11, 59:10,<br/>66:15, 66:17,<br/>66:20, 67:7,<br/>80:2, 85:13,<br/>85:18, 86:19,<br/>88:15, 99:20,<br/>102:18, 105:17,<br/>105:18, 111:20,<br/>116:21, 129:10,<br/>132:1, 155:5,<br/>156:19, 160:19,<br/>178:2, 178:5,<br/>179:9, 190:2,<br/>197:5, 216:13,<br/>219:18, 228:11,<br/>232:16, 232:18,<br/>233:20, 234:19,<br/>239:12, 243:19,<br/>248:15, 270:21,<br/>272:4, 273:18,<br/>274:10, 276:21,<br/>281:4<br/><b>state"</b><br/>40:21</p> | <p><b>stated</b><br/>29:5, 62:15,<br/>72:18, 120:5,<br/>137:5, 137:19,<br/>195:15, 227:7,<br/>236:5, 240:14,<br/>256:10<br/><b>statement</b><br/>22:14, 27:6,<br/>61:22, 65:5,<br/>65:10, 65:17,<br/>85:9, 86:3,<br/>86:14, 86:16,<br/>87:16, 89:1,<br/>115:9, 211:8,<br/>214:5, 216:19,<br/>240:9, 245:5,<br/>248:12, 248:13,<br/>255:3, 256:1,<br/>256:10, 277:5<br/><b>statements</b><br/>52:4<br/><b>states</b><br/>1:1, 6:6, 272:5<br/><b>stating</b><br/>45:19<br/><b>step</b><br/>252:4<br/><b>still</b><br/>21:7, 79:9,<br/>164:1, 194:22,<br/>239:15, 247:22,<br/>277:2<br/><b>stop</b><br/>191:12, 220:3<br/><b>stopped</b><br/>199:9, 199:15,<br/>200:2, 200:6<br/><b>stops</b><br/>20:8, 20:9,<br/>26:12, 27:3,<br/>28:2, 28:15,<br/>29:13, 193:11,<br/>199:19, 200:8<br/><b>stops"</b><br/>20:1, 193:3<br/><b>street</b><br/>2:18, 6:13</p> | <p><b>strict</b><br/>230:22<br/><b>strike</b><br/>15:19, 73:6,<br/>73:22, 74:7,<br/>81:3, 81:12,<br/>81:19, 82:9,<br/>82:17, 100:10,<br/>117:15, 129:16,<br/>155:12, 190:11,<br/>202:11, 246:21<br/><b>strong</b><br/>100:7<br/><b>struck</b><br/>261:17, 262:4,<br/>262:15, 263:3<br/><b>structural</b><br/>51:5<br/><b>structure</b><br/>100:3, 102:5,<br/>102:11, 102:16,<br/>147:8, 160:20,<br/>161:5, 163:20,<br/>164:19<br/><b>students</b><br/>144:2, 279:3<br/><b>studies</b><br/>173:17<br/><b>stuff</b><br/>81:20, 249:10<br/><b>style</b><br/>4:3<br/><b>submitted</b><br/>11:21, 12:3,<br/>13:14, 158:3,<br/>204:14, 204:21,<br/>204:22, 205:1,<br/>206:9, 207:21<br/><b>submitting</b><br/>237:22, 238:5<br/><b>substance</b><br/>89:16, 184:20<br/><b>substantial</b><br/>53:11, 268:21<br/><b>success</b><br/>111:22, 219:7,<br/>219:10<br/><b>successful</b><br/>214:14, 216:3,</p> |
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| <p>218:15<br/><b>successfully</b><br/>213:18<br/><b>suggests</b><br/>168:14<br/><b>suit</b><br/>110:5, 110:10,<br/>111:13, 129:15<br/><b>suite</b><br/>2:18, 6:13,<br/>282:9<br/><b>supplied</b><br/>74:13<br/><b>supply</b><br/>277:1<br/><b>support</b><br/>4:16, 52:3,<br/>62:8, 68:2,<br/>70:3, 72:1,<br/>72:9, 73:14,<br/>74:2, 96:18,<br/>119:22, 122:18,<br/>136:19, 155:8,<br/>235:12, 237:15<br/><b>sure</b><br/>8:1, 8:8, 17:4,<br/>23:8, 26:21,<br/>31:19, 61:14,<br/>67:17, 88:4,<br/>97:9, 113:16,<br/>143:1, 145:9,<br/>148:18, 166:18,<br/>211:18, 213:14,<br/>237:9, 239:18,<br/>255:2, 263:15,<br/>276:8<br/><b>surface</b><br/>102:22, 197:22<br/><b>surfaced</b><br/>103:1<br/><b>surprised</b><br/>252:11<br/><b>surprising</b><br/>251:7, 251:9<br/><b>swear</b><br/>7:4<br/><b>sworn</b><br/>2:12, 7:6,</p> | <p>281:7<br/><b>synonymous</b><br/>58:15, 58:18,<br/>58:21, 63:9,<br/>65:19<br/><b>synonymously</b><br/>34:22, 35:12,<br/>36:2, 36:14,<br/>57:18, 58:4,<br/>61:9, 61:16,<br/>62:10, 62:17,<br/>63:4, 63:17,<br/>64:4, 65:2,<br/>65:13<br/><b>synthesis</b><br/>214:14, 216:3,<br/>218:15, 219:2,<br/>219:5, 219:8,<br/>219:11, 244:6,<br/>250:8<br/><b>synthesize</b><br/>155:7, 215:19,<br/>215:20, 244:11<br/><b>synthesized</b><br/>213:18, 213:21,<br/>218:12, 256:3<br/><b>synthesizing</b><br/>218:18, 250:2,<br/>250:20<br/><b>system</b><br/>103:16</p> <hr/> <p style="text-align: center;"><b>T</b></p> <hr/> <p><b>table</b><br/>181:1, 181:9,<br/>181:13, 182:5,<br/>193:17, 222:6,<br/>222:9, 222:16,<br/>236:6, 246:18<br/><b>tables</b><br/>180:4<br/><b>tackle</b><br/>268:12<br/><b>taikoo</b><br/>3:17<br/><b>take</b><br/>8:14, 15:2,<br/>15:13, 26:16,</p> | <p>89:7, 184:13,<br/>194:20, 196:6,<br/>205:8, 205:13,<br/>205:17, 238:19,<br/>238:20, 244:14,<br/>266:7, 266:16<br/><b>taken</b><br/>2:12, 281:9<br/><b>taking</b><br/>6:12<br/><b>talk</b><br/>26:4, 126:14,<br/>146:11, 167:4,<br/>178:12, 205:21,<br/>232:3, 256:12,<br/>263:8<br/><b>talking</b><br/>26:18, 54:19,<br/>70:9, 92:7,<br/>96:3, 125:7,<br/>125:18, 174:19,<br/>241:16, 260:14,<br/>260:15, 264:19<br/><b>tandem</b><br/>268:13<br/><b>taught</b><br/>60:16, 144:2,<br/>145:5, 145:11,<br/>146:3, 215:20,<br/>252:14, 279:1<br/><b>teach</b><br/>103:20, 104:20,<br/>105:6, 136:21,<br/>146:16, 146:20,<br/>152:18, 153:3,<br/>159:8, 174:4,<br/>174:8, 