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Transcript of P. Morgan Pattison, Ph.D.

Date: August 20, 2025

Case: Samsung Display Co., Ltd. -v- Pictiva Displays International Ltd. (PTAB)

Planet Depos

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1 UNITED STATES PATENT AND TRADEMARK OFFICE

2
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4
5 SAMSUNG DISPLAY CO., LTD.,

6 Petitioner,

7 v.

8 PICTIVA DISPLAYS INTERNATIONAL LTD.,

9 Patent Owner.

10
11 Case IPR2024-01187

12 U.S. Patent No. 9,257,492

13
14 Deposition of P. MORGAN PATTISON, PH.D.

15 Conducted Virtually

16 Wednesday, August, 20, 2025

17 9:33 a.m. EDT

18
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20 Pages: 1 - 110

21 Stenographically reported by: Judith E. Bellinger,

22 RPR, CRR, CSR-TX CCR-WA, CCR-NM

1 Deposition of P. MORGAN PATTISON, PH.D.,
2 conducted virtually.

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 Pursuant to notice, before Judith E.
Bellinger, Registered Professional Reporter,
Certified Realtime Reporter, and E-Notary Public
in and for the State of Maryland.

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C O N T E N T S

EXAMINATION OF P. MORGAN PATTISON, PH.D.	PAGE
By Mr. Frisch	5
By Mr. Warrick	106

E X H I B I T S

(Attached to the transcript)

Exhibits:	PAGE
Tab 9 Patent Owner Response	101
Exhibit 1001 United States Patent Number 9,257,492 B2	51
Exhibit 1008 United States Patent Number 5,691,877	83
Exhibit 2001 Declaration of P. Morgan Pattison, Ph.D.	11
Exhibit 2005 Supplemental Declaration of P. Morgan Pattison, Ph.D.	15

1 P R O C E E D I N G S

2

3 P. MORGAN PATTISON, PH.D.,

4 being first duly sworn, was examined
5 and testified as follows:

6 EXAMINATION BY COUNSEL FOR THE PETITIONER

7 BY MR. FRISCH:

8 Q Good morning, Dr. Pattison.

9 A Good morning.

10 Q Can you, please, state your full name
11 for the record.

12 A Sure. Paul Morgan Pattison.

13 Q You've been deposed before, correct?

14 A I have.

15 Q Approximately, how many times?

16 A About a dozen, I'd say.

17 Q When was the last time?

18 A Two or three weeks ago.

19 Q And I know you've been deposed a number
20 of times, but let's lay out some ground rules that
21 will just help us today.

22 During the deposition, I'll be asking

1 questions. If you don't understand one of my
2 questions, can you, please, let me know and I'll
3 try and clarify; otherwise, I'm going to assume
4 you understood my question.

5 Is that fair?

6 A Yes.

7 Q I'll try to take breaks today
8 periodically. But if you need a break, just let
9 me know. All that I ask is that you answer any
10 pending questions before we take a break, okay?

11 A Okay.

12 Q We're taking this deposition remotely,
13 as you know. You understand, however, that this
14 deposition will be treated as if it were in an
15 in-person proceeding, correct?

16 A Yes.

17 Q Where are you taking the deposition
18 from today?

19 A Ringgold, Georgia.

20 Q Is that your home?

21 A Yes.

22 Q Is there anyone else there with you

1 today?

2 A Not in my office.

3 Q Do you have any communication utilities
4 open on your computer, aside from the Zoom
5 platform that we're using?

6 A I do not.

7 Q Do you have any folders saved on your
8 computer with documents for the deposition today?

9 A I do.

10 Q And which documents do you have
11 specifically for today's deposition?

12 A Well, I have folders and I have hard
13 copies on my desk. So I have the Hanamura patent,
14 my declarations, the decision, the Egitto patent,
15 the Ingle patent. Let's see. The Hasei patent,
16 the Thomas declaration, '492 patent, and the
17 patent owner response, and the petition for the
18 IPR.

19 Q I think I heard you mention the
20 patent owner's response, correct?

21 A Yes.

22 Q Do you have the preliminary

1 patent owner's response as well or just the
2 patent owner response?

3 A It looks like it's just the
4 patent owner response.

5 Q And are any of the documents that you
6 have with you, either hard copy or in electronic
7 form, marked up or are they all clean versions?

8 A They're all clean versions.

9 Q Okay. And I'll have copies of any
10 documents we use today put into the chat box and
11 put up on the screen, and you can use it that way,
12 if you'd like. But I'm happy for you to use the
13 hard copies as well, whatever you're most
14 comfortable with.

15 A Okay.

16 Q And during today's deposition, you
17 know, I'd ask that you not engage in any
18 communications with anyone other than through this
19 Zoom session, for example, through any other chat
20 application, okay?

21 A Okay.

22 Q And if someone does attempt to

1 communicate with you during the deposition, other
2 than through this Zoom platform, will you let me
3 know for the record?

4 A Yeah, I put my phone on airplane mode,
5 so it should not be an issue.

6 Q Great. Is there any reason you cannot
7 give true, complete, accurate, and honest
8 testimony today?

9 A No.

10 Q And you understand that you are to
11 answer questions truthfully and fully today, as if
12 you were in court, correct?

13 A Correct.

14 Q What did you do to prepare for today's
15 deposition?

16 A I had meetings with counsel, with
17 Mr. Warrick, and reviewed some of the documents.

18 Q How many meetings did you have?

19 A Maybe three, I think.

20 Q Do you know, approximately, how long,
21 in total, those meetings would have been?

22 A A few hours, maybe three; three or

1 four hours.

2 Q So that's total for all three?

3 A Yes.

4 Q And in preparation for today's
5 deposition, did you speak to anyone other than
6 counsel for Pictiva?

7 A No.

8 Q And since you submitted your
9 declarations in this proceeding, have you spoken
10 with anyone about this proceeding, besides counsel
11 for Pictiva?

12 A No.

13 Q Did you review your declarations in
14 preparation for today's deposition?

15 A I did.

16 Q Did you review the references that you
17 cited in those declarations?

18 A Some of them.

19 Q And you submitted two declarations in
20 this proceeding, correct?

21 A Correct.

22 Q Let's take a look at the first one.

1 MR. FRISCH: Mr. Welsh, if you could
2 throw tab 01 into the chat. And just for the
3 record, what's been marked as tab 01 for today's
4 deposition is a copy of Exhibit 2001.

5 PLANET DEPOS TECHNICIAN: Would you
6 like me to bring that up on screen as well?

7 MR. FRISCH: Sure. Thank you.

8 (Exhibit 2001 marked for identification
9 and attached to the transcript.)

10 Q And, Dr. Pattison, again, feel free to
11 use your own hard copy, if you'd like. But do you
12 recognize Exhibit 2001 as a copy of your
13 declaration in this proceeding?

14 A Yeah, it looks like it. I mean, if you
15 could just scroll up a little bit and see my name
16 on it, that would be good. Yes.

17 Q And as we talked about, you filed two
18 declarations, but the first is a declaration and
19 the second was a supplemental declaration, right?

20 A Correct.

21 Q And so you recognize this as your first
22 declaration, right?

1 A Yes.

2 Q And this is a declaration about U.S.
3 Patent Number 9,257,492, right?

4 A Yes.

5 Q And will you understand what I mean
6 today if I refer to U.S. Patent Number 9,257,492
7 as the '492 patent?

8 A I'll understand that.

9 Q And if we can turn to the last page of
10 the declaration, which is page 45, and I believe
11 PDF page 48. If we scroll to the bottom of that
12 page -- are you looking at a hard copy, by the
13 way, or should we give you control of the PDF?

14 A I'm looking at a hard copy.

15 Q Okay. Well, let me know if you need
16 control; otherwise, I'll assume you're going
17 through your hard copy along with me.

18 At the bottom of page 45, is that your
19 signature?

20 A Yes.

21 Q And you signed this declaration on
22 November 20th, 2024?

1 A Yes.

2 Q And you signed that in Ringgold,
3 Georgia, as well?

4 A Yes.

5 Q Is that the day you completed your
6 declaration?

7 A Yes.

8 Q How long would you say you spent
9 working on this declaration?

10 A I don't know. I don't remember.

11 Q Do you think it was more than 40 hours?

12 A I don't think so. That would be a lot
13 for one of these declarations. But it could have
14 been around that, or a little bit less.

15 Q And you understand that this
16 declaration was submitted as an exhibit in support
17 of Pictiva's preliminary patent owner response,
18 right?

19 A Yes.

20 Q And have you read Pictiva's preliminary
21 patent owner response?

22 A I have.

1 Q Did you read that prior to putting
2 together your declaration or after?

3 A I don't recall.

4 Q Did you write this declaration?

5 A Yes.

6 Q Did you write all parts of this
7 declaration yourself?

8 A No.

9 Q Who helped you, for the parts that you
10 didn't write yourself?

11 A Counsel.

12 Q And which particular parts of your
13 declaration did you not write yourself?

14 A There was a mix. I don't know specific
15 parts, but the technical parts would be mostly me,
16 and the legal background would have been me but
17 with support from -- more support from the
18 counsel.

19 Q And you're not an attorney, correct?

20 A That's correct.

21 Q So, for example, you've got a legal
22 standards section. Is that something that the

1 attorneys would have helped you with?

2 A Yes.

3 Q Let's take a look, now, for a moment,
4 at your other declaration.

5 MR. FRISCH: If we could put tab 2 into
6 the chat for everyone.

7 And tab 2, for the record, is
8 Exhibit 2005.

9 (Exhibit 2005 marked for identification
10 and attached to the transcript.)

11 Q And you have a copy of Exhibit 2005,
12 correct?

13 A If it's the supplemental declaration, I
14 do.

15 Q That's right. And if we look at the
16 first page of Exhibit 2005, that's now up on the
17 screen, it says Supplemental Declaration of Pete
18 Morgan Pattison, Ph.D., right?

19 A Yes.

20 Q And this declaration, that's
21 Exhibit 2005 was meant to supplement the
22 declaration we were just looking at, that was

1 Exhibit 2001, correct?

2 A Correct.

3 Q Now, to keep the record clear today,
4 can I call Exhibit 2001 your declaration and
5 Exhibit 2005 your supplemental declaration?

6 A Yes.

7 Q Okay. I'll use that terminology, or at
8 least I'll try to use that terminology going
9 forward. If it becomes unclear at any point, just
10 let me know.

11 So if we could turn to page 11, which
12 is PDF page 13 of your supplemental declaration.

13 Is that your signature at the end of
14 that page?

15 A Yes.

16 Q Did you sign the supplemental
17 declaration on May 28th, 2025?

18 A Yes.

19 Q You signed that in Charleston,
20 West Virginia?

21 A Yes.

22 Q And why is it that the supplemental

1 declaration was signed in Charleston,
2 West Virginia, but the original declaration signed
3 in Ringgold, Georgia?

4 A I was working in Charleston,
5 West Virginia. I was attending my niece's
6 wedding.

7 Q Okay. And do you understand that your
8 supplemental declaration was served in support of
9 Pictiva's patent owner response?

10 A Yes.

11 Q And have you read Pictiva's
12 patent owner response?

13 A Yes.

14 Q Did you read the patent owner response
15 prior to writing your supplemental declaration?

16 A Let's see. If it was the original
17 patent owner response, then it would have been
18 before. So probably, yes.

19 Q Okay. And just to be clear, there was
20 a preliminary patent owner response, and then
21 there was a patent owner response. And maybe I
22 got my question wrong. So let me re-ask the

1 question.

2 Did you read Pictiva's patent owner
3 response, so not the preliminary, but their
4 patent owner response, prior to writing your
5 supplemental declaration?

6 A I don't recall if it was before or
7 after writing my declaration.

8 Q Okay. But you have read both Pictiva's
9 preliminary patent owner response and its
10 patent owner response, right?

11 A Correct.

12 Q All right. Let's turn to the original
13 declaration, Exhibit 2001, and I want to go to
14 Exhibit A, which is on PDF page 49.

15 Do you recognize Exhibit A as a copy of
16 your CV?

17 A Yes.

18 Q And to your knowledge, is this an
19 accurate copy of your CV?

20 A Yes.

21 Q Is this up to date or is there anything
22 that you'd like to add to it?

1 A I think it's pretty much up to date. I
2 believe I've given a couple of talks, which I tend
3 to list in here, since submitting this, and I have
4 a new -- at least one new publication that would
5 have been added to the list, but it's -- yeah,
6 that would be it.

7 Q Okay. So your work experience is still
8 up to date?

9 A Yes.

10 Q And you currently work at Solid State
11 Lighting Services, Inc.?

12 A That's correct.

13 Q How would you describe the work that
14 Solid State Lighting Services, Inc. does?

15 A Technical consulting, primarily, in the
16 field of lighting and lighting technologies.

17 Q Okay. So it's a consulting business?

18 A Correct.

19 Q Have you worked exclusively in
20 consulting since November 2007?

21 A Yes. But, you know, there's a broad
22 range of activities that come under that umbrella.

1 But, yeah, it's all been consulting of one type or
2 another.

3 Q When you say "there's a broad range of
4 activities," what kind of activities are you
5 talking about?

6 A Well, you know, I have an ongoing
7 client, Department of Energy, so consulting with
8 their lighting R&D program since 2008. But then
9 I've worked with corporate clients as well,
10 sometimes, you know, at a pretty high level of
11 effort, acting as, like, head of R&D or even CTO
12 sometimes, still in, like, a consulting capacity,
13 but in -- you know, kind of temporary.

14 And then working with investors and
15 working on my own ventures as well within that
16 umbrella. So there's just kind of wide range of
17 activities that I classify as consulting, but just
18 for -- you know, they're maybe not all
19 conventionally considered consulting.

20 Q And before you started working at Solid
21 State Lighting Services, you were at the U.S.
22 Department of Energy, right?

1 A Yes, I was a project manager at the
2 DOE, working on managing lighting, R&D-funded
3 projects.

4 Q Again, that was for less than two years
5 total.

6 A Correct.

7 Q And did you actually participate in any
8 projects of the Department of Energy or did you
9 just manage the solicitation and selection of
10 projects?

11 A No, I managed the projects, as well,
12 from the DOE perspective, as the funding agency.
13 And then continued to do that, also, as a
14 consultant. So there'd be, like, you know, over
15 the course of -- since 2006, over a hundred, like
16 a couple hundred projects that the DOE has funded.
17 And on many of those, I would be, effectively, the
18 DOE representative on those, and these were
19 contracts, not grants. So, the DOE was required
20 and wanted to play an active role in the R&D
21 that's going on. So my job, as a subject matter
22 technical expert, would be to make sure the

1 projects were progressing well, that they had
2 meaningful milestones, that they were making good
3 decisions, that they're spending the money well,
4 and all of that, and that the results or the
5 activities lined up with the broader strategy from
6 the DOE. So I would say I was actively working on
7 those projects.

8 Q I guess what I'm trying to figure out
9 is if there was a particular research project, for
10 instance, that you were helping to manage, would
11 you actually be doing the research and development
12 or would you be working with the team that was
13 doing the research and development and helping to
14 make sure that they are progressing according to
15 the schedule that was laid out?

16 MR. WARRICK: Object to form.

17 A Yeah, like, as we learn in R&D, when
18 you get your Ph.D., you're not going to be the
19 hands-on person all the time, you're managing R&D.
20 That's what -- at least in my educational
21 background, that's what we were being trained for,
22 not to be, I guess, the technicians or the lab

1 engineers, but to manage broader activities, and
2 that's what I did at DOE.

3 So I wasn't dispensing the solution or
4 growing the crystals or whatever, but I was
5 evaluating the results, understanding the
6 motivation, and the potential for the approaches.
7 I did do, you know, work as a grad student,
8 specifically, performing R&D on optoelectronic
9 semiconductor devices. But with the DOE, it was
10 more of a leadership and management role and
11 higher-level strategic role, I guess.

12 Q Okay. And let's talk about the grad
13 student experience. So that was what you did
14 right before you went to the U.S. Department of
15 Energy, right?

16 A Correct.

17 Q Is it fair to say, looking at your CV,
18 that the majority of your career has been spent in
19 consulting?

20 A Yeah. Absolutely.

21 Q Let's turn to paragraph 4 of your
22 declaration, so that's on page 1 or PDF page 4.

1 Are you there?

2 A I'm there.

3 Q Okay. Great. Here it says "My
4 testimony herein is based on my educational
5 background, technical background, my years of
6 experience in the field of designing and
7 fabricating semiconductor optoelectronic devices,
8 my years of experience managing R&D of
9 optoelectronic devices, and my review of the
10 materials cited herein," right?

11 A That's correct.

12 Q So when it says here that your
13 testimony is based, at least in part, on your
14 years of experience in the field of designing and
15 fabricating semiconductor optoelectronic devices,
16 which years of your experience are you referring
17 to?

18 A Designing -- well, I did design opt --
19 let's see, between '96 and now.

20 Q So from '96 until now, you've been
21 designing semiconductor optoelectronic devices?

22 A Designing and fabricating. So in '96,

1 I was working on semiconductor tools for making
2 semiconductor devices using photolithography, so
3 optical tools, lasers, from 2000 to 2006. So I
4 was designing and making -- well, and also as an
5 undergrad at UC San Diego, designed and made
6 semiconductor devices as part of my electrical
7 engineering degree. So that would even be back to
8 '92.

9 As a consultant, I've designed and
10 fabricated various optoelectronic devices since
11 2006 as well. So, yeah, it's been -- span that
12 entire range.

13 Q And you've personally done the
14 fabrication?

15 A Sometimes.

16 Q And which optoelectronic devices have
17 you personally fabricated?

18 A Fabricated some lights, some specialty
19 lights for FAA, some horticulture lights, made
20 modification to horticulture lights.

21 Q Let's talk about the design aspect for
22 a moment.

1 Have you ever designed a full display?

2 A A full display?

3 Q Yes.

4 A No.

5 Q Have you ever designed part of a
6 display?

7 A Yes.

8 Q What part of a display have you worked
9 on designing?

10 A The light-emitting device.

11 Q What type of light-emitting devices
12 have you designed?

13 A Resonant, cavity, microcavity, LEDs.

14 Q And were those organic LEDs?

15 A No.

16 Q Have you ever designed an organic LED?

17 A No.

18 Q Am I correct that a display generally
19 consists of a number of pixels?

20 A Yes.

21 Q And what is a pixel?

22 A It's an individual light-emitting

1 device or element, usually it's just one color, a
2 monochromatic element. It can also be -- it could
3 also be a filter element, filtering a white
4 backlight. So it's like a shutter and liquid
5 crystal that allows light through and filters it
6 to a certain color to generate the display image.

7 Q Throughout your declaration, you refer
8 to something called a subpixel. What do you mean
9 by a subpixel?

10 A It's different, I guess, people call
11 it -- a subpixel would be an individual device,
12 red, green, or blue, that, together, with red,
13 green, and blue, might be considered a single
14 pixel. So it would be just the red, green, or
15 blue individual element.

16 Q Okay. So just to make sure I'm clear.
17 So for a subpixel, that might be the individual
18 element that is, you know, one diode for red, one
19 for green, one for blue, and the pixel would be a
20 composition of those subpixels?

21 A Yeah. And sometimes certain displays
22 will use four subpixels to generate, like, a

1 repeating pixel. Pretty typical to use a couple
2 of greens in certain instances. But, yes, each of
3 those is -- each subpixel is a discrete device.

4 Q And so, a pixel may have three
5 subpixels, or it may have four subpixels,
6 depending on how the display is designed?

7 A Yes, depends on the architecture.

8 Q And the display, itself, will have
9 multiple of those pixels, correct?

10 A Correct.

11 Q Are you familiar with what a passive
12 matrix display is?

13 A Yes.

14 Q What is a passive matrix display?

15 A It's a display that, essentially, just
16 has kind of row-and-column control over the pixels
17 or the subpixels and how they're controlled. It
18 doesn't have an associated transistor or set of
19 transistors to hold the charge for the individual
20 pixels. So it's -- it's a little bit less
21 sophisticated. You can't get the brightness or
22 resolution, typically, with a passive matrix

1 arrangement.

2 Q Are you familiar with an active matrix
3 display?

4 A Yeah.

5 Q And what is an active matrix display?

6 A It's got transistors and capacitors and
7 resistors, you know, a circuit associated with the
8 individual subpixels to control and hold the
9 on/off state of each of those subpixels.

10 Q And you mentioned it having capacitors.
11 What is the purpose of a capacitor in an active
12 matrix display?

13 A To hold the charge.

14 Q And so, we talked about design now.
15 You said you've also fabricated semiconductor
16 optoelectronic devices yourself?

17 A Yes.

18 Q And what kind of manufacturing
19 processes have you used to create semiconductor
20 optoelectronic devices?

21 A I mean, well, optoelectronic devices,
22 and just kind of passive devices as well, but

1 photolithography, MOCVD is a deposition technique,
2 crystal deposition technique, etching, materials
3 deposition with CVD, other CVD approaches. Yeah,
4 a lot of that. Evaporative deposition. Yeah,
5 kind of the whole suite of semiconductor
6 manufacturing techniques.

7 Q I think you mentioned MOCVD. Is that
8 metal-organic chemical vapor deposition?

9 A It is. It's just different people have
10 a slightly different acronym or name for it. So
11 MOCDV is metal-organic chemical vapor deposition,
12 but it is the same as metal-organic vapor phase
13 epitaxy.

14 Q And is that a type of material
15 deposition, as you called it?

16 A Yeah, it's for crystalline layer
17 deposition.

18 Q Can you explain to me how a crystalline
19 layer deposition works, at a high level?

20 A Yeah, you basically flow, in this case,
21 with this kind of tool, you flow metal-organic
22 precursors in a carrier gas over a heated

1 substrate, and they -- and these molecules,
2 organic, metal-organic molecules, you know, attach
3 themselves to the substrate and orient themselves
4 in a crystal based upon the starting crystal
5 lattice of your substrate material and form a
6 substrate, and then you have some pretty refined
7 control, almost atomic-level control. So you can
8 switch gases, and the ratio gases to generate
9 alloys in the process and to make, you know, very
10 particular device structures of the LED to get
11 good performance.

12 Q When you create layers using that
13 process, do you, then, pattern them?

14 A You do eventually, but not within the
15 MOCVD process.

16 Q So after the MOCVD process, you
17 pattern?

18 A Yes. I mean, it depends what you're
19 trying to do. If you're trying to fabricate a
20 discrete LED device, you would typically do some
21 sort of patterning.

22 Q And do all the processes you talked

1 about, I mean, you talked about photolithography,
2 crystal deposition, etching, material deposition,
3 evaporative deposition, are all those
4 manufacturing processes where you, essentially,
5 build layers and then pattern layers to get the
6 design you're looking for?

7 A Yeah, you build layers and then you
8 remove them, remove sublayers, you take away
9 material, you add material, take it away. You
10 have to have some material there to take it away
11 eventually.

12 I mean, there's other things you can do
13 that are, I guess, just additive. I'm trying to
14 think where there's kind of a preformed structure.
15 Sometimes, in some MOCVD approaches, there's
16 patterns involved that are preformed and you can
17 actually induce, you know, like, nanorod growth,
18 you know, to kind of grow a preformed, desired
19 structure that you wouldn't -- you might not do
20 anything to that after the fact, except define
21 contacts or electrodes. But, yeah, it's usually
22 you build stuff up and then you take it away in a

1 patterned way.

2 Q Am I correct that in semiconductor
3 deposition manufacturing, you're generally
4 depositing alternating layers of conducting and
5 insulating materials?

6 MR. WARRICK: Objection. Form.

7 A Not necessarily.

8 Q Can you expand on that?

9 A Yeah, I just -- I think it's -- you do
10 need conducting. Sometimes the semiconductors are
11 already conducting. Sometimes you make them to be
12 conducting, either in the deposition process or
13 after the fact. And then you can apply,
14 sometimes, multiple layers of conductors or
15 singular layers. But it's usually not
16 alternating. You don't have a sandwich of
17 conductors, typically, like, conductor, insulator,
18 conductor. I mean, maybe for some kind of device.
19 But that's not, like, any kind of standard, you
20 know -- yeah.

21 Q Well, if you were building two metal
22 layers, for instance, and you didn't want those

1 layers to short, you'd have to build an insulation
2 layer between them, right?

3 A I mean, unless I wanted them to be
4 electrically connected to each other, and there's
5 reasons to have multiple metal layers of different
6 materials.

7 Or yeah, like, just like on any LED,
8 you have two electrodes, and the current flows
9 through the junction. And, yeah, you do not want
10 that to short. So you have the whole LED device
11 structure, which is typically multiple layers, in
12 between the two electrodes, and that can be some
13 sort of vertical lateral structure, entirely
14 lateral. There's lots of different ways to do
15 that.

16 Q I think you just mentioned kind of
17 electrically connecting two metal layers.

18 Is that something like a VIA?

19 A It could be a VIA to, like, make an
20 electrical connection within the semiconductor
21 device to the world, right? Like, you know, for
22 packaging. But it could also be to improve

1 conductivity. You might use multiple layers, you
2 might use layers that have different functions,
3 some might be somewhat sacrificial. Some of them
4 get removed later. You might be wanting to
5 engineer transparency and/or conductivity of
6 layers. So it's very -- it can be very typical to
7 have multiple conductors in some sort of
8 engineered structure.

9 So, yeah, I think that's pretty normal.

10 Q Have you ever manufactured kind of a
11 VIA between two conductive layers in any of your
12 semiconductor manufacturing?

13 A I don't know if I'd call it a VIA.
14 There's also thermal VIAs sometimes people use,
15 but, you know, in most of my work, being R&D,
16 wasn't, you know, taking these devices all the way
17 to the fully packaged state. And VIAs would
18 typically be used for the -- kind of the final
19 packaging. But, yeah, I've deposited big
20 electrodes for connection, for testing, for
21 applying current, you know, to operate the devices
22 I make and to test and characterize them. I mean,

1 they could be -- they're big pads, big metal pads,
2 for applying probes. So I don't know, it depends,
3 maybe, on the specific definition of a VIA. I'd
4 say a VIA, in my mind, usually goes pretty deep
5 between a complicated structure and, you know,
6 goes through multiple layers and it's a pretty big
7 metal connector or relay, not -- and it's
8 something that's for packaging, ultimately,
9 because it's just -- it's a bigger size scale, in
10 my mind, than what your -- than what's necessary
11 for the basic device functionality.