175:1,<br/>198:6<br/><b>teaches</b><br/>39:5, 60:18,<br/>98:5, 105:3,<br/>109:4, 115:13,<br/>144:21, 146:15,<br/>150:21, 153:16,<br/>156:8, 164:18,<br/>168:22, 173:4,<br/>174:1, 185:15,<br/>227:22</p> | <p><b>teaching</b><br/>101:17, 127:3,<br/>145:21, 218:12<br/><b>teachings</b><br/>217:15, 217:21,<br/>218:4, 251:14<br/><b>tech</b><br/>4:21, 64:20,<br/>66:6<br/><b>technology</b><br/>1:7, 4:17, 6:5,<br/>6:21, 11:7,<br/>11:15, 64:16,<br/>65:21, 116:5,<br/>116:12, 118:19,<br/>281:12<br/><b>technology's</b><br/>11:6, 65:10,<br/>114:4, 114:21,<br/>115:3, 119:5<br/><b>tell</b><br/>18:18, 19:2,<br/>23:2, 23:18,<br/>28:19, 29:1,<br/>35:19, 56:17,<br/>107:5, 129:18,<br/>130:18, 131:4,<br/>142:5, 142:8,<br/>154:19, 155:17,<br/>159:6, 161:19,<br/>162:18, 182:13,<br/>182:19, 195:6,<br/>216:14, 249:7<br/><b>telling</b><br/>25:1, 25:8,<br/>25:19, 26:1,<br/>33:7, 107:3,<br/>112:18, 136:11,<br/>154:7, 156:7,<br/>255:10<br/><b>temperature</b><br/>151:1, 159:2,<br/>185:12, 198:1,<br/>222:4<br/><b>term</b><br/>39:3, 39:10,<br/>41:8, 42:19,<br/>50:11, 57:22,</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 58:3, 62:16,<br>62:18, 64:21,<br>65:11, 68:6,<br>71:9, 120:21,<br>121:21, 129:19,<br>131:5, 132:5,<br>134:8, 255:3<br><b>terminology</b><br>71:9, 273:9<br><b>terms</b><br>57:18, 58:4,<br>58:9, 67:4,<br>172:17, 177:15<br><b>test</b><br>93:11, 93:17,<br>94:3, 94:16,<br>104:11, 105:19,<br>178:14, 222:19,<br>268:4<br><b>tested</b><br>77:20, 213:20<br><b>testers</b><br>238:7<br><b>testified</b><br>71:19, 99:1,<br>114:17, 140:14,<br>206:8, 216:15,<br>220:4, 220:11<br><b>testify</b><br>249:10<br><b>testimony</b><br>8:12, 15:18,<br>15:20, 77:9,<br>78:15, 84:20,<br>89:17, 101:6,<br>152:6, 184:20,<br>194:6, 210:20,<br>218:6, 281:10<br><b>testing</b><br>123:4, 165:21,<br>203:13, 203:16,<br>204:4, 204:13,<br>206:11, 207:14,<br>208:3, 208:11,<br>208:15, 209:8,<br>209:13, 210:7,<br>210:11, 211:11,<br>212:7, 212:15, | 223:16, 237:4,<br>240:3, 271:5<br><b>tests</b><br>269:8, 269:14,<br>270:15, 271:2<br><b>texas</b><br>2:15, 2:18,<br>281:5, 282:5<br><b>th</b><br>13:10, 13:15,<br>14:2, 14:4,<br>107:13, 282:1<br><b>thank</b><br>13:12, 168:2,<br>279:9, 280:2<br><b>themselves</b><br>6:15<br><b>theoretic</b><br>44:7, 91:22,<br>95:12, 95:14,<br>116:6, 116:12,<br>118:20, 119:15,<br>119:20, 120:2,<br>120:4, 120:6,<br>121:13, 121:17,<br>124:8, 125:8,<br>126:3, 126:10,<br>126:22, 127:4,<br>128:13, 129:1,<br>130:13, 130:19,<br>131:5, 131:11,<br>131:14, 131:17,<br>132:2, 132:5,<br>132:20, 133:5,<br>133:7, 133:9,<br>133:14, 133:18,<br>134:10, 134:11,<br>139:2, 139:6,<br>140:7, 140:17,<br>169:22, 170:5,<br>170:7, 170:22,<br>171:2, 171:5,<br>171:10, 171:21,<br>172:2, 172:15,<br>176:10, 176:13,<br>176:20, 177:3,<br>177:7, 177:10,<br>177:12, 177:13, | 177:19, 179:2,<br>179:3, 181:10,<br>181:17, 182:5,<br>182:7, 182:15,<br>224:7, 224:10,<br>226:9, 226:16,<br>231:17, 231:21<br><b>theoretic"</b><br>131:6, 133:19<br><b>theoretical</b><br>116:6, 116:13,<br>116:19, 116:20,<br>118:21, 119:11,<br>119:15, 119:17,<br>120:9, 123:18,<br>124:5, 124:19,<br>125:4, 125:14,<br>125:15, 125:21,<br>128:6, 129:11,<br>129:20, 130:8,<br>132:12, 134:3,<br>166:20, 170:14,<br>175:22, 179:12,<br>179:14, 180:12,<br>181:14, 224:3<br><b>theoretical"</b><br>121:13<br><b>theoretically</b><br>223:7<br><b>therefore</b><br>24:19, 103:13,<br>103:17, 106:1,<br>107:11, 133:6,<br>232:18, 279:6<br><b>thereof</b><br>222:5<br><b>thermal</b><br>51:8, 102:8,<br>102:11<br><b>thetford</b><br>3:23, 6:11<br><b>thickness</b><br>197:22<br><b>thing</b><br>19:7, 34:5,<br>36:10, 41:11,<br>46:14, 52:2,<br>139:12, 139:14, | 209:12, 273:8<br><b>things</b><br>36:10, 161:6,<br>176:5<br><b>think</b><br>23:14, 27:7,<br>28:7, 29:12,<br>31:20, 32:15,<br>42:13, 42:17,<br>44:9, 45:2,<br>45:15, 47:1,<br>47:5, 47:11,<br>47:15, 51:19,<br>51:20, 53:21,<br>54:1, 61:21,<br>62:19, 64:12,<br>69:20, 70:17,<br>72:6, 73:19,<br>74:9, 75:15,<br>76:19, 83:9,<br>83:11, 84:18,<br>95:4, 95:15,<br>96:19, 100:7,<br>100:19, 101:3,<br>103:17, 105:2,<br>106:11, 108:11,<br>108:17, 108:22,<br>110:16, 116:19,<br>119:2, 119:10,<br>119:11, 119:20,<br>123:17, 124:18,<br>125:17, 126:14,<br>134:9, 139:12,<br>139:19, 140:1,<br>140:9, 141:3,<br>144:10, 144:11,<br>145:16, 146:9,<br>153:9, 153:22,<br>154:15, 170:12,<br>171:6, 183:11,<br>186:13, 188:12,<br>205:12, 205:18,<br>211:7, 213:10,<br>214:5, 215:7,<br>215:15, 215:22,<br>216:20, 217:4,<br>221:3, 224:9,<br>227:18, 229:4, |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>229:16, 