12 Q So maybe I'm using a different
13 terminology than you. What would you normally
14 call, the -- if I'm building a semiconductor
15 device and it's going to have multiple conductive
16 layers and I want to make a contact from one layer
17 down into another, what would you call that, if
18 not a VIA?

19 A I mean, I'd just need to, I guess, know
20 what kind of device you're talking about, and it
21 could be a VIA. I guess I'm just thinking of a
22 VIA as, like, something that's used in kind of

1 vertically deep device structures, so you need to,
2 like, kind of tunnel down with your electrode
3 through multiple layers of semiconductor material
4 through insulating material, down to where a
5 submerged contact is.

6 So it just depends on the context, on
7 the specific context of if something like that, in
8 my definition, yeah, is a VIA. You can make
9 electrical contacts, you can etch out and deposit
10 metal to go down. So, yeah. Sorry. That's --
11 yeah.

12 Q Sorry, I didn't mean to cut you off, if
13 you were still going.

14 A No, I'm done. I was trying to think of
15 the end --

16 Q Maybe I can try to take the terminology
17 out and maybe go off of what you were just saying
18 there.

19 So you were taking about kind of
20 etching out and depositing metal, and that's kind
21 of what I'm driving at here. So if I had, like, a
22 first metal layer, and then I built an insulating

1 layer on top it, and I wanted to, then, build
2 another metal layer to connect down to the first,
3 is that normally done by etching through the
4 insulating layer and then laying the second metal
5 layer on top, such that it fills the hole?

6 MR. WARRICK: Objection. Form.

7 A It's one way to do it. There's also,
8 you know, you can pattern -- it's not -- maybe not
9 etching a hole, but, like, you could etch a mesa,
10 right? I guess maybe the idea of the VIA is that
11 you're kind of making a tunnel or a hole down, but
12 that's not always what you need, right? Sometimes
13 you're really wanting to make a mesa out of your
14 LED or device structure, and then the layers that
15 you're wanting to contact are exposed. So that's
16 just another way, you know, of doing that.

17 But, really, there's, you know,
18 semiconductor, fabrication is a pretty broad
19 topic. So there's a lot of ways to do stuff,
20 depending on what you're trying to accomplish
21 within, you know -- with your device structure.

22 Q Let's go back to your declaration for a

1 moment, Exhibit 2001, and let's look at paragraph
2 37, which I believe is on page 12 and PDF page 15,
3 if that's helpful.

4 A I see it.

5 Q Great. And here in paragraph 37, you
6 start out by saying semiconductor processes
7 consist of both additive and subtractive
8 manufacturing techniques, right?

9 A Yes.

10 Q And can you explain what you mean by
11 that?

12 A It's like we were just talking about.
13 So you, let's say, grow up a crystal with the
14 device structure in it, for example, by MOCVD.
15 And then you want to make a contact to that device
16 structure, so you, let's say you pattern a mesa
17 structure and protect a portion of that planar
18 crystalline structure and etch down to where --
19 you know, a layer that you want to electrically
20 contact is. And so now you have, let's say, a
21 mesa, right, on a planar substrate. So you've
22 additively created this planar crystal structure,

1 and then you've etched it down into the device
2 shape that you're looking for, which would be a
3 subtractive process.

4 Q And so, essentially, when you're
5 depositing, that's the additive piece, and then
6 when you're etching or taking away, through some
7 other process, that's the subtractive technique?

8 A Yeah. And sometimes you are additive
9 in order to be subtractive, you might add an oxide
10 to work as an etch protectant, right, to not etch
11 in a certain area. So it all gets pretty
12 intermixed. But, yeah, I think what you said is,
13 you know, is right. You add materials and you
14 take away materials as you're manufacturing these
15 structures.

16 Q Can you make a structure using either
17 an additive technique or a subtractive technique,
18 or do you need to use both?

19 MR. WARRICK: Objection. Form.

20 A Well, let's see, you can do -- I'm
21 trying to think of a case where you just use a
22 subtractive. You've got to start with something,

1 right? So if you're doing a subtractive
2 technique, you're subtracting something from
3 something that exists, right? That might have
4 made a certain way in the first place, which, you
5 know, it could be additive of planar layers,
6 right?

7 So I think you can have an entirely
8 additive process, if you have control, you know,
9 to just add in certain places using semiconductor
10 processes, but if you're doing a subtractive
11 approach, you know, just with the LED example, you
12 know, you might subtract material to form a mesa,
13 but then you need to still deposit metals to
14 connect that mesa electrically, so that would,
15 again, go back to an additive process.

16 Q And you said you can have an entirely
17 additive processes if you have control to just add
18 it in certain places.

19 Which types of semiconductor processes
20 would do that?

21 A I mean, there's R&D ways to do that,
22 and there's some printing processes. I don't --

1 yeah, you can print organic semiconductors. You
2 can print electrodes. It depends, really, on the
3 level of resolution you're looking for, the
4 size -- you know, the timing, you know, how long
5 it takes, right? I mean, the thing about a lot of
6 the semiconductor work is that it's -- with some
7 of these, most of these processes, they're kind of
8 massively parallel, right, you're making
9 thousands, if not millions, of devices
10 simultaneously, right? It's like a big parallel
11 process where, with some of these kind of printing
12 more specific, solely out of your processes,
13 your -- it's more of a serial process, right,
14 you're doing one thing at a time.

15 Q And maybe we can expand on a few of the
16 things you talked about by kind of continuing down
17 this paragraph 37 in your declaration.

18 So it goes on to say layers of the
19 semiconductor device can be deposited as
20 continuous layers or as patterns defined by a mask
21 or by some form of printing, right?

22 A Yes.

1 Q I mean, you were just talking about
2 some of those items, including printing, correct?

3 A Yeah, and the other one would be, like,
4 a shadow mask, right?

5 Q And the shadow mask, that's different
6 from printing?

7 A Yeah. That would be, like, say you're
8 depositing a metal or a semiconductor and you have
9 some sort of physical mask. And so, the material
10 that you're generating in the vacuum, however
11 you're generating it, goes through that, and the
12 mask is placed over your deposition substrate, and
13 then the material goes through and is formed onto
14 the substrate in the pattern of that mask. So,
15 yeah, it's a different process. There's different
16 trades-off with it.

17 Q Is that what you meant in paragraph 37,
18 when you said patterns defined by a mask; is that
19 the shadow-masking process?

20 A Yeah.

21 Q And if we go down to your next
22 paragraph, your paragraph 38, you discuss

1 patterning of additive layers can be achieved by
2 mask or photolithographic deposition techniques,
3 right?

4 A Yeah, it's a little bit more nuanced.
5 If you're doing photolithographic techniques, you
6 have to have a material that's additively
7 deposited that takes the light and is affected by
8 the light, and it's called photoresist, and that
9 gets patterned. Same thing I was talking about, a
10 physical mask, you put it on a light mask, and
11 that gets patterned. So there's an additive
12 element to it.

13 But, yeah, you put on that photoresist,
14 pattern it, remove the places that either were
15 exposed to the light or not exposed to the light,
16 depending on which kind of photoresist you have,
17 and then that photoresist typically acts as a
18 temporary layer that will protect from a
19 subsequent etch or deposition process, and you can
20 deposit something on top, if it's a deposition
21 process, or etch away material where the
22 semiconductors is not protected by the

1 photoresist.

2 And then, so you've been additive to
3 become subtractive. So, yeah, those are kind of
4 broad terms. But there's also this approach where
5 you could deposit a metal on top of the
6 photoresist structure, and then lift it off in
7 certain ways by removing the underlying
8 photoresist, which is pretty readily etched and
9 designed to be etched, most cases. But there are
10 some devices where you leave the photoresist on as
11 some sort of layer also.

12 Q Okay. So that's kind of an additive
13 process than a subtractive process, for the
14 photolithographic deposition?

15 A Yes. I mean, it's not -- nothing's
16 deposited photolithographically. Patterns are
17 defined photolithographically.

18 Q And then, the achieved by mask piece
19 that you're talking about here, in paragraph 38,
20 that's more like the shadow masking we were
21 talking about, right?

22 A Yeah. So just the little nuance there

1 is photolithography also uses a mask, right? So
2 there's, like, a physical mask or a light mask
3 involved. It's a little bit of the difference.
4 But, yes, that's correct.

5 Q Okay. Yeah, because you say here
6 achieved by mask of photolithographic deposition
7 technique --

8 A Right.

9 Q -- so I'm trying to parse out what you
10 mean for each of these.

11 So what you're referring to as achieved
12 by mask here is not the photolithographic masking
13 technique, it's more like the shadow masking
14 technique, right?

15 MR. WARRICK: Objection. Form.

16 A Yes. And there are other ways to
17 pattern devices beyond the use of masks. It would
18 be like -- well, this is patterning, so, yeah.
19 But you could print patterns too. But -- what was
20 I go to say? Yeah, it's just a physical mask or
21 light mask involved in the process.

22 Q And printing's actually the next thing

1 you talk about in paragraph 38, right? You say a
2 patterning of layers can also be achieved by
3 printing materials?

4 A That's correct.

5 Q And so, that's, essentially, a third
6 process that you're talking about in paragraph 38,
7 right? The first is achieving by mask, the second
8 is photolithographic deposition, and then the
9 third is this printing?

10 A Yes.

11 Q And how does kind of printing, that
12 you're talking about here, how does that differ
13 from the mask technique that you're talking about
14 in paragraph 38?

15 A I think it's really about kind of the
16 parallelization of it. A mask is -- generally has
17 a repeated pattern in it, right, that covers a
18 large area, semiconductor-wise, right? And so,
19 it's in parallel, generating, you know, like I
20 said, thousands or millions of structures
21 simultaneously. Whereas, printing, it's kind of
22 one nozzle, printing in one place. Yeah, you

1 could have parallel nozzles, but each nozzle's
2 doing it. So it's more of a serial process.

3 Q And you say here, paragraph 38, that
4 patterning of layers can also be achieved by
5 printing materials in their desired location,
6 which can be lower cost for larger areas, but with
7 reduced resolution and accuracy?

8 A Yeah. I mean, there's a lot that goes
9 into that. There's numerous printing types and
10 people make advancements constantly in printing
11 techniques. There's even electron beam printing,
12 that's very high cost but pretty high resolution.
13 So, I mean, there's a lot of -- that's not a
14 standard approach. It's very slow also.

15 So it really comes down to this last
16 sentence, where you can mix and match, there's a
17 whole range, there's a whole palette of techniques
18 that can be used, and it just depends on what
19 you're trying to do.

20 Q And when you say here, though, that it
21 has reduced resolution and accuracy, I guess I'm
22 trying to figure out, reduced as to what? As to

1 the other processes you're talking about here in
2 paragraph 38?

3 A Photolithography will generally have
4 the best resolution of patterning of any
5 patterning technique. And best resolution and
6 best accuracy. If you're, you know, making a
7 complicated structure, 20 layers or whatever,
8 photolithography will be -- will have the best
9 resolution and accuracy and will come in at a
10 pretty good cost, too.

11 Q How does the resolution and accuracy of
12 printing compare to patterning using the mask,
13 that you talk about here?

14 MR. WARRICK: Objection. Form.

15 A It really depends on the context, the
16 type of device you're making, and the printing
17 technique you're deploying.

18 Q At the time of the '492 patent, could a
19 sufficient resolution be achieved via printing to
20 form the components that are contemplated by the
21 '492 patent?

22 MR. WARRICK: Objection. Form.

1 A The '492 patent contemplates kind of a
2 pretty broad variety of components, so it would
3 depend on the component.

4 Q Well, how about -- well, one of the
5 things the '492 patent contemplates is a
6 capacitor, right?

7 MR. WARRICK: Objection. Form.

8 A It's -- well, it's really -- yeah, a
9 capacitor, in the context of an optoelectronic
10 device. And so, the specifics of what that
11 capacitor would need to be, size-wise, would
12 depend on the optoelectronic device that's at
13 issue.

14 Q Can you explain what you mean by that?

15 A Optoelectronic devices, there's a
16 pretty broad category of types of devices. It
17 could be an LED, and it could be a photovoltaic
18 cell. I think, in the context of this device, in
19 this patent, I suppose it could even be a laser or
20 a VCSEL. So those have different size needs,
21 right? And that would define the types of
22 processes that you're contemplating. And so,

1 yeah, you just need a little more context to, I
2 guess, answer that question.

3 Q Would the type of optoelectronic device
4 also determine the size of the capacitor you would
5 need?

6 A I mean, practically speaking, yes,
7 right? Motivationally speaking, I think it would.
8 Because you could make some kind of home-brew lab
9 device with mis-sized components, that would be --
10 I don't know why you'd want to do it, maybe for
11 some research thing or something, but, yeah, if
12 you were trying to sell or be efficient, or
13 worried about cost, I think they would need to go
14 together.

15 Q Let's take a look at the '492 patent
16 for a moment.

17 MR. FRISCH: That's tab 10, to be put
18 into the chat box.

19 (Exhibit 1001 marked for identification
20 and attached to the transcript.)

21 PLANET DEPOS TECHNICIAN: Sorry, I'm
22 not seeing it. What tab was that again?

1 MR. FRISCH: It should be tab 10. It
2 should be Exhibit 1001.

3 PLANET DEPOS TECHNICIAN: Oh, I see it
4 now.

5 Q And, Dr. Pattison, you have a copy of
6 Exhibit 1001 as well, right?

7 A I do.

8 Q And you recognize Exhibit 1001 as a
9 copy of the '492 patent?

10 A That's right.

11 Q And I just want to look, for a moment,
12 at column 2 and, specifically, lines 15 through
13 19.

14 Let me know when you're there.

15 A I see it.

16 Q Okay. And this portion of text falls
17 under the '492 patent summary of its invention,
18 correct?

19 A Yes.

20 Q And at column 2, line 15 to 19, it
21 states that the corresponding materials or layers
22 can be applied in the structured fashion to the

1 substrate, for example, by printing, for example,
2 inkjet printing or screen printing, by blade
3 coating and/or by deposition with the aid of SAMs,
4 and then in parentheses, self-assembling
5 monolayers, and the like, right?

6 A Yes.

7 Q So the '492 patent contemplates that
8 printing techniques would have sufficient
9 resolution to form the components it's discussing,
10 correct?

11 MR. WARRICK: Objection. Form.

12 A Well, again, there's a broad range of
13 optoelectronic devices, so maybe, for some of the
14 implementations, it would contemplate the
15 printing, yes.

16 Q You're not aware of anywhere in the
17 '492 patent where it singles out any embodiment
18 and says that it can't be done using printing,
19 right?

20 A I'm not aware of that. They give, you
21 know, different techniques. I mean, one of their
22 printing approaches, looks like it's screen

1 printing, so kind of like, I would assume, a
2 shadow mask kind of printing style.

3 So, yeah, I don't know. It doesn't say
4 that it can't be done, but it's covering a pretty
5 broad array of types of devices that would have a
6 pretty broad array or trade-off space for cost,
7 size, resolution. So, yeah.

8 Q And I'm a little bit confused because I
9 think you just said shadow masking and described
10 it as a type of printing style, but I thought, a
11 few minutes ago, we talked about shadow masking as
12 an alternative to printing.

13 Can you clarify that?

14 MR. WARRICK: Objection. Form.

15 A I don't know. When it says screen
16 printing, that strikes me as crossing over with,
17 maybe, some types of shadow masking or some sort
18 of mask approach. That's what this patent's
19 saying.

20 MR. FRISCH: Think we've been going for
21 about an hour. Why don't we take our first break
22 here.

1 (Recess taken from 10:32 a.m. to
2 10:44 a.m.)

3 BY MR. FRISCH:

4 Q Dr. Pattison, one follow-up question on
5 an item we were talking about before the break
6 here.

7 The '492 patent, it doesn't claim to
8 have invented any novel printing techniques,
9 right?

10 MR. WARRICK: Objection. Form.

11 A I don't -- I think the invention is
12 more about the relationship of various techniques
13 than any specific technique.

14 Q And let's go back to your declaration,
15 Exhibit 2001.

16 And, specifically, I want to turn to
17 the claim construction portion starting at
18 paragraph 18, which is on page 5 and PDF page 8.

19 Are you there?

20 A I'm there.

21 Q Okay. And you have a heading here that
22 says "Claim Construction," right before paragraph

1 18, right?

2 A Yes.

3 Q And that's in that Section 3, that you
4 call Legal Standards?

5 A Yes.

6 Q And as we discussed earlier, you're not
7 an attorney, and so -- and the attorneys helped
8 you with this legal standards section, right?

9 A Yes.

10 Q And I assume -- or, well, let me ask
11 you the question. That's true, also, for the
12 subsection A on claim construction?

13 A Yeah, I mean, it was a discussion, they
14 explained the stuff to me, and we went through it.

15 Q And you understand that claim terms in
16 an IPR are given their ordinary and customer
17 meaning, as understood by one of ordinary skill in
18 the art?

19 A Yes.

20 Q And at the end of this paragraph and
21 section, you say, "I understand that applicants
22 sometimes provide special definitions for claim

1 terms that differ from the meaning the term might
2 otherwise possess, also known as lexicography,"
3 right?

4 A Yes. Yes.

5 Q So you don't provide any opinions, in
6 this proceeding, that the applicants for the '492
7 patent have engaged in lexicography, correct?

8 A Not in this declaration.

9 Q And not in your other declaration
10 either, right?

11 A Yeah --

12 MR. WARRICK: Objection. Form.

13 A I believe that's true. I'd have to
14 double-check or we'd have to go to the other
15 supplemental declaration to review that. But,
16 yeah, just what it says here, the PTAB standard.

17 Q And I'm happy to let you, if it would
18 help, you can pull out your copy of your
19 supplemental declaration and take a moment to
20 check, and let me know if there's anywhere in the
21 supplemental declaration where you provide an
22 opinion that the applicants for the '492 patent

1 engaged in lexicography.

2 A No, I don't think I did.

3 Q Okay. So you would agree, then, that
4 the claim terms of the '492 patent should be given
5 their plain and ordinary meaning, correct?

6 MR. WARRICK: Objection. Form.

7 A I think that's not exactly the -- what
8 it says. You know, that you've taken into
9 consideration the patent context, also.

10 Q But to be clear, you don't think that
11 the applicants have provided any special
12 definitions for claim terms, right?

13 MR. WARRICK: Objection. Form.

14 A Just a lot of context.

15 Q Now, let's turn to paragraph 45 of your
16 declaration. And that's on page 14 and PDF
17 page 17.

18 A Okay.

19 Q And in this particular paragraph, you
20 talk about capacitors, correct?

21 A Correct.

22 Q And as of the time of the '492 patent,

1 capacitors were not some new type of passive
2 electronic component, right?

3 A Correct.

4 Q And the '492 patent's not claiming to
5 have invented the capacitor, right?

6 A No.

7 Q How long have capacitors been used for?

8 A I guess there would be some context
9 there provided by the patent. But, you know,
10 there is kind of discrete capacitor components
11 that are individual components, that you can pick
12 up or a machine can pick up, and then there are
13 capacitors that would be made in an integrated way
14 within a -- you know, a semiconductor circuit, an
15 integrated -- you know, a part of an integrated
16 circuit. And both of those have been around for a
17 long time. But they're pretty different in
18 practice, even the fundamental, you know, how you
19 determine the capacitance is, you know,
20 fundamental physics.

21 Q And in terms of the fundamentals, what
22 is the basic components of a capacitor?

1 A We have two electrodes, and you have
2 some sort of dielectric between the electrodes,
3 the electrodes cover some area, the area's pretty
4 important because that defines the capacitance and
5 then, also, the spacing between the electrodes is
6 typically uniform over that area because that
7 distance is also a critical parameter for the
8 capacitor performance. And then the choice of the
9 dielectric and its permittivity is another factor.
10 All of those go into making a practical,
11 functional capacitor.

12 Q And so, fundamentally, you have, as you
13 described, two electrodes and some sort of
14 dielectric between them?

15 A Yeah, but parallel, two electrodes that
16 are parallel in covering an area. Because that's
17 how you prescribe the performance of the
18 capacitor. The capacitor needs to have a certain
19 performance to work within the circuit you're
20 trying to make, and you define that performance
21 based on the area, the parallel area of the two
22 electrodes, and the distance apart that the

1 electrodes are and the material, the dielectric
2 material that's being used in between them.

3 Q And you said that capacitors have been
4 known for a long time. Are those fundamental
5 components of the two electrodes, the dielectric
6 between them, have those been known for a long
7 time as well?

8 A Yes.

9 Q And would a person of ordinary skill in
10 the art understand that if you had an electrode
11 and a dielectric on top of it, that to finish the
12 capacitor, you'd have to form an opposite
13 electrode on the other side of the dielectric?

14 MR. WARRICK: Objection. Form.

15 A Yeah. I mean, it depends on what
16 you're trying to do. But they would understand
17 that. They would understand that you need to
18 have, you know, control over the capacitor
19 performance and over the -- you know, these
20 parameters that define the performance. And in a
21 circuit, in any circuit or circuit board, there
22 can be undesirable capacitance that occur that are

1 kind of out of control, that you want to avoid, so
2 that the -- you know, when you are trying to make
3 a capacitor, you're trying to make it with defined
4 performance, controllable performance.

5 Q And the parameters that you've just
6 been discussing, are those what you have in
7 paragraph 45, when you talk about the critical
8 parameters?

9 MR. WARRICK: Objection. Form.

10 A Yeah, those are the critical
11 parameters, as well as, you know, consistency and
12 avoiding shorts and stuff like that, if you're
13 doing it in a semiconductor system context.

14 Q And were those critical parameters
15 known to persons of ordinary skill in the art
16 prior to the '492 patent?

17 A Yes.

18 Q Now, if we look at paragraph 45, just
19 beneath that sentence we were talking about, where
20 it discusses the critical parameters, do you see
21 the sentence, starts two lines down, on page 15,
22 "capacitors are."

1 Do you see that?

2 A Yes.

3 Q It says capacitors are typically formed
4 with a uniformed distance between the electrodes,
5 right?

6 A Yeah. You need -- if you have an
7 uneven distance, you have uneven electric fields,
8 and you, basically, kind of lose control of the
9 desired capacitance that you're trying to achieve.

10 Q You say capacitors are typically formed
11 that way. In what instances are they not formed
12 that way?

13 A I would say when you have -- I don't
14 know, there could be some very unconventional
15 capacitors that maybe people are pursuing, but I
16 can't think of an example when they wouldn't be
17 formed this way, practically speaking.

18 Q Now, let's go to paragraph 87 of your
19 declaration. That's on page 38 and PDF page 41.

20 A I see that.

21 Q And here, one of the things you're
22 talking about in paragraph 87 is the risk of a

1 short-circuit, right?

2 A Yes.

3 Q And is that short-circuit caused by the
4 two electrodes, the capacitor touching one
5 another?

6 MR. WARRICK: Objection. Form.

7 A Yeah, that would be if you spill over,
8 you know, beyond the dielectric, and your
9 tolerances aren't right or -- yeah, you basically
10 just make an electrical connection, correct.

11 Q And when you reference the
12 short-circuit here, is that what you were
13 referencing or were you referencing something
14 else?

15 A That's it.

16 Q And is that a well-known risk when
17 you're forming a capacitor?

18 A It's a well-known risk in any
19 semiconductor process or --

20 Q Is that -- sorry, I didn't mean to cut
21 you off there, if you want to finish your answer.

22 A Yeah, it's always considered in making

1 semiconductors, any semiconductor device.

2 Q And how is that risk generally
3 mitigated?

4 A Well, it's evaluated based, you know,
5 on the -- I'd say the precision of your --
6 whichever deposition technique you're deploying to
7 make these devices, and, also, how you design the
8 devices and how much tolerance you bake in, based
9 on the known tolerances or resolution of all of
10 the processes that are involved.

11 Q And would those mitigation techniques
12 have been known at the time of the '492 patent?

13 A Yeah. I mean, the '492 patent talks
14 about them, I would say, so, yes.

15 Q Now, you go on, in that same sentence,
16 to talk about capacitor breakdown, right?

17 A Yes.

18 Q Can you explain what you mean by that?

19 A So if you have an issue or unevenness
20 in your dielectric between your -- the plates of
21 your capacitor, the parallel portions of your
22 capacitor, you can kind of have a hot spot or a

1 spot with high electric field that could, you
2 know, basically, burn or drill through the
3 dielectric and create a short-circuit or degrade
4 your capacitor.

5 Q And was that a well-known risk at the
6 time of the '492 patent?

7 A Yes.

8 Q And how is that risk generally
9 mitigated?

10 A By -- basically, by designing a, let's
11 say, you know, by the choice of your dielectric
12 material and by the, you know, ensuring that you
13 have, you know, parallel portions of the capacitor
14 that are even, so you have an even electric field
15 within your dielectric.

16 Q And were those mitigation techniques
17 known at the time of the '492 patent?

18 A Yeah, it's just design, right, it's a
19 design.

20 Q And when you say one of the mitigation
21 techniques is choice of the dielectric material,
22 can you explain what you mean by that?

1 A Well, the different dielectric
2 materials have different kind of breakdown levels.
3 So -- and different permittivities. So you're
4 choosing that material to achieve the capacitance.
5 You're looking for it, also, to be robust enough
6 to not break down under the expected electrical
7 fields.

8 Q And persons of ordinary skill in the
9 art know those characteristics of materials that
10 are generally used for capacitors?