234:10,<br/>235:12, 245:7,<br/>247:14, 253:14,<br/>256:1, 256:4,<br/>256:21, 266:17,<br/>272:10, 279:19<br/><b>thinking</b><br/>64:1<br/><b>third</b><br/>3:11, 104:10,<br/>197:17<br/><b>three</b><br/>9:13, 9:15,<br/>16:7, 16:15,<br/>81:10, 82:8,<br/>125:13, 128:12,<br/>194:20, 243:20,<br/>257:4<br/><b>through</b><br/>108:7, 243:20<br/><b>thursday</b><br/>1:15<br/><b>till</b><br/>89:20<br/><b>time</b><br/>6:9, 6:10,<br/>9:11, 9:20,<br/>27:12, 29:7,<br/>33:15, 36:12,<br/>41:1, 47:2,<br/>50:16, 52:18,<br/>53:18, 53:22,<br/>55:4, 60:3,<br/>64:1, 82:18,<br/>89:12, 96:12,<br/>102:21, 108:10,<br/>117:15, 117:17,<br/>117:19, 117:21,<br/>118:17, 130:6,<br/>133:12, 141:18,<br/>142:22, 143:9,<br/>144:14, 148:18,<br/>149:5, 153:11,<br/>154:5, 155:16,<br/>158:19, 184:17,<br/>186:14, 195:15,<br/>206:6, 216:7,<br/>217:14, 217:21,</p> | <p>218:3, 238:19,<br/>239:4, 244:18,<br/>256:12, 257:1,<br/>261:14, 266:11,<br/>267:3, 272:16,<br/>278:3, 279:11,<br/>280:3<br/><b>times</b><br/>9:15, 71:11,<br/>71:19, 108:3,<br/>167:22, 181:4,<br/>183:15, 214:17,<br/>215:2, 215:7,<br/>215:11, 218:16,<br/>219:1, 219:8,<br/>219:10<br/><b>tod</b><br/>1:22, 2:14,<br/>281:3, 282:5<br/><b>today</b><br/>6:10, 7:2,<br/>7:16, 8:12,<br/>8:20, 15:18,<br/>15:20, 35:21,<br/>46:9, 81:5,<br/>81:15, 81:21,<br/>83:1, 83:9,<br/>84:21, 89:17,<br/>99:1, 110:2,<br/>112:19, 140:14,<br/>153:15, 153:22,<br/>154:17, 155:14,<br/>156:3, 156:20,<br/>173:22, 189:5,<br/>189:13, 206:9,<br/>207:19, 220:4,<br/>220:12, 234:3,<br/>234:13, 262:13,<br/>263:1, 280:3<br/><b>today's</b><br/>6:8, 8:22, 9:2<br/><b>together</b><br/>222:6<br/><b>tokens</b><br/>180:4<br/><b>told</b><br/>18:12, 20:4,<br/>25:14, 26:8,</p> | <p>26:13, 26:21,<br/>27:20, 28:3,<br/>30:1, 30:6,<br/>30:15, 31:3,<br/>37:18, 40:2,<br/>40:4, 40:5,<br/>47:16, 47:20,<br/>57:2, 64:20,<br/>65:21, 66:6,<br/>88:22, 128:22,<br/>130:7, 130:12,<br/>132:1, 132:10,<br/>134:1, 134:3,<br/>192:13, 233:20<br/><b>tons</b><br/>252:13<br/><b>took</b><br/>174:13, 180:5<br/><b>top</b><br/>22:5, 93:15,<br/>94:12, 115:10,<br/>125:18, 165:13,<br/>175:16<br/><b>topic</b><br/>116:1<br/><b>total</b><br/>221:10, 222:11,<br/>230:17, 230:18,<br/>245:15<br/><b>totally</b><br/>244:2<br/><b>trademark</b><br/>1:1, 6:6, 99:11<br/><b>traditionally</b><br/>51:1<br/><b>transcript</b><br/>4:13, 5:2<br/><b>transition</b><br/>160:21, 163:22,<br/>221:22<br/><b>translation</b><br/>5:5<br/><b>traurig</b><br/>2:17, 3:4, 6:17<br/><b>traveling</b><br/>207:16<br/><b>treat</b><br/>233:10</p> | <p><b>treated</b><br/>233:4, 234:4,<br/>234:13<br/><b>trend</b><br/>181:3<br/><b>trial</b><br/>1:2, 219:1<br/><b>trick</b><br/>31:20, 46:16,<br/>52:7, 113:15<br/><b>tried</b><br/>214:18, 215:3,<br/>215:8, 215:11,<br/>215:15, 216:6,<br/>216:15, 217:13,<br/>217:20, 218:3,<br/>219:6, 237:5,<br/>250:17, 251:14,<br/>251:18, 267:18,<br/>268:1<br/><b>tries</b><br/>218:13<br/><b>trip</b><br/>99:2<br/><b>true</b><br/>75:15, 98:2,<br/>98:18, 99:14,<br/>178:22, 218:1,<br/>240:12, 256:1,<br/>281:9<br/><b>try</b><br/>7:22, 8:14,<br/>8:16, 37:9,<br/>218:16, 219:8,<br/>219:9<br/><b>trying</b><br/>23:12, 31:19,<br/>36:7, 46:16,<br/>52:6, 54:15,<br/>99:2, 108:10,<br/>113:12, 113:15,<br/>113:16, 115:9,<br/>236:13, 241:3,<br/>246:12, 251:3,<br/>263:9, 277:18<br/><b>turn</b><br/>21:20, 37:10,<br/>56:3, 64:18,</p> |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| 66:13, 86:7,<br>90:5, 90:6,<br>120:11, 120:15,<br>123:19, 128:17,<br>128:19, 129:14,<br>131:20, 137:1,<br>144:17, 165:12,<br>185:1, 225:2,<br>227:20, 238:14,<br>257:13, 258:5,<br>258:12<br><b>turning</b><br>89:19, 239:6,<br>257:5<br><b>twice</b><br>9:12, 122:6<br><b>two</b><br>9:19, 10:3,<br>11:21, 12:2,<br>12:3, 16:9,<br>24:9, 36:9,<br>38:22, 41:11,<br>48:2, 67:3,<br>69:21, 72:19,<br>73:20, 95:6,<br>107:21, 108:9,<br>131:1, 159:15,<br>162:10, 172:17,<br>174:1, 176:5,<br>177:14, 232:19,<br>233:8, 233:21,<br>234:19, 243:14,<br>244:2, 244:5,<br>244:12, 252:13,<br>257:4<br><b>two-part</b><br>180:21<br><b>type</b><br>134:12, 134:14,<br>145:16, 145:17,<br>247:13<br><b>types</b><br>125:14<br><b>typical</b><br>107:8, 171:20,<br>260:11, 272:11<br><b>typically</b><br>14:20, 80:3, | 80:5, 80:22,<br>107:20, 107:22,<br>108:8, 172:3,<br>224:1, 254:17<br><b>typing</b><br>8:3<br><hr/> <b>U</b><br><hr/> <b>uemura"</b><br>245:13<br><b>uemura's</b><br>147:1, 167:1,<br>179:10, 180:2,<br>181:2, 181:7,<br>183:7, 184:4,<br>194:17, 199:3,<br>215:16, 215:20,<br>216:2, 218:12,<br>221:19, 229:5,<br>230:2, 239:22,<br>251:5, 