11 A I suppose they could look them up, yes.

12 Q Let's look back at the '492 patent for
13 a moment, which was Exhibit 1001.

14 Do you have that in front of you?

15 A Yes.

16 Q Okay. And I want to look, for a
17 moment, at Figure 1.

18 Let me know when you're there.

19 A Yep.

20 Q What is your understanding of what's
21 been shown in Figure 1?

22 A It's a substrate.

1 Q And, specifically, is this a
2 cross-section of the substrate?

3 A Yeah. This would be, like, a planar
4 substrate?

5 Q And what is being shown in Figure 2?

6 A I recall that that's the deposition of
7 the first conductive electrode layer.

8 Q So that's a similar cross-section, but
9 now a layer has been added on top of the substrate
10 that was shown in Figure 1?

11 A Correct.

12 Q And if we continue through the figures,
13 Figures 3, 4, 5, and 6, those are additional
14 manufacturing steps being shown?

15 A Yes.

16 Q And, ultimately, you have Figure 7,
17 which is a finished passive electronic component,
18 correct?

19 A Yeah. And the top view, Figure 8.

20 Q Yeah. And I'll go to Figure 8 in a
21 moment. But Figure 7, that's a capacitor they
22 formed?

1 A Yeah. And there's a symbol, the
2 electronic symbol for capacitor, overlaid on the
3 substrate portion of the figure.

4 Q You got ahead of me. Okay. Now if we
5 go to Figure 8 here, Figure 8, that's a plan view,
6 right?

7 A Yes.

8 Q And what's the difference between a
9 plan view and a cross-section.

10 A I'd say in the cross-section, we're
11 looking at the structure from the side. And the
12 plan view, we're looking at it from the top.

13 Q Why do people generally use plan
14 view -- scratch that. Let me start again.

15 Why would someone use a plan view in
16 addition to or instead of a cross-section?

17 A They just are showing you different
18 things, different parts of the device, I guess,
19 structure. You don't see -- in Figure 7, you
20 don't see the area of the capacitor region and
21 kind of how it goes over the dielectric into the,
22 I think it's called the first electrode region of

1 the -- of this device that they're showing.

2 Q Would you agree with me that what you
3 see in a cross-section may change, depending on
4 where the cross-section is taken?

5 A It depends on if it's -- I would say
6 that would be a bad idea, if you're trying to
7 communicate something with the cross-section. So
8 if it's changing at different, I guess, depths of
9 the cross-section, that would be kind of weird,
10 especially in semiconductor processing. So it
11 shouldn't. I don't know why it would, but it's
12 possible.

13 Q Well, let's look at a real example.
14 Let's take Figure 8, which is the plan view.

15 A Uh-huh.

16 Q And if we took a horizontal
17 cross-section, like they've been doing in the
18 patent, and we took that towards the top of
19 Figure 8, you may not see the presence of
20 electrode layer 38, right?

21 MR. WARRICK: Objection. Form.

22 A You do see it. It's 38 -- it's in

1 Figure 7 and Figure 8.

2 Q So if you took a cross-section
3 horizontally down the center of Figure 8, you
4 might see 38. But I'm asking, if you took a
5 cross-section towards the top of what's shown in
6 Figure 38, above that rectangle that's labeled 38,
7 you wouldn't see 38 in the cross-section anymore,
8 correct?

9 MR. WARRICK: Objection. Form.

10 A I don't know what would be trying to be
11 communicated if you did that. You'd just be
12 cutting out critical information. But I guess
13 that's correct.

14 Q Because what you see in the
15 cross-section depends on where you take that
16 cross-section across the device, right?

17 A Yeah, which depends on what you're
18 trying to convey by showing the cross-section.
19 But it's kind of nonsensical to show a fractional
20 cross-section. I don't know why you would do
21 that. Sometimes people will put in, like, a
22 dashed line to show you, like, this is this

1 cross-section from here, or this is the
2 cross-section from another place, if there's some
3 reason to see that.

4 But, like, in semiconductor
5 communications, you're really trying to show
6 regular structures and, you know, there's reason
7 why you communicate with these figures and what
8 they're trying to show. So, yeah, I mean, if that
9 context is provided, you know, that might make
10 sense, but, in this instance, you're trying to
11 show the overlap of these layers, and then you're
12 trying to show the area of the capacitor from the
13 top view. So that's, I think, the best way to do
14 it.

15 Q Let's look at Figure 9 for a moment.
16 Figure 9 is also a plan view, right?

17 A That's right.

18 Q And one of the things that's shown in
19 the plan view, among other things, is the shapes
20 of the second and third trenches 40 and 42, right?

21 A That's right.

22 Q Now, if I took a horizontal

1 cross-section of Figure 9, right in the middle,
2 you wouldn't actually see either of those
3 trenches, 40 or 42, correct?

4 MR. WARRICK: Objection. Form.

5 A Yeah, that's correct.

6 Q Now, let's take a look back at
7 Figure 7. As we talked about earlier, Figure 7
8 shows the finished capacitor, right?

9 A It shows a cross-sectional view of the
10 figure -- yeah, of the, you know, not a schematic
11 but a conceptual view of the finished capacitor,
12 yeah.

13 Q And the '492 patent treats this
14 capacitor as a working capacitor, right?

15 A It does.

16 Q And element 28 is the dielectric?

17 A Yes.

18 Q And element 38 is the upper electrode
19 of the capacitor?

20 A Correct.

21 Q And the dielectric is shown here as
22 being rounded, right?

1 MR. WARRICK: Objection. Form.

2 A Somewhat rounded. Yeah, slightly
3 rounded, I guess.

4 Q And electrode 38 is shown as following
5 the curvature of the dielectric?

6 MR. WARRICK: Objection. Form.

7 A Yeah, and this is, like I said, not an
8 engineering drawing, but it's showing it as kind
9 of -- yeah, it has a rounded structure on top.

10 Q And you noted that this is not an
11 engineering drawing. Why did you note that?

12 A Well, because it looks like it's hand
13 drawn, not a picture or -- you know, with
14 tolerances or dimensions involved.

15 Q So you wouldn't read dimensions into an
16 image like this?

17 MR. WARRICK: Objection. Form.

18 A And I'd read some level of -- well, I
19 read, like, overlaps from a figure like this, and
20 general principals from a figure like this. Yeah,
21 like, general relationships from a figure like
22 this.

1 Q From a figure like this, though, would
2 you read into whether or not the dielectric is
3 rounded?

4 MR. WARRICK: Objection. Form.

5 A It's -- I don't know, the rounding's a
6 little bit subtle in the dielectric. I mean, it's
7 noticeable. I wouldn't -- and I'd say, within the
8 context of the patent, where they do talk about a
9 kind of a melting process, it might be somewhat
10 rounded. So, yeah, I would say there could be
11 some rounding, but that's not necessarily rounded.

12 Q And so, there would be an irregular
13 distance here between the anode and cathode of the
14 capacitor in Figure 7, right?

15 MR. WARRICK: Objection. Form.

16 A There could be. I mean, I think these
17 figures are meant to convey the concept, and I
18 think you could adjust the processes to make it
19 more or less rounded.

20 Q Would a person of ordinary skill in the
21 art know how to do that?

22 A Maybe. It depends on the material

1 that's involved.

2 Q And the '492 patent never identifies an
3 irregular distance between its anode and cathode
4 of the capacitor as being a problem, right?

5 A I don't believe it does, no.

6 Q Now let's turn to paragraph 83 of your
7 declaration. That's on page 34 and PDF page 37.

8 A I see that.

9 Q Okay. And do you see, after paragraph
10 83, actually, on page 35, you have an image?

11 A I do.

12 Q And that's a modified Figure 1I from
13 Ingle, right?

14 A Yeah. I think it's from the Kattamis
15 report, that's how it's been modified.

16 Q And to be clear, in some ways, it's
17 actually twice modified, right? So Dr. Kattamis
18 had a figure in his report, or his declaration,
19 and your declaration includes that figure but
20 further modifies it by adding a dotted line,
21 right?

22 A Correct.

1 Q And is the red dotted line, that runs
2 vertically up through the figure, is that the only
3 modification that's been made?

4 A Yes.

5 Q And is that a modification that you
6 made?

7 A Yes.

8 Q And what program did you use to make
9 that modification?

10 A I don't know. I directed. Let's say I
11 directed that it's made.

12 Q Okay. So somebody else actually did
13 the -- made the modified picture for you?

14 A Yes.

15 Q And what is the modified figure
16 intended to demonstrate?

17 A Well, going back to our discussion
18 with -- about capacitors. If you're intending to
19 generate a capacitor, you would -- you need --
20 you'd really want, like, a parallel overlap
21 between the two electrodes of the capacitor and to
22 generate a controllable area of the capacitor.

1 And this just doesn't show that.

2 Q Let's take a look at the modification
3 for a second. There's a green layer in this
4 image, right, and that's the -- well, you see the
5 green layer up on the top of the modified 1I,
6 right?

7 A I do.

8 Q And is it your understanding that's the
9 second electrically conducted layer 5, right?

10 A Yes.

11 Q And I want to focus on where that red
12 dotted line goes through that green layer.

13 Do you see that portion of the image?

14 A Yes.

15 Q And the right side of the red dotted
16 line, lines up with the right edge of the second
17 electrically conductive layer 5, right?

18 MR. WARRICK: Objection. Form.

19 A Right side, it kind of looks like it
20 goes through the middle of the edge of the
21 electrode layer.

22 Q Sorry, maybe you can help me, clarify

1 here. You say it kind of looks like it goes
2 through the middle.

3 Can you explain what you mean?

4 A So there's that -- so the red dotted
5 line is overlaid with the edge of the two
6 electrode materials, and it's the thickness of the
7 red dotted line, the center of the red dotted
8 line, it looks like, is on the edge, the actual
9 line edge of those electrodes.

10 Q Well, that's what I want to get at,
11 actually. You know, you can use the PDF version,
12 if it helps you zoom in.

13 MR. FRISCH: And can we give
14 Dr. Pattison control?

15 PLANET DEPOS TECHNICIAN: Yes, he
16 should have control now.

17 Q And, Dr. Pattison, you can feel free to
18 zoom in, if it makes it easier for you to see on
19 this modified image.

20 But how would you describe the
21 relationship of where the edge of the green layer,
22 the second electrode conductive layer 5 is, with

1 respect to red dotted line?

2 A It looks like it's in the middle of the
3 red dotted line.

4 Q Okay. If we go up, you see the gray
5 layer there?

6 A Yes.

7 Q And that gray layer, that's intended to
8 be the upper electrode of the capacitor?

9 A Yes.

10 Q And if we look at that, it's the left
11 side of the red dotted line that lines up with the
12 edge of the gray layer, correct?

13 A Yeah. That looks like that's right.

14 Q Okay. So unlike the green layer, that
15 you said went through the middle of the red line,
16 here, it actually lines up with the left edge of
17 the red line, right?

18 A Correct.

19 Q And so, actually, this does indicate
20 that there is some overlap between the gray layer
21 and the green layer, right?

22 A There's overlap, but it's, like, a very

1 small area. Like, it goes back to what you would
2 do if you're making an actual capacitor, is you
3 would want to have control over that area, and you
4 want to have a consistent thickness. That's the
5 point that I was trying to make with this image.
6 This is an image that I was provided, of somebody
7 trying to show a capacitor, and when I see this, I
8 think that's really not a capacitor, that's maybe
9 got some bad capacitance in there, but it's now
10 how you would actually design a capacitor, and
11 this was the choice of the image that I was
12 provided, and the only image that I was provided
13 to make this point. So it was kind of confusing
14 to me.

15 Q And did you ask for the red dotted line
16 to have the width that it was given?

17 A I just asked for the red dotted line.

18 Q And the red dotted line actually
19 obscures the overlap, right?

20 MR. WARRICK: Objection. Form.

21 A The overlap is in there. The point is
22 to show the point that some amount of overlap or

1 minimum overlap, or no overlap, this is a bad
2 capacitor design that was chosen to try to
3 represent a capacitor. It doesn't represent a
4 capacitor. It's an out-of-control capacitor, if
5 it's one at all. It's just really a capacitance
6 that would cause more problems than it could
7 actually solve.

8 Q But at the end of paragraph 83, you say
9 "As shown above, the electrode gray ends at the
10 right edge of the first contact region and it is,
11 therefore, not above the first contact region."

12 That's not actually correct, though,
13 right?

14 MR. WARRICK: Objection. Form.

15 A I guess in this demonstrative figure, I
16 don't know. It's potentially some minor amount of
17 overlap, but it really doesn't show it being
18 above. It shows it -- you know, it's just --
19 ends. It ends right where the other layer begins.
20 So I think it's pretty marginal.

21 Q And do you know who chose the width of
22 that red dotted line?

1 A I do not.

2 Q I want to switch to Hanamura for a
3 moment.

4 MR. FRISCH: And if we can put Hanamura
5 in the chat box. It's tab 16, Exhibit 1008.

6 (Exhibit 1008 marked for identification
7 and attached to the transcript.)

8 Q And do you have Hanamura in front of
9 you?

10 A I do.

11 Q And you recognize Exhibit 1008 as the
12 Hanamura reference that you've discussed in your
13 declarations, right?

14 A Yes.

15 Q What is the problems that Hanamura's
16 trying to solve?

17 MR. WARRICK: Objection. Form.

18 A It's a method for making a thick film
19 capacitor. And, I guess, making it simply, cost
20 effectively.

21 Q And to try to make this less of a
22 memory test, if we go to column 1, lines 49 to 59

1 of Hanamura, that section's part of the background
2 art section, right?