251:14,<br>256:4<br><b>unclear</b><br>7:21<br><b>under</b><br>8:19, 10:20,<br>12:20, 13:21,<br>17:15, 25:8,<br>54:14, 123:1,<br>123:13, 124:13,<br>127:11, 144:22,<br>145:7, 145:22,<br>147:1, 147:14,<br>176:13, 183:1,<br>190:13, 196:5,<br>196:11, 196:20,<br>197:10, 200:14,<br>212:2, 220:19<br><b>undergo</b><br>51:4, 102:5<br><b>underscore</b><br>86:8<br><b>understand</b><br>8:19, 10:9,<br>10:19, 25:1,<br>29:12, 29:14,<br>31:13, 49:19,<br>70:6, 86:13, | 91:3, 91:4,<br>91:11, 91:17,<br>92:3, 92:15,<br>98:8, 112:18,<br>112:19, 118:1,<br>120:4, 126:21,<br>131:10, 131:14,<br>133:10, 133:13,<br>146:14, 154:6,<br>156:18, 162:6,<br>164:13, 173:3,<br>184:6, 189:16,<br>190:15, 191:15,<br>193:8, 194:6,<br>198:14, 212:8,<br>216:5, 217:13,<br>217:19, 218:2,<br>226:6, 235:13,<br>235:16, 239:21,<br>250:12, 251:11,<br>251:12, 261:21,<br>271:1<br><b>understanding</b><br>95:19, 107:22,<br>116:19, 123:8,<br>196:5, 196:12,<br>196:21, 197:10,<br>198:4, 215:11,<br>220:5, 220:20,<br>229:2, 273:2<br><b>understood</b><br>7:19, 47:2,<br>47:4, 51:3,<br>64:21, 65:11,<br>69:20, 82:20,<br>102:3<br><b>undue</b><br>239:8, 239:18,<br>240:3<br><b>unforeseen</b><br>98:1, 98:18,<br>99:13<br><b>unintelligible</b><br>279:4<br><b>unit</b><br>84:12, 84:13,<br>84:15, 84:16,<br>87:5, 121:4, | 121:5, 121:7,<br>121:8, 138:9<br><b>united</b><br>1:1, 6:6<br><b>university</b><br>143:20<br><b>unknown</b><br>142:6<br><b>unless</b><br>8:17, 191:10<br><b>unnecessary</b><br>54:13<br><b>unstable</b><br>144:21, 145:6,<br>145:12, 145:22,<br>146:5, 147:1,<br>147:14<br><b>until</b><br>8:6, 16:21,<br>17:7, 17:15,<br>17:17, 18:8,<br>18:10, 18:15,<br>19:12, 20:6,<br>20:12, 22:11,<br>22:18, 23:4,<br>23:20, 25:16,<br>27:1, 27:22,<br>30:16, 49:3,<br>189:18, 190:17,<br>191:17, 193:8,<br>195:10<br><b>upper</b><br>58:10, 58:15,<br>62:19, 62:21<br><b>use</b><br>14:20, 15:1,<br>16:19, 17:4,<br>24:17, 30:9,<br>31:8, 31:10,<br>31:15, 32:4,<br>33:15, 34:12,<br>34:18, 35:4,<br>39:3, 42:19,<br>43:10, 43:15,<br>56:7, 94:19,<br>100:15, 133:14,<br>162:12, 166:20,<br>166:22, 169:2, |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170:4, 171:20,<br>176:7, 176:9,<br>177:18, 181:4,<br>183:9, 202:2,<br>226:22, 227:16,<br>228:5, 228:7,<br>228:19, 229:15,<br>230:3, 240:19,<br>240:21, 243:7,<br>245:18, 266:1,<br>272:11, 274:7,<br>275:10, 276:9<br><b>used"</b><br>88:20<br><b>uses</b><br>95:1, 147:12,<br>147:19, 221:10,<br>272:1<br><b>using</b><br>18:6, 30:3,<br>33:10, 41:9,<br>47:6, 61:8,<br>61:15, 62:10,<br>63:3, 63:16,<br>64:4, 64:21,<br>65:11, 79:2,<br>80:14, 80:18,<br>81:8, 82:2,<br>82:7, 82:13,<br>83:4, 83:10,<br>83:16, 84:6,<br>84:22, 93:11,<br>93:18, 94:4,<br>94:16, 94:17,<br>97:22, 98:5,<br>98:17, 99:12,<br>105:19, 111:22,<br>115:13, 128:12,<br>149:4, 149:5,<br>162:2, 168:5,<br>169:15, 171:13,<br>173:17, 185:19,<br>195:1, 196:10,<br>213:22, 214:7,<br>214:11, 227:18,<br>229:17, 239:22,<br>240:1, 265:17,<br>273:22, 274:12 | <b>utilization</b><br>53:7<br><b>utilized</b><br>124:9<br><hr/> <b>v</b> <hr/> <b>vague</b><br>34:3<br><b>valid</b><br>194:4<br><b>value</b><br>40:17, 41:19,<br>41:20, 48:5,<br>48:14, 49:5,<br>49:6, 49:9,<br>55:12, 55:16,<br>59:12, 59:14,<br>63:10, 138:2,<br>138:11, 138:15,<br>138:18, 139:11,<br>139:21, 140:13,<br>142:6, 166:2,<br>168:4, 171:21,<br>175:22, 176:20,<br>177:3, 177:8,<br>177:16, 181:14,<br>182:5, 183:10,<br>222:22, 275:19<br><b>values</b><br>128:11, 169:15,<br>183:18, 184:11,<br>220:21, 222:7<br><b>vanderbilt</b><br>3:5<br><b>vapor</b><br>261:1<br><b>vapor-grows</b><br>260:9<br><b>vapor-phase-grown</b><br>258:15, 260:10,<br>260:20, 261:1,<br>262:8<br><b>vapor-phase-grow-</b><br><b>th</b><br>259:21<br><b>variable</b><br>74:14<br><b>varied</b><br>27:13, 36:18, | 159:3, 162:14<br><b>various</b><br>57:5, 57:9,<br>78:20, 79:3,<br>179:4, 228:2,<br>277:20<br><b>verbatim</b><br>52:1<br><b>verifying</b><br>106:17<br><b>versions</b><br>179:4<br><b>versus</b><br>159:18, 195:17,<br>201:10<br><b>via</b><br>3:15<br><b>video</b><br>6:9, 6:10, 6:11<br><b>videographer</b><br>3:23, 6:2,<br>6:10, 7:1,<br>54:22, 55:4,<br>89:8, 89:12,<br>143:6, 143:9,<br>184:14, 184:17,<br>206:3, 206:6,<br>239:1, 239:4,<br>244:15, 244:18,<br>266:8, 266:11,<br>266:22, 267:3,<br>279:21, 280:4<br><b>videotaped</b><br>1:13, 2:10, 6:3<br><b>view</b><br>117:14, 148:5,<br>148:6, 164:1<br><b>views</b><br>276:3, 276:10<br><b>voice</b><br>6:14<br><b>voiced</b><br>206:16<br><b>volt</b><br>44:11, 44:12,<br>49:5, 49:6,<br>50:18, 51:2,<br>53:10, 65:22, | 66:8, 95:8,<br>95:13, 99:18,<br>100:7, 102:4,<br>102:10, 102:13,<br>103:7, 103:11,<br>103:12, 103:15,<br>105:4, 105:6,<br>106:4, 125:16,<br>128:7, 133:4,<br>139:14, 141:8,<br>146:11, 147:18,<br>150:14, 152:13,<br>153:19, 162:15,<br>169:10, 170:1,<br>170:4, 174:12,<br>175:7, 186:11,<br>198:10, 199:10,<br>200:9, 202:6,<br>202:7, 202:19,<br>222:3, 224:11,<br>260:12, 260:20,<br>262:10, 268:20,<br>274:2, 274:14<br><b>voltage"</b><br>39:19, 46:20,<br>66:3, 66:9<br><b>voltages</b><br>78:20, 79:3,<br>100:16, 104:13,<br>104:20, 152:19,<br>153:5, 159:18,<br>160:11, 163:17<br><b>volting</b><br>16:20, 17:5<br><b>voltometry</b><br>173:18<br><b>volts"</b><br>129:5, 132:17,<br>168:17, 173:20<br><b>vs</b><br>6:5, 11:7<br><hr/> <b>W</b> <hr/> <b>w0</b><br>98:5, 98:8<br><b>wait</b><br>8:6, 89:20,<br>96:11, 242:14, |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 268:17<br><b>waned</b><br>102:21<br><b>want</b><br>35:3, 35:8,<br>54:11, 75:22,<br>82:17, 117:16,<br>148:17, 178:9,<br>191:10, 200:12,<br>205:19, 205:20,<br>207:3, 207:4,<br>207:7, 209:1,<br>209:2, 238:18,<br>238:21, 249:10<br><b>wanted</b><br>132:5<br><b>wasting</b><br>117:17, 118:17<br><b>way</b><br>47:7, 64:21,<br>65:11, 81:1,<br>81:17, 84:18,<br>120:7, 162:15,<br>163:4, 164:19,<br>182:15, 187:19,<br>276:4, 276:10,<br>278:10, 281:21<br><b>ways</b><br>65:1<br><b>we'll</b><br>8:16, 266:17<br><b>we're</b><br>53:16, 55:5,<br>64:12, 89:13,<br>92:7, 117:22,<br>139:14, 143:10,<br>156:20, 184:18,<br>206:7, 239:5,<br>242:15, 244:19,<br>257:8, 257:15,<br>266:12, 266:16,<br>267:4<br><b>we've</b><br>90:10, 142:20<br><b>week</b><br>9:12<br><b>weeks</b><br>9:13, 9:15 | <b>weight</b><br>181:11<br><b>welcome</b><br>117:21, 267:7<br><b>well-studied</b><br>50:20<br><b>whenever</b><br>143:2<br><b>whereas</b><br>102:1<br><b>whether</b><br>36:1, 64:3,<br>108:14, 109:3,<br>111:13, 112:14,<br>112:21, 153:15,<br>154:19, 155:17,<br>156:8, 159:7,<br>175:2, 189:6,<br>189:10, 219:22,<br>234:4, 234:13,<br>255:18, 256:8,<br>267:10, 267:19,<br>270:13, 272:15,<br>275:15, 276:15,<br>277:5<br><b>whole</b><br>16:13, 91:7,<br>115:12, 192:1,<br>226:4, 259:10<br><b>wholly</b><br>98:1, 98:18,<br>99:13<br><b>withdraw</b><br>188:15, 211:8,<br>269:3<br><b>within</b><br>27:7, 171:1,<br>225:13, 225:16,<br>225:18, 226:1,<br>231:8, 232:5,<br>235:17, 281:4<br><b>without</b><br>19:20, 26:10,<br>53:10, 64:22,<br>65:12, 103:8,<br>105:4, 119:14,<br>142:9, 142:12,<br>154:8, 159:7, | 192:18, 203:20,<br>222:11, 223:16,<br>268:21<br><b>witness</b><br>2:11, 4:6, 7:4,<br>13:12, 54:6,<br>54:9, 54:12,<br>54:19, 117:9,<br>117:10, 117:14,<br>186:15, 191:4,<br>191:11, 216:21,<br>217:8, 266:14,<br>279:11, 281:6,<br>281:10<br><b>witness's</b><br>54:7<br><b>wo</b><br>99:17<br><b>wondering</b><br>238:18<br><b>word</b><br>116:5, 116:12,<br>118:20, 119:15,<br>121:13, 131:6,<br>131:12, 133:19,<br>276:9<br><b>words</b><br>28:3, 227:12,<br>232:14, 233:9,<br>233:22, 236:10<br><b>work</b><br>11:14, 11:15,<br>144:3, 278:22<br><b>working</b><br>143:17, 143:19,<br>144:5, 147:7,<br>213:7, 213:12,<br>213:16, 214:6<br><b>wouldn't</b><br>133:5, 278:19<br><b>write</b><br>142:17, 192:4<br><b>written</b><br>26:2, 35:18,<br>92:20, 168:20,<br>169:19, 173:21,<br>194:17, 262:7<br><b>wrong</b><br>41:6, 78:9, | 133:2, 218:13,<br>218:14, 226:5<br><hr/> <b>x</b><br><hr/> <b>x</b><br>138:2<br><b>xrd</b><br>164:8<br><hr/> <b>y</b><br><hr/> <b>yan</b><br>1:14, 2:1,<br>2:10, 4:6, 4:15,<br>5:7, 6:4, 7:5,<br>10:12, 281:5,<br>281:15<br><b>yao's</b><br>86:5<br><b>yeah</b><br>9:10, 10:2,<br>10:5, 29:21,<br>32:1, 33:14,<br>35:10, 39:9,<br>47:8, 47:20,<br>52:5, 59:10,<br>60:2, 71:2,<br>80:16, 91:14,<br>92:15, 95:5,<br>99:7, 108:7,<br>113:12, 114:12,<br>114:14, 136:2,<br>137:17, 141:19,<br>146:8, 151:12,<br>154:12, 156:14,<br>158:18, 159:12,<br>161:10, 163:14,<br>164:12, 168:9,<br>169:9, 170:20,<br>171:16, 173:4,<br>176:21, 178:12,<br>180:21, 183:5,<br>187:1, 207:15,<br>214:11, 220:11,<br>223:14, 224:1,<br>233:10, 238:8,<br>250:15, 259:19,<br>268:10, 272:7<br><b>year</b><br>211:6, 211:13, |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 212:7, 212:9,<br>212:12<br><b>years</b><br>143:22, 212:11,<br>273:10, 279:1<br><b>yellow</b><br>236:9<br><b>yi</b><br>3:18<br><b>york</b><br>3:6, 3:12<br><b>yourself</b><br>76:1, 256:17,<br>270:6                                                                                              | 153:17, 155:21,<br>159:2<br><b>0.5</b><br>165:20, 168:14,<br>185:9<br><b>00</b><br>184:16<br><b>0009</b><br>126:18<br><b>01141615.7</b><br>86:4<br><b>01183</b><br>1:10, 6:7<br><b>02</b><br>89:11, 