3 A Yeah.

4 Q Am I correct that that section is
5 discussing a particular problem that Hanamura's
6 identified, where a short-circuit can be created
7 during the manufacturing process?

8 A Yeah, can you point me to that line?
9 There it is, 57.

10 Q Yes, that's right. So if you go down
11 to column 1, around line 53, it starts with thus,
12 it says "Thus, if the screen used for the second
13 screen printing step is improperly positioned, the
14 first capacitor electrode forms and unexpectedly
15 deviates in position towards the second lead
16 electric 3 to come into connection therewith. As
17 a result, the capacitor may become inoperative due
18 to electrical shorting between the first and
19 second capacitor electrodes 4 and 6," right?

20 A Correct.

21 Q And so, one of the problems Hanamura
22 identified was, in the previous processes, when

1 you put these materials down, they might
2 accidentally come into contact and create a
3 short-circuit, right?

4 A That's correct.

5 Q And how, in your understanding, does
6 Hanamura go about solving that problem?

7 A Just with this manufacturing process
8 with the screen printing and generating, you know,
9 the specific structure that they're talking about.

10 Q And using that screen-printing process,
11 Hanamura makes sure that there is a defined
12 distance between those electrodes, right?

13 MR. WARRICK: Objection. Form.

14 A A defined distance between -- yes,
15 between -- yeah, between the layers -- the layer
16 that they're putting down.

17 Q And let's go to Figure 1 of Hanamura.
18 Figure 1 of Hanamura shows a capacitor, right?

19 A Yes. A thick film capacitor, so a
20 discrete component capacitor.

21 Q And Figures 3 through 6 of Hanamura
22 shows steps of manufacturing that capacitor?

1 A Yes.

2 Q And Hanamura is using masks to deposit
3 its layers?

4 A Just keep in mind, thick film, the
5 resolution and tolerances are going to be very
6 different for this type of capacitor than for a
7 capacitor in an integrated circuit, like what's
8 being talked about in the '492 patent. So the
9 scale's pretty different.

10 Q Do any of the claims of the '492 patent
11 call out an integrated circuit?

12 A It's in the context, like we talked
13 about. Yeah. I mean, that's the whole reason why
14 you put a capacitor next to an optoelectronic
15 device, to integrate them together. That's
16 exactly what it's talking about.

17 Q In the claims, that's a claimed
18 feature?

19 A In the context.

20 MR. WARRICK: Objection. Form.

21 Q Let's take a look back at the '492
22 patent, then. And that's tab 10, Exhibit 1001.

1 And let's take a look at claim 1, in column 20,
2 for a moment. Let me know when you're there.

3 A Yeah, I'm there.

4 Q Claim 1 says nothing about an
5 optoelectronic component, correct?

6 A No, it's just the context. Like we
7 were talking about with the motivation of how to
8 do or why to do certain things. It does not talk
9 about an optoelectronic component here, but it
10 speaks to the motivation of pursuing, you know,
11 these combinations or the technology, in general.

12 Q But to be clear, you're not saying that
13 you have to have an optoelectronic component to
14 meet claim 1 of the '492 patent, right?

15 MR. WARRICK: Objection. Form.

16 A Not to meet the claims. But to
17 motivate a combination.

18 Q And so, to motivate a combination, you
19 have to look at what the specification of the '492
20 patent says?

21 MR. WARRICK: Objection. Form.

22 A To make a combination, you need to be

1 working with, let's say, combining references that
2 are operating under the same or similar scale of
3 the device structures that you're trying to make.
4 So this is a pretty dramatically different size
5 scale and resolution scale than what's talked
6 about in the Ingle reference. So that's all I was
7 getting at.

8 Q Okay. But you would agree with me that
9 all that's required for the '492 patent, claim 1,
10 is a method for producing a passive electronic
11 component, right?

12 MR. WARRICK: Objection. Form.

13 A Yeah, but the context is a passive
14 electronic component with these other layers that
15 are clearly intended to host an optoelectronic
16 device. That's in the spec. So, yeah, that's the
17 context provided in the patent specification.

18 Q So this is where I start to get
19 unclear, then. So are you saying that in order to
20 meet claim 1, you have to have a component with
21 layers that can host an optoelectronic device?

22 MR. WARRICK: Objection. Form.

1 A Well, that's what it says in this spec,
2 that these layers are for, that are in claim 1.

3 Q But in your opinion, is that a
4 requirement of claim 1?

5 MR. WARRICK: Objection. Form.

6 A I'm not a lawyer. So I just say that
7 when I read this, this claim, within the context
8 of the specification, it's talking about the, you
9 know, the function to host an optoelectronic
10 device.

11 Q I know you're not a lawyer, but you did
12 analyze this claim and offer opinions on whether
13 certain references rendered obviousness as
14 claimed, right?

15 A Exactly. That's just what I was saying
16 about the obviousness of combining -- or
17 motivating the combination of those references,
18 which are really dramatically different
19 technologies in size scales.

20 Q But when you analyzed claim 1, were you
21 requiring, as part of your analysis, that these
22 layers be capable of hosting an optoelectronic

1 device?

2 MR. WARRICK: Objection. Form.

3 A I was analyzing the motivation to make
4 this combination.

5 Q But that's not my question. When you
6 were analyzing this claim, was your understanding
7 that this claim required layers that could host an
8 optoelectronic device?

9 MR. WARRICK: Objection. Form.

10 A You mentioned the obviousness analysis,
11 and that's -- the motivation to combine is part of
12 the obviousness analysis. You're right, I mean,
13 like I said, I'm not a lawyer, but this wording
14 does not require that there's an optoelectronic
15 device involved.

16 Q And with respect to the particular
17 grounds that were given for claim 1, Hanamura was
18 not being combined with any other reference,
19 right?

20 A Claim 1, Hanamura. Let me think. I'd
21 have to go back. But, yeah, I think that's
22 correct, it's just by itself.

1 Q Okay. So you wouldn't have to take
2 into consideration the types of things that you
3 were talking about, in terms of the capability of
4 Hanamura with anything else, with respect to claim
5 1, right?

6 MR. WARRICK: Objection. Form.

7 A Yeah, I guess -- let me just think
8 about this. Sure. I guess it's just by itself.
9 But, you know, the context of the application is
10 different for these two different patents.
11 Hanamura is talking about -- well, yeah, I'll just
12 leave it there.

13 Q Okay. And Hanamura's masking process,
14 that we were just looking at in these figures, is
15 that the earlier -- well, is that the patterning
16 of additive layers by mask that we talked about
17 earlier from your declaration?

18 MR. WARRICK: Objection. Form.

19 A Yeah. That's -- it's using, I guess
20 I'd call it a shadow mask, to define the features.

21 Q Let's look back at Hanamura Figure 1.
22 Are you there?

1 A Yep. I'm there.

2 Q Okay. And elements 12 and 13 in this
3 figure are the lead electrodes of the capacitor in
4 Hanamura, right?

5 A That's correct.

6 Q And then, element 14 is a first
7 capacitor electrode?

8 A Yes.

9 Q And element 20 is an auxillary
10 electrode?

11 A Auxillary? Yeah, they're -- it's
12 another electrode.

13 Q And I'm happy for you to look through
14 Hanamura, if it helps, at column 4, lines 58 to
15 59, I believe it calls element 20 an auxillary
16 electrode, but you can check me on that.

17 A Sure. No, that makes sense.

18 Q Element 16, that's a second capacitor
19 electrode?

20 A Yes.

21 Q Element 15, is a dielectric layer?

22 A Correct.

1 Q And what is the purpose of dielectric
2 layer 15?

3 A It's like we talked about. It
4 insulates the electrodes, right, from not touching
5 it, it creates the capacitance within the
6 electrodes, again, like we talked about. It's got
7 some permittivity, you know, the choice of
8 material gives you some engineerability of the
9 capacitance that you're desiring, along with the
10 thickness of the material and the area of the
11 capacitor that's being made, you know, defines the
12 performance of the capacitor. And then you also
13 want to look at the breakdown voltage so that you
14 can get reliable performance.

15 Q And what is D1?

16 A D1 is the spacing between the, I guess,
17 call it the auxillary electrode and the other
18 electrode, 14.

19 Q And what is the purpose of D1?

20 A To make sure the electrodes don't
21 short.

22 Q So one side of the capacitor, you have

1 second lead electrode 13, auxillary electrode 20,
2 and second capacitor electrode 16, right?

3 A Well, they're overlapped, overlaid,
4 but, yeah, electrically, on one side, they're all
5 connected; that's right.

6 Q And electrically, on the other side of
7 the capacitor, you've got first electrode 14 and
8 first lead electrode 12, right?

9 A That's right.

10 Q And as we discussed earlier, when we
11 were kind of talking about capacitors more
12 generally, the capacitor shown in Figure 1 of
13 Hanamura would not function if the second
14 capacitor electrode 16 was short-circuited to
15 first capacitor electrode 14, right?

16 A Yeah. All the current would not -- you
17 wouldn't generate an electric field, it would just
18 flow.

19 Q And similarly, the capacitor would not
20 function if the second lead electrode 13 was
21 short-circuited to the first lead electrode 12,
22 right?

1 A That's correct.

2 Q So that's why, in Figure 3, to keep the
3 second lead electrode 13 and the first lead
4 electrode 12 from short-circuiting, they're
5 selectively deposited with a space between them,
6 right?

7 A In Figure 3? Yeah.

8 Q Now, let's take a look at your
9 supplemental declaration for a few minutes,
10 Exhibit 2005. And let's go to paragraph 30, which
11 is at page 10 and PDF page 12.

12 A Okay.

13 Q Okay. And at the start of paragraph
14 30, you say "In my opinion, a person of ordinary
15 skill in the art would also understand that the
16 second electrically conductive layer on the first
17 electrically conductive layer is important to the
18 claimed invention of the '492 patent because the
19 layers are formed from different materials,"
20 right?

21 A Yes.

22 Q And I want to go back, now, to the '492

1 patent, which was Exhibit 1001. And can you turn
2 to claim 22 -- I'm sorry, column 22 of the '492
3 patent, and look at claim 16.

4 A Yes.

5 Q And this is one of the claims you've
6 analyzed, right?

7 A Yes.

8 Q And the preamble of claim 16 is a
9 passive electronic component, right?

10 A Yes.

11 Q And the first limitation of claim 16 is
12 a first electrically conductive layer on a
13 substrate, right?

14 A Yes.

15 Q All right. Now would you agree with me
16 that in order to determine if something meets this
17 claim limitation, you would, first, have to
18 identify a substrate, then you'd have to identify
19 a first electrically conductive layer, and
20 finally, you'd have to determine if what you've
21 identified as the first electrode conductive layer
22 is on what you've identified as the substrate?

1 A Yes.

2 Q And claim 16 further requires, in the
3 next limitation, a second electrically conductive
4 layer on the first electrically conductive layer,
5 right?

6 A Yes.

7 Q Would you agree with me that in order
8 to determine if something meets this limitation,
9 you, first, have to identify a first electrically
10 conductive layer, then you have to identify a
11 second electrically conductive layer, and,
12 finally, you have to determine if what you've
13 identified as the second electrically conductive
14 layer is on what you've identified as the first
15 electrically conductive layer?

16 MR. WARRICK: Objection. Form.

17 A Yeah. That would be how you would look
18 at it.

19 Q And how, in your opinion, would a
20 person of ordinary skill in the art understand the
21 term "layer," as used in the '492 patent?

22 MR. WARRICK: Objection. Form.

1 A In the '492 patent, it's -- they talked
2 about layers and then partial layers. So a layer
3 would be, you know, kind of on planar deposition
4 of a material, and the partial layer would be, you
5 know, a part of a planar deposition. So it's
6 qualified in the -- in the specification of the
7 '492 patent.

8 Q And can you point me to an example of
9 what you're talking about when you say the spec
10 talks about a partial layer?

11 A I'd have to look it up here. It's
12 going to take me a minute to find it.

13 Q To try to maybe help you out, column
14 11, paragraph starting at line 5, is that what
15 you're looking for?

16 A Yeah, I think there's another place,
17 though. But that's talking about kind of
18 sub-elements of a planar layer.

19 Q Would those be sub-layers?

20 A Yeah. They're just kind of an
21 integrated layer, electrode, is the way that's
22 talking about it.

1 There's a discussion of laterally
2 partial layers in here.

3 Q I would help you if I could, but I'm
4 not aware of which thing you're referencing at the
5 moment.

6 A I don't know if I can have control to
7 do a search function.

8 Q Yeah, you can take control.

9 A Not super responsive here. Okay.
10 Yeah, I guess, not exactly seeing it. Maybe it's
11 just I was thinking this partial region in
12 column 12. But that's talking about a little bit
13 different context of the dielectric. Yeah, sorry.
14 That's -- maybe that's just what I was --

15 Q Okay. Well, let me move on to a
16 different question.

17 What differentiates one layer from
18 another layer?

19 A I guess the context of the
20 specification. I mean, they do talk about partial
21 layers being within one layer, and maybe it's the
22 deposition process, but I'd say that the context,

1 in this spec, was really, like, different
2 materials that were, in the context, pointing
3 toward the use of transparent conductive from one
4 layer and then, you know, metal or just a better
5 conductor for another layer. And you remove one
6 of the layers so that you have a transparent path
7 for the generated light from the optoelectronic
8 device or for the optoelectronic sensor to be able
9 to sense the light. That's the differentiation.