89:13<br><b>04</b><br>55:1, 55:2                                                                                                                                                                                                             | 281:16<br><b>100</b><br>122:6, 122:9<br><b>1000</b><br>2:17, 6:12<br><b>1001</b><br>32:1, 32:2,<br>75:18, 90:6<br><b>10017</b><br>3:6<br><b>10022</b><br>3:12<br><b>1003</b><br>60:5<br><b>1004</b><br>97:10<br><b>1005</b><br>99:22, 257:7,<br>257:14<br><b>1008</b><br>104:3, 104:5<br><b>102</b><br>221:14, 222:8,<br>260:14, 261:5<br><b>103</b><br>135:1, 135:6<br><b>1036</b><br>4:15, 13:9,<br>13:11, 38:16,<br>85:7, 85:9,<br>86:6, 131:22,<br>270:1, 270:21,<br>279:14, 279:16<br><b>1037</b><br>4:19, 38:15,<br>64:12<br><b>1038</b><br>4:21, 64:13,<br>64:14, 85:22<br><b>1039</b><br>5:4, 85:22,<br>86:1<br><b>104</b><br>125:13<br><b>1040</b><br>5:6, 157:12,<br>157:16, 157:17<br><b>105</b><br>100:22, 138:1, | 214:3<br><b>106</b><br>99:21<br><b>109</b><br>138:21, 139:13,<br>140:11<br><b>11</b><br>55:1, 55:2,<br>55:3, 55:5,<br>282:1<br><b>110</b><br>122:7, 122:14<br><b>111</b><br>10:16<br><b>114</b><br>121:20, 122:2,<br>227:7<br><b>117</b><br>23:9, 23:11,<br>116:1, 185:2,<br>185:7<br><b>119</b><br>23:10, 116:2,<br>190:2<br><b>12</b><br>5:8, 13:18,<br>89:9, 89:10,<br>97:12, 250:10<br><b>120</b><br>125:2, 140:6,<br>140:9, 140:16,<br>197:14, 198:18<br><b>123</b><br>203:14<br><b>125</b><br>225:2<br><b>126</b><br>230:6, 230:9,<br>230:10<br><b>127</b><br>232:9, 233:20<br><b>13</b><br>143:22, 279:1<br><b>130</b><br>64:12, 85:7,<br>221:8, 221:9<br><b>132</b><br>184:5 |
| <b>z</b>                                                                                                                                                                                                                                                                                         | <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>zach</b><br>3:23, 6:10<br><b>zero</b><br>260:20<br><b>zhou</b><br>3:15, 6:22<br><b>zoom</b><br>3:15, 9:12                                                                                                                                                                                     | 47:17, 47:22,<br>89:11, 89:13,<br>93:13, 272:1,<br>272:2<br><b>1.0</b><br>91:21<br><b>1.1</b><br>225:18<br><b>1.3</b><br>225:11, 225:13<br><b>1.5</b><br>225:16, 230:14,<br>231:6, 231:8,<br>232:5<br><b>1.6</b><br>263:19, 264:13,<br>264:21, 265:9<br><b>10</b><br>2:14, 5:7,<br>64:18, 66:6,<br>106:21, 107:5,<br>114:16, 167:17,<br>167:21, 168:5,<br>171:17, 222:12,<br>222:15, 243:4,<br>244:7, 249:2,<br>271:16, 271:20,<br>280:5, 280:6, |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>.002</b><br>245:20, 246:9<br><b>.1</b><br>154:4, 198:13,<br>260:12, 262:10<br><b>.2</b><br>260:12, 262:10<br><b>.3767</b><br>282:11, 282:12<br><b>.44</b><br>245:16, 245:17<br><b>.5</b><br>139:2, 139:5,<br>139:14, 140:12,<br>185:19, 190:8,<br>213:19, 222:2<br><b>.8</b><br>213:19, 256:4 |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>0</b>                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>0.1</b><br>150:22, 151:17,                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>133</b><br/>184:5<br/><b>134</b><br/>166:18<br/><b>136</b><br/>179:9, 181:6,<br/>182:14<br/><b>137</b><br/>139:5, 140:10,<br/>180:18, 181:16,<br/>182:14, 183:8<br/><b>14</b><br/>13:10, 13:15,<br/>14:2, 14:4,<br/>64:19<br/><b>140</b><br/>124:7, 125:2,<br/>140:6, 140:9,<br/>140:16<br/><b>142</b><br/>236:4<br/><b>144</b><br/>215:9, 238:14,<br/>239:6<br/><b>147</b><br/>240:8, 245:4,<br/>245:12, 246:11,<br/>248:14<br/><b>148</b><br/>243:18<br/><b>149</b><br/>252:8, 256:12<br/><b>15</b><br/>55:3, 55:5,<br/>149:12, 149:18,<br/>155:4, 266:16,<br/>266:18, 270:4,<br/>270:8, 270:21,<br/>271:8, 271:12,<br/>271:20<br/><b>150</b><br/>250:7, 251:4<br/><b>151</b><br/>251:6, 251:10<br/><b>153</b><br/>213:17<br/><b>157</b><br/>5:6</p> | <p><b>16</b><br/>89:9, 89:10,<br/>229:15, 272:3<br/><b>165</b><br/>183:22<br/><b>166</b><br/>183:22<br/><b>17</b><br/>179:11, 180:6,<br/>181:22, 183:10,<br/>240:11, 240:16,<br/>243:4, 244:7<br/><b>170</b><br/>126:17, 178:16<br/><b>171</b><br/>181:9<br/><b>172</b><br/>219:19<br/><b>173</b><br/>219:18, 220:1<br/><b>177</b><br/>126:16, 126:17<br/><b>179</b><br/>226:21<br/><b>18</b><br/>19:17, 37:12,<br/>37:13, 38:6,<br/>38:18, 39:3,<br/>39:10, 160:13,<br/>163:19, 263:10,<br/>263:15, 265:6<br/><b>180</b><br/>167:1, 