10 Q So am I understanding correctly, is it
11 the different materials that, essentially,
12 determines if you kind of move from one layer to
13 another?

14 MR. WARRICK: Objection. Form.

15 A That's the context in the patent.

16 Q And in the '492 patent, what makes
17 something an electrically conductive layer?

18 A I would say conductive material. But,
19 of course, within that description, there's more
20 or less conductive materials, and there's other
21 functional properties of the materials beyond just
22 their conductivity that need to be balanced in

1 a -- you know, in a device or in an
2 implementation?

3 MR. FRISCH: Why don't we take another
4 break here.

5 Would another ten minutes work for you
6 all?

7 THE WITNESS: Sure.

8 MR. FRISCH: Great. Thanks.

9 (Recess taken from 11:42 a.m. to
10 11:52 a.m.)

11 BY MR. FRISCH:

12 Q Okay. I'd like to take a look at
13 another item we haven't looked at yet.

14 MR. FRISCH: If we can put tab 9 into
15 the chat.

16 (Tab 9 marked for identification and
17 attached to the transcript.)

18 Q And, Dr. Pattison, just so you're
19 aware, tab 9 is a copy -- or should be a copy of
20 the patent owner response. I don't recall, was
21 the patent owner response something you had a copy
22 of or did you only have the preliminary?

1 A I have the patent owner response.

2 Q Okay. Great. And I want -- and you've
3 read the patent owner response, correct?

4 A Yes.

5 Q And I want to go to page 16, or PDF
6 page 22 of the patent owner response.

7 Are you there?

8 A I'm there.

9 Q Do you see an image at the bottom of
10 page 16 of the patent owner response?

11 A I do.

12 Q And you've seen this image before,
13 having read the response?

14 A Yes.

15 Q Did you create the image?

16 A No.

17 Q Do you know who did?

18 A No.

19 Q Do you know what this image represents?

20 A I can remind myself here.

21 Q Please do.

22 A They're regions that contain

1 electrically conductive materials.

2 Q And am I correct that in this
3 hypothetical, shown by the image, the blue is
4 supposed to be the substrate?

5 A Yes.

6 Q And what does the black represent?

7 A It says it's also -- contains an
8 electrically conductive material.

9 Q Okay. And is the orange here meant to
10 represent another electrically conductive material
11 there?

12 A Yes.

13 MR. WARRICK: Objection. Form.

14 A Says contained an electrically
15 conductive material, yeah.

16 Q And is the green, yet, another layer of
17 electrically conductive material?

18 MR. WARRICK: Objection. Form.

19 A Yes, that's what it shows in this
20 configuration, yes.

21 Q And is the red yet another layer of
22 electrically conductive material?

1 MR. WARRICK: Objection. Form.

2 A Yes.

3 Q Given your experience is manufacturing
4 semiconductors, how would you manufacture a device
5 like this?

6 A Exactly like this? Well, it just
7 depends on the context of what the sizing is and
8 the application. That would be, you know,
9 relevant.

10 Q But would you generally start with the
11 substrate that's shown here in blue?

12 A Generally, yes. I guess there could be
13 instances where you do some sort of flip type of
14 process, but, generally, yes.

15 Q And then you'd lay down a layer of the
16 black material?

17 MR. WARRICK: Objection. Form.

18 A Well, I don't see a layer. I just see
19 areas or portions where there's black material.
20 So I don't -- it could be -- yeah. You would --
21 you could do shadow mask, a print, or a
22 photolithographic process to define those black

1 portions.

2 Q And how would you form the orange
3 layer?

4 MR. WARRICK: Objection. Form.

5 A Same. The orange layer would be, I
6 think, similarly done. It may, you know, it may
7 be -- it may extend, right? This may be just
8 showing a portion of the full structure. So it
9 may be, yeah, just a planar deposition. That
10 would be my basic assumption, is that this is
11 showing a portion of a planar deposition.

12 Q And would the same be true for the
13 green and red layers?

14 A Yes.

15 Q During any of the breaks today, did you
16 discuss the substance of your testimony with
17 counsel?

18 A No.

19 MR. FRISCH: Okay. I pass the witness.

20 MR. WARRICK: If we could take about a
21 ten-minute break or so for me to go over my notes,
22 we'll come back on the record.

1 MR. FRISCH: Sure.

2 MR. WARRICK: All right. Thanks.

3 (Recess taken from 11:57 a.m. to
4 12:05 p.m.)

5 EXAMINATION BY COUNSEL FOR THE PATENT OWNER
6 BY MR. WARRICK:

7 Q Dr. Pattison, do you recall, counsel
8 asked you some questions this morning about the
9 first and second electrically conductive layer
10 limitations and some claims of the '492 patent?

11 A Yes.

12 Q If you still have it in front of you,
13 go to your supplemental declaration, Exhibit 2005,
14 and, specifically, I'd like you to look at page 6
15 of that, that's page 8 of the PDF, and paragraph
16 21.

17 A Okay.

18 Q And you see paragraph 21 outlines your
19 understanding of Pictiva's proposed constructions
20 for the first -- a first electrically conductive
21 layer on a substrate, as well as its proposed
22 construction for a second electrically conductive

1 layer on the first electrically conductive layer?

2 MR. FRISCH: Objection to form.

3 A Yes, I see that.

4 Q Now, your opinions as to whether or not
5 petitioner has demonstrated that the '492 patent's
6 claimed invention would be obvious in view of
7 Hanamura, were those -- those opinions were made
8 in view of these claim constructions; is that
9 correct?

10 MR. FRISCH: Objection. Leading.

11 A That's correct.

12 Q Are those constructions consistent with
13 your understanding of how a person of ordinary
14 skill in the art would have interpreted the '492
15 patent at the time of the invention?

16 A Yes.

17 MR. WARRICK: I have no further
18 questions.

19 MR. FRISCH: No further questions for
20 me either.

21 Dr. Pattison, appreciate your time
22 today.

1 THE WITNESS: All right.

2 MR. WARRICK: Thank you.

3 THE STENOGRAPHER: Mr. Warrick, do you
4 need a copy?

5 MR. WARRICK: Yes. What's the standard
6 turnaround time?

7 THE STENOGRAPHER: Ten business days.

8 MR. WARRICK: That would be fine.

9 (Off the record at 12:08 p.m.)
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1 CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC

2
3 I, Judith E. Bellinger, Certified Reporter
4 and Notary Public within and for the State of
5 Maryland do hereby certify:

6 That P. MORGAN PATTISON, PH.D., the
7 witness whose deposition is hereinbefore set
8 forth, was duly sworn by me before the
9 commencement of such deposition and that such
10 deposition was taken before me and is a true
11 record of the testimony given by such witness.

12 I further certify that the adverse party,
13 PICTIVA DISPLAYS INTERNATIONAL LTD., was
14 represented by counsel at the
15 deposition.

16 I further certify that the deposition of
17 P. MORGAN PATTISON, PH.D., occurred
18 remotely via Zoom
19 on Wednesday, August 20, 2025, commencing at
20 9:33 a.m. EDT.

21 I further certify the inspection, reading
22 and signing of said deposition was not discussed

1 on the record.

2 I further certify that I am not related to
3 any of the parties to this action by blood or
4 marriage, I am not employed by or an attorney to
5 any of the parties to this action, and that I am
6 in no way interested, financially or otherwise, in
7 the outcome of this matter.

8
9 IN WITNESS WHEREOF, I have hereunto set my
10 hand this 27th day of August, 2025.

11
12 My commission expires:
13 November 3, 2028

14 
15 _____

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17 State of Maryland

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able	according	40:9, 40:13,	airplane
100:8	22:14	41:9, 41:17	9:4
about	accuracy	added	all
5:16, 10:10,	48:7, 48:21,	19:5, 68:9	6:9, 8:7, 8:8,
11:17, 12:2,	49:6, 49:9,	adding	10:2, 14:6,
20:5, 23:12,	49:11	76:20	18:12, 20:1,
25:21, 29:14,	accurate	addition	20:18, 22:4,
32:1, 36:20,	9:7, 18:19	69:16	22:19, 31:22,
37:19, 39:12,	achieve	additional	32:3, 35:16,
42:5, 42:16,	63:9, 67:4	68:13	40:11, 60:10,
43:1, 44:9,	achieved	additive	65:9, 82:5,
45:19, 45:21,	44:1, 45:18,	32:13, 39:7,	88:6, 88:9,
47:1, 47:6,	46:6, 46:11,	40:5, 40:8,	94:4, 94:16,
47:12, 47:13,	47:2, 48:4,	40:17, 41:5,	96:15, 101:6,
47:15, 49:1,	49:19	41:8, 41:15,	106:2, 108:1
49:13, 50:4,	achieving	41:17, 44:1,	allows
51:13, 54:11,	47:7	44:11, 45:2,	27:5
54:21, 55:5,	acronym	45:12, 91:16	alloys
55:12, 58:20,	30:10	additively	31:9
62:7, 62:19,	across	39:22, 44:6	almost
63:22, 65:14,	71:16	adjust	31:7
65:16, 73:7,	acting	75:18	along
75:8, 77:18,	20:11	advancements	12:17, 93:9
85:6, 85:9,	action	48:10	already
86:8, 86:13,	110:3, 110:5	adverse	33:11
86:16, 87:4,	active	109:12	also
87:7, 87:9,	21:20, 29:2,	affected	3:19, 21:13,
88:6, 89:8,	29:5, 29:11	44:7	25:4, 27:2,
89:16, 91:3,	actively	after	27:3, 29:15,
91:8, 91:11,	22:6	14:2, 18:7,	34:22, 35:14,
91:16, 93:3,	activities	31:16, 32:20,	38:7, 45:4,
93:6, 94:11,	19:22, 20:4,	33:13, 76:9	45:11, 46:1,
98:2, 98:9,	20:17, 22:5,	again	47:2, 48:4,
98:10, 98:17,	23:1	11:10, 21:4,	48:14, 51:4,
98:22, 99:12,	acts	41:15, 51:22,	56:11, 57:2,
99:20, 105:20,	44:17	53:12, 69:14,	58:9, 60:5,
106:8	actual	93:6	60:7, 65:7,
above	79:8, 81:2	agency	67:5, 72:16,
71:6, 82:9,	actually	21:12	93:12, 95:15,
82:11, 82:18	21:7, 22:11,	ago	103:7
absolutely	32:17, 46:22,	5:18, 54:11	alternating
23:20	73:2, 76:10,	agree	33:4, 33:16
accidentally	76:17, 77:12,	58:3, 70:2,	alternative
85:2	79:11, 80:16,	88:8, 96:15,	54:12
accomplish	80:19, 81:10,	97:7	always
38:20	81:18, 82:7,	ahead	38:12, 64:22
	82:12	69:4	among
	add	aid	72:19
	18:22, 32:9,	53:3	

amount 81:22, 82:16 analysis 89:21, 90:10, 90:12 analyze 89:12 analyzed 89:20, 96:6 analyzing 90:3, 90:6 anode 75:13, 76:3 another 20:2, 36:17, 38:2, 38:16, 60:9, 64:5, 72:2, 92:12, 98:16, 99:18, 100:5, 100:13, 101:3, 101:5, 101:13, 103:10, 103:16, 103:21 answer 6:9, 9:11, 51:2, 64:21 any 6:9, 7:3, 7:7, 8:5, 8:9, 8:17, 8:19, 9:6, 16:9, 21:7, 33:19, 34:7, 35:11, 49:4, 53:17, 55:8, 55:13, 57:5, 58:11, 61:21, 64:18, 65:1, 86:10, 90:18, 105:15, 110:3, 110:5 anymore 71:7 anyone 6:22, 8:18, 10:5, 10:10 anything 18:21, 32:20, 91:4 anywhere 53:16, 57:20	apart 60:22 appeal 1:3 applicants 56:21, 57:6, 57:22, 58:11 application 8:20, 91:9, 104:8 applied 52:22 apply 33:13 applying 35:21, 36:2 appreciate 107:21 approach 41:11, 45:4, 48:14, 54:18 approaches 23:6, 30:3, 32:15, 53:22 approximately 5:15, 9:20 architecture 28:7 area 40:11, 47:18, 60:3, 60:6, 60:16, 60:21, 69:20, 72:12, 77:22, 81:1, 81:3, 93:10 area's 60:3 areas 48:6, 104:19 aren't 64:9 around 13:14, 59:16, 84:11 arrangement 29:1 array 54:5, 54:6	art 56:18, 61:10, 62:15, 67:9, 75:21, 84:2, 95:15, 97:20, 107:14 aside 7:4 asked 81:17, 106:8 asking 5:22, 71:4 aspect 25:21 associated 28:18, 29:7 assume 6:3, 12:16, 54:1, 56:10 assumption 105:10 atomic-level 31:7 attach 31:2 attached 4:6, 11:9, 15:10, 51:20, 83:7, 101:17 attempt 8:22 attending 17:5 attorney 14:19, 56:7, 110:4 attorneys 15:1, 56:7 august 1:16, 109:19, 110:10 auxillary 92:9, 92:11, 92:15, 93:17, 94:1 avoid 62:1 avoiding 62:12	aware 53:16, 53:20, 99:4, 101:19 away 32:8, 32:9, 32:10, 32:22, 40:6, 40:14, 44:21 B b2 4:10 back 25:7, 38:22, 41:15, 55:14, 67:12, 73:6, 77:17, 81:1, 86:21, 90:21, 91:21, 95:22, 105:22 background 14:16, 22:21, 24:5, 84:1 backlight 27:4 bad 70:6, 81:9, 82:1 bake 65:8 balanced 100:22 based 24:4, 24:13, 31:4, 60:21, 65:4, 65:8 basic 36:11, 59:22, 105:10 basically 30:20, 63:8, 64:9, 66:2, 66:10 beam 48:11 because 36:9, 46:5, 51:8, 54:8,
--	--	---	--