181:4,<br/>183:9, 183:16,<br/>184:10, 220:15<br/><b>188</b><br/>257:5, 257:8,<br/>257:11, 258:6,<br/>258:17<br/><b>19</b><br/>264:3, 272:1<br/><b>190</b><br/>178:11<br/><b>192</b><br/>162:5<br/><b>193</b><br/>259:18, 260:2,<br/>260:9, 260:13,</p> | <p>260:22, 261:4,<br/>261:6, 262:7,<br/>262:20<br/><b>194</b><br/>259:19, 260:2<br/><b>197</b><br/>259:19, 260:3<br/><b>199</b><br/>190:2<br/><b>1990</b><br/>155:6<br/><b>1991</b><br/>273:8<br/><b>1996</b><br/>165:8, 169:21,<br/>175:9<br/><b>1:</b><br/>57:7, 57:13<br/><b>1:-</b><br/>57:7<br/><b>1b</b><br/>164:8<br/><hr/><b>2</b><br/><hr/><b>2</b><br/>98:6, 143:7,<br/>143:8, 143:10<br/><b>2.0</b><br/>185:11, 222:3<br/><b>2.1</b><br/>86:11, 86:19<br/><b>2.2</b><br/>150:20<br/><b>2.5</b><br/>91:21, 225:13,<br/>225:16, 225:19,<br/>226:1, 231:9<br/><b>20</b><br/>15:3, 19:17,<br/>50:6, 115:9<br/><b>200</b><br/>168:15, 169:1,<br/>169:6, 169:14,<br/>171:12, 172:20,<br/>173:7<br/><b>2000</b><br/>143:12, 158:3<br/><b>200041</b><br/>3:19</p> | <p><b>2001</b><br/>5:6, 101:7,<br/>101:18, 144:8,<br/>144:14, 157:7,<br/>157:12, 158:4,<br/>161:20<br/><b>2003</b><br/>143:15<br/><b>2006</b><br/>5:7, 10:14,<br/>38:20, 39:16<br/><b>2009</b><br/>165:6<br/><b>2010</b><br/>21:13, 120:12,<br/>143:20, 144:3,<br/>144:6<br/><b>2012</b><br/>144:5<br/><b>2013</b><br/>13:10<br/><b>2017</b><br/>149:17, 157:1,<br/>161:11<br/><b>202</b><br/>128:1<br/><b>2022</b><br/>5:8, 12:11,<br/>12:12, 13:6,<br/>17:13, 18:5,<br/>19:17, 25:18,<br/>26:7, 26:22,<br/>37:11, 37:13,<br/>38:18, 39:3,<br/>39:10, 56:5,<br/>56:6, 57:17,<br/>59:18, 62:2,<br/>112:7, 116:18,<br/>128:19, 137:2,<br/>192:7, 192:10,<br/>194:8<br/><b>2023</b><br/>1:10, 6:7,<br/>12:14, 13:16,<br/>14:2, 14:5<br/><b>2024</b><br/>1:15, 2:13,<br/>6:8, 281:15,</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 282:2<br><b>203</b><br>111:19<br><b>206</b><br>99:21<br><b>20850</b><br>282:10<br><b>21</b><br>3:21<br><b>212</b><br>3:7<br><b>21665</b><br>98:5, 98:9,<br>99:17<br><b>2174</b><br>3:21<br><b>22</b><br>19:17, 60:8,<br>272:7<br><b>2298</b><br>2:15<br><b>23</b><br>12:13, 60:9,<br>272:8<br><b>24</b><br>60:9, 160:14,<br>163:19<br><b>248</b><br>124:5<br><b>25</b><br>12:17, 104:12,<br>172:4, 271:16<br><b>254</b><br>97:14<br><b>26</b><br>57:16, 58:2,<br>65:21, 66:6,<br>282:6<br><b>267</b><br>4:8<br><b>27</b><br>56:2, 56:7,<br>56:12, 57:5,<br>59:10, 77:18,<br>147:4, 206:4,<br>206:5<br><b>270</b><br>166:13, 166:21, | 167:5, 167:7,<br>167:16, 168:3,<br>169:13, 170:1,<br>170:3, 170:16,<br>171:7, 171:10,<br>172:20, 173:6,<br>176:10, 177:18,<br>179:15, 180:1,<br>180:7, 180:13,<br>181:19, 182:17,<br>183:9<br><b>279</b><br>4:9<br><b>28</b><br>65:21, 66:6,<br>143:7, 143:8,<br>272:1, 282:6<br><b>281</b><br>4:11<br><b>282</b><br>1:21<br><b>285</b><br>170:8, 171:5<br><b>288</b><br>3:18<br><b>29</b><br>59:18, 60:12,<br>62:4, 227:20,<br>228:8, 271:20<br><b>298</b><br>282:5<br><b>2:3</b><br>93:13<br><b>2nd</b><br>158:4<br><hr/> <b>3</b><br><hr/> <b>3</b><br>165:21, 183:17,<br>184:15, 184:16,<br>223:22<br><b>3.4</b><br>165:14<br><b>3.5</b><br>151:1, 151:9,<br>151:18, 153:18,<br>154:22, 155:22,<br>159:3 | <b>30</b><br>3:21, 111:19,<br>175:15, 228:10<br><b>31</b><br>120:16, 175:16,<br>217:11, 264:3<br><b>32</b><br>17:14, 18:5,<br>19:11, 21:20,<br>104:15, 120:16,<br>266:9<br><b>3210</b><br>3:21<br><b>33</b><br>19:16, 25:18,<br>26:6, 30:6,<br>31:3, 77:18,<br>97:13, 192:8,<br>192:16, 193:6,<br>194:8, 230:7,<br>230:12, 231:3,<br>231:11, 231:16,<br>231:20, 232:1,<br>232:10, 232:17,<br>234:14, 235:1,<br>235:8, 235:14,<br>235:21, 236:19,<br>266:10<br><b>330</b><br>246:6<br><b>34</b><br>78:17, 239:2,<br>239:3<br><b>35</b><br>222:15<br><b>3578</b><br>86:8<br><b>36</b><br>183:8<br><b>37</b><br>77:18, 78:17,<br>104:16<br><b>38</b><br>4:18<br><b>3rd</b><br>158:3<br><hr/> <b>4</b><br><hr/> <b>4</b><br>184:16, 206:4, | 206:5, 206:7,<br>244:11, 272:2<br><b>4.1</b><br>170:3<br><b>4.25</b><br>130:10<br><b>4.3</b><br>103:12, 115:14,<br>165:14, 168:16,<br>169:3, 169:10,<br>169:16, 175:12,<br>175:21, 185:11,<br>185:16, 185:21,<br>186:2, 186:4,<br>186:8, 186:11,<br>189:7, 190:6,<br>196:4, 196:10,<br>196:19, 197:9,<br>198:10, 199:3,<br>199:4, 199:10,<br>199:16, 199:21,<br>200:2, 200:8,<br>201:4, 202:6,<br>202:7, 202:8,<br>202:19, 222:3<br><b>4.4</b><br>173:20, 174:3,<br>174:10, 174:12,<br>174:15<br><b>4.45</b><br>77:21<br><b>4.5</b><br>104:14, 149:21,<br>152:20, 153:5,<br>158:10, 159:18,<br>160:11, 162:15,<br>163:17<br><b>4.6</b><br>77:21<br><b>4.8</b><br>77:22<br><b>4.9</b><br>104:14<br><b>40</b><br>123:22, 