60:4, 60:6, 60:16, 71:14, 74:12, 95:18 become 45:3, 84:17 becomes 16:9 been 5:13, 5:19, 9:21, 11:3, 13:14, 14:16, 17:17, 19:5, 20:1, 23:18, 24:20, 25:11, 45:2, 54:20, 59:7, 59:16, 61:3, 61:6, 62:6, 65:12, 67:21, 68:9, 70:17, 76:15, 77:3 before 1:3, 2:11, 5:13, 6:10, 17:18, 18:6, 20:20, 23:14, 55:5, 55:22, 102:12, 109:8, 109:10 begins 82:19 behalf 3:3, 3:11 being 5:4, 22:21, 35:15, 61:2, 68:5, 68:14, 73:22, 76:4, 82:17, 86:8, 90:18, 93:11, 99:21 believe 12:10, 19:2, 39:2, 57:13, 76:5, 92:15 bellinger 1:21, 2:12, 109:3	beneath 62:19 besides 10:10 best 49:4, 49:5, 49:6, 49:8, 72:13 better 100:4 between 24:19, 34:2, 34:12, 35:11, 36:5, 60:2, 60:5, 60:14, 61:2, 61:6, 63:4, 65:20, 69:8, 75:13, 76:3, 77:21, 80:20, 84:18, 85:12, 85:14, 85:15, 93:16, 95:5 beyond 46:17, 64:8, 100:21 big 35:19, 36:1, 36:6, 42:10 bigger 36:9 bit 11:15, 13:14, 28:20, 44:4, 46:3, 54:8, 75:6, 99:12 black 103:6, 104:16, 104:19, 104:22 blade 53:2 blood 110:3 blue 27:12, 27:13, 27:15, 27:19, 103:3, 104:11 board 1:3, 61:21	both 18:8, 39:7, 40:18, 59:16 bottom 12:11, 12:18, 102:9 box 8:10, 51:18, 83:5 break 6:8, 6:10, 54:21, 55:5, 67:6, 101:4, 105:21 breakdown 65:16, 67:2, 93:13 breaks 6:7, 105:15 brightness 28:21 bring 11:6 broad 19:21, 20:3, 38:18, 45:4, 50:2, 50:16, 53:12, 54:5, 54:6 broader 22:5, 23:1 build 32:5, 32:7, 32:22, 34:1, 38:1 building 33:21, 36:14 built 37:22 burling 3:5 burn 66:2 business 19:17, 108:7 C caleb 3:20	call 16:4, 27:10, 35:13, 36:14, 36:17, 56:4, 86:11, 91:20, 93:17 called 27:8, 30:15, 44:8, 69:22 calls 92:15 can't 28:21, 53:18, 54:4, 63:16 cannot 9:6 capability 91:3 capable 89:22 capacitance 59:19, 60:4, 61:22, 63:9, 67:4, 81:9, 82:5, 93:5, 93:9 capacitor 29:11, 50:6, 50:9, 50:11, 51:4, 59:5, 59:10, 59:22, 60:8, 60:11, 60:18, 61:12, 61:18, 62:3, 64:4, 64:17, 65:16, 65:21, 65:22, 66:4, 66:13, 68:21, 69:2, 69:20, 72:12, 73:8, 73:11, 73:14, 73:19, 75:14, 76:4, 77:19, 77:21, 77:22, 80:8, 81:2, 81:7, 81:8, 81:10, 82:2, 82:3, 82:4, 83:19, 84:14,
--	---	---	--

84:17, 84:19, 85:18, 85:19, 85:20, 85:22, 86:6, 86:7, 86:14, 92:3, 92:7, 92:18, 93:11, 93:12, 93:22, 94:2, 94:7, 94:12, 94:14, 94:15, 94:19 capacitors 29:6, 29:10, 58:20, 59:1, 59:7, 59:13, 61:3, 62:22, 63:3, 63:10, 63:15, 67:10, 77:18, 94:11 capacity 20:12 career 23:18 carrier 30:22 case 1:11, 30:20, 40:21 cases 45:9 category 50:16 cathode 75:13, 76:3 cause 82:6 caused 64:3 cavity 26:13 ccr-nm 1:22 ccr-wa 1:22 cell 50:18 center 3:7, 71:3, 79:7	certain 27:6, 27:21, 28:2, 40:11, 41:4, 41:9, 41:18, 45:7, 60:18, 87:8, 89:13 certificate 109:1 certified 2:13, 109:3 certify 109:5, 109:12, 109:16, 109:21, 110:2 change 70:3 changing 70:8 characteristics 67:9 characterize 35:22 charge 28:19, 29:13 charleston 16:19, 17:1, 17:4 chat 8:10, 8:19, 11:2, 15:6, 51:18, 83:5, 101:15 check 57:20, 92:16 chemical 30:8, 30:11 choice 60:8, 66:11, 66:21, 81:11, 93:7 choosing 67:4 chose 82:21 chosen 82:2 circuit 29:7, 59:14,	59:16, 60:19, 61:21, 86:7, 86:11 cited 10:17, 24:10 city 3:7 claim 55:7, 55:17, 55:22, 56:12, 56:15, 56:22, 58:4, 58:12, 87:1, 87:4, 87:14, 88:9, 88:20, 89:2, 89:4, 89:7, 89:12, 89:20, 90:6, 90:7, 90:17, 90:20, 91:4, 96:2, 96:3, 96:8, 96:11, 96:17, 97:2, 107:8 claimed 86:17, 89:14, 95:18, 107:6 claiming 59:4 claims 86:10, 86:17, 87:16, 96:5, 106:10 clarify 6:3, 54:13, 78:22 classify 20:17 clean 8:7, 8:8 clear 16:3, 17:19, 27:16, 58:10, 76:16, 87:12 clearly 88:15 client 20:7 clients 20:9	coating 53:3 color 27:1, 27:6 column 52:12, 52:20, 83:22, 84:11, 87:1, 92:14, 96:2, 98:13, 99:12 combination 87:17, 87:18, 87:22, 89:17, 90:4 combinations 87:11 combine 90:11 combined 90:18 combining 88:1, 89:16 come 19:22, 49:9, 84:16, 85:2, 105:22 comes 48:15 comfortable 8:14 commencement 109:9 commencing 109:19 commission 110:12 communicate 9:1, 70:7, 72:7 communicated 71:11 communication 7:3 communications 8:18, 72:5 compare 49:12 complete 9:7
--	--	--	--

completed 13:5 complicated 36:5, 49:7 component 50:3, 59:2, 68:17, 85:20, 87:5, 87:9, 87:13, 88:11, 88:14, 88:20, 96:9 components 49:20, 50:2, 51:9, 53:9, 59:10, 59:11, 59:22, 61:5 composition 27:20 computer 7:4, 7:8 concept 75:17 conceptual 73:11 conducted 1:15, 2:2, 78:9 conducting 33:4, 33:10, 33:11, 33:12 conductive 35:11, 36:15, 68:7, 78:17, 79:22, 95:16, 95:17, 96:12, 96:19, 96:21, 97:3, 97:4, 97:10, 97:11, 97:13, 97:15, 100:3, 100:17, 100:18, 100:20, 103:1, 103:8, 103:10, 103:15, 103:17, 103:22, 106:9, 106:20, 106:22, 107:1 conductivity 35:1, 35:5, 100:22	conductor 33:17, 33:18, 100:5 conductors 33:14, 33:17, 35:7 configuration 103:20 confused 54:8 confusing 81:13 connect 38:2, 41:14 connected 34:4, 94:5 connecting 34:17 connection 34:20, 35:20, 64:10, 84:16 connector 36:7 consideration 58:9, 91:2 considered 20:19, 27:13, 64:22 consist 39:7 consistency 62:11 consistent 81:4, 107:12 consists 26:19 constantly 48:10 construction 55:17, 55:22, 56:12, 106:22 constructions 106:19, 107:8, 107:12 consultant 21:14, 25:9 consulting 19:15, 19:17, 19:20, 20:1, 20:7, 20:12, 20:17, 20:19, 23:19 contact 36:16, 37:5, 38:15, 39:15, 39:20, 82:10, 82:11, 85:2 contacts 32:21, 37:9 contain 102:22 contained 103:14 contains 103:7 contemplate 53:14 contemplated 49:20 contemplates 50:1, 50:5, 53:7 contemplating 50:22 context 37:6, 37:7, 49:15, 50:9, 50:18, 51:1, 58:9, 58:14, 59:8, 62:13, 72:9, 75:8, 86:12, 86:19, 87:6, 88:13, 88:17, 89:7, 91:9, 99:13, 99:19, 99:22, 100:2, 100:15, 104:7 continue 68:12 continued 21:13 continuing 42:16 continuous 42:20	contracts 21:19 control 12:13, 12:16, 28:16, 29:8, 31:7, 41:8, 41:17, 61:18, 62:1, 63:8, 79:14, 79:16, 81:3, 99:6, 99:8 controllable 62:4, 77:22 controlled 28:17 conventionally 20:19 convey 71:18, 75:17 copies 7:13, 8:9, 8:13 copy 8:6, 11:4, 11:11, 11:12, 12:12, 12:14, 12:17, 15:11, 18:15, 18:19, 52:5, 52:9, 57:18, 101:19, 101:21, 108:4 corporate 20:9 correct 5:13, 6:15, 7:20, 9:12, 9:13, 10:20, 10:21, 11:20, 14:19, 14:20, 15:12, 16:1, 16:2, 18:11, 19:12, 19:18, 21:6, 23:16, 24:11, 26:18, 28:9, 28:10, 33:2, 43:2, 46:4, 47:4, 52:18, 53:10, 57:7, 58:5, 58:20, 58:21,
---	--	---

59:3, 64:10, 68:11, 68:18, 71:8, 71:13, 73:3, 73:5, 73:20, 76:22, 80:12, 80:18, 82:12, 84:4, 84:20, 85:4, 87:5, 90:22, 92:5, 92:22, 95:1, 102:3, 103:2, 107:9, 107:11 correctly 100:10 corresponding 52:21 cost 48:6, 48:12, 49:10, 51:13, 54:6, 83:19 could 11:1, 11:15, 13:13, 15:5, 16:11, 27:2, 34:19, 34:22, 36:1, 36:21, 38:9, 41:5, 45:5, 46:19, 48:1, 49:18, 50:17, 50:19, 51:8, 63:14, 66:1, 67:11, 75:10, 75:16, 75:18, 82:6, 90:7, 99:3, 104:12, 104:20, 104:21, 105:20 counsel 5:6, 9:16, 10:6, 10:10, 14:11, 14:18, 105:17, 106:5, 106:7, 109:14 couple 19:2, 21:16, 28:1 course 21:15, 100:19	court 9:12 cover 60:3 covering 54:4, 60:16 covers 47:17 covington 3:5 create 29:19, 31:12, 66:3, 85:2, 102:15 created 39:22, 84:6 creates 93:5 critical 60:7, 62:7, 62:10, 62:14, 62:20, 71:12 cross-section 68:2, 68:8, 69:9, 69:10, 69:16, 70:3, 70:4, 70:7, 70:9, 70:17, 71:2, 71:5, 71:7, 71:15, 71:16, 71:18, 71:20, 72:1, 72:2, 73:1 cross-sectional 73:9 crossing 54:16 crr 1:22 crystal 27:5, 30:2, 31:4, 32:2, 39:13, 39:22 crystalline 30:16, 30:18, 39:18 crystals 23:4	csr-tx 1:22 cto 20:11 current 34:8, 35:21, 94:16 currently 19:10 curvature 74:5 customer 56:16 cut 37:12, 64:20 cutting 71:12 cv 18:16, 18:19, 23:17 cvd 30:3 D d1 93:15, 93:16, 93:19 dashed 71:22 date 18:21, 19:1, 19:8 day 13:5, 110:10 days 108:7 dc 3:8, 3:16 decision 7:14 decisions 22:3 declaration 4:13, 4:15, 7:16, 11:13, 11:18, 11:19, 11:