143:8,<br>143:10, 206:5,<br>206:7<br><b>400</b><br>111:4, 224:20, |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>282:9<br/><b>41</b><br/>76:2, 116:21,<br/>120:1, 266:10,<br/>266:12<br/><b>42</b><br/>123:20, 267:1,<br/>267:2<br/><b>43</b><br/>3:18, 239:3,<br/>239:5, 272:2<br/><b>430</b><br/>246:6<br/><b>44</b><br/>72:5, 123:20,<br/>123:22, 184:15,<br/>184:16<br/><b>45</b><br/>75:17, 75:20,<br/>76:3, 76:6,<br/>77:1, 120:3,<br/>272:3<br/><b>451</b><br/>282:8<br/><b>46</b><br/>57:7, 57:12<br/><b>47</b><br/>76:3, 128:20<br/><b>48</b><br/>272:3<br/><b>49</b><br/>1:16, 2:14,<br/>6:9, 38:20,<br/>39:16, 57:7,<br/>57:12, 281:16<br/><b>4972</b><br/>3:13</p> <hr/> <p><b>5</b></p> <hr/> <p><b>5</b><br/>44:16, 44:21,<br/>45:12, 46:5,<br/>239:2, 239:3,<br/>239:5, 244:16,<br/>244:17, 244:19<br/><b>5.0</b><br/>77:22, 150:14<br/><b>5.2</b><br/>77:22, 151:1,</p> | <p>151:9, 151:13,<br/>151:18, 152:2,<br/>152:8, 152:13,<br/>153:18, 155:1,<br/>155:22, 159:3,<br/>163:4, 164:20<br/><b>5.4</b><br/>77:22<br/><b>5.6</b><br/>77:22, 78:1<br/><b>5.8</b><br/>78:1, 90:14,<br/>95:8, 95:21<br/><b>50</b><br/>15:3, 15:13,<br/>75:17, 75:20,<br/>76:2, 76:3,<br/>77:1, 122:10,<br/>125:3, 140:7,<br/>140:11, 141:8,<br/>141:9, 196:4,<br/>196:6<br/><b>500</b><br/>106:21, 107:4,<br/>107:13, 166:5,<br/>250:9<br/><b>51</b><br/>50:6, 66:14,<br/>66:15, 66:19,<br/>96:10, 244:16,<br/>244:17, 272:3<br/><b>52</b><br/>50:6, 102:1<br/><b>53</b><br/>137:3, 137:9,<br/>228:8, 244:17,<br/>244:19, 267:2,<br/>267:4, 272:2<br/><b>54</b><br/>102:15, 102:17,<br/>271:20<br/><b>548258</b><br/>1:20<br/><b>55</b><br/>57:7, 57:13,<br/>104:13, 122:10,<br/>185:3<br/><b>559</b><br/>60:18</p> | <p><b>56</b><br/>194:18<br/><b>57</b><br/>194:18<br/><b>58</b><br/>52:17, 52:20<br/><b>59</b><br/>53:4, 268:11,<br/>268:15, 268:16,<br/>269:2, 269:5,<br/>269:11</p> <hr/> <p><b>6</b></p> <hr/> <p><b>6</b><br/>145:1, 266:9,<br/>266:10, 266:12,<br/>267:1, 267:2,<br/>267:4<br/><b>60</b><br/>47:17, 47:21,<br/>48:1, 185:12,<br/>222:4<br/><b>61</b><br/>52:17, 52:20,<br/>271:15<br/><b>63</b><br/>57:7, 57:13<br/><b>64</b><br/>4:22, 93:13,<br/>144:17, 144:20,<br/>147:5, 190:7,<br/>194:19, 272:2<br/><b>646</b><br/>3:13<br/><b>6494</b><br/>3:7<br/><b>65</b><br/>124:21, 149:9,<br/>149:13, 165:1<br/><b>658</b><br/>3:13<br/><b>66</b><br/>140:1<br/><b>67</b><br/>124:22, 140:1,<br/>175:8, 175:15,<br/>180:22, 272:2<br/><b>6700</b><br/>2:18, 6:13</p> | <p><b>686</b><br/>282:7<br/><b>69</b><br/>242:3, 243:1,<br/>243:9</p> <hr/> <p><b>7</b></p> <hr/> <p><b>7</b><br/>2:14, 246:2,<br/>280:5, 280:6,<br/>281:16<br/><b>7,749,641</b><br/>1:11, 32:2<br/><b>71</b><br/>226:21, 242:3,<br/>243:1, 243:22<br/><b>72</b><br/>243:9<br/><b>73</b><br/>243:9<br/><b>74</b><br/>3:21, 111:19,<br/>112:8, 221:20<br/><b>75</b><br/>100:20<br/><b>77</b><br/>104:7, 104:10,<br/>106:14, 221:13<br/><b>78</b><br/>100:21, 105:8,<br/>105:16, 109:10,<br/>257:10, 257:13,<br/>257:18, 258:12,<br/>258:20, 259:6,<br/>259:14, 260:4,<br/>260:15, 261:8,<br/>261:11, 261:17,<br/>262:3, 262:9,<br/>262:14, 262:21,<br/>263:3<br/><b>79</b><br/>221:20<br/><b>7:1</b><br/>272:2</p> <hr/> <p><b>8</b></p> <hr/> <p><b>8</b><br/>107:1, 272:3</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                               |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p><b>800</b><br/>3:11<br/><b>801</b><br/>3:7<br/><b>81</b><br/>185:7, 221:14,<br/>221:16, 221:22<br/><b>817028</b><br/>97:12<br/><b>82</b><br/>68:2<br/><b>83</b><br/>67:14, 67:20<br/><b>84</b><br/>69:8, 69:12,<br/>70:8, 169:20,<br/>170:14<br/><b>86</b><br/>3:21, 5:5,<br/>24:8, 24:13,<br/>72:15, 72:18,<br/>73:11, 179:16<br/><b>87</b><br/>181:8, 181:13<br/><b>88</b><br/>181:13, 182:4<br/><b>888.433</b><br/>282:11<br/><b>888.503</b><br/>282:12<br/><b>89</b><br/>182:4<br/><b>8th</b><br/>6:8</p> <hr/> <p style="text-align: center;"><b>9</b></p> <hr/> <p><b>9</b><br/>1:16, 2:14,<br/>6:9, 157:2,<br/>247:7, 271:15,<br/>272:3, 272:7,<br/>281:16<br/><b>900</b><br/>250:10<br/><b>91</b><br/>229:14<br/><b>92</b><br/>24:2, 71:12,</p> | <p>71:16, 74:11<br/><b>93</b><br/>98:5, 98:9,<br/>99:17<br/><b>94</b><br/>79:12, 79:15,<br/>79:16, 79:21<br/><b>95</b><br/>79:13, 79:16,<br/>79:21, 80:2,<br/>80:8<br/><b>96</b><br/>68:3<br/><b>97</b><br/>67:14, 67:20,<br/>68:11, 68:15,<br/>68:20, 69:2,<br/>89:20, 90:1,<br/>93:3, 94:8<br/><b>98</b><br/>84:9, 121:20,<br/>122:2, 229:14,<br/>258:5<br/><b>99</b><br/>260:14, 261:5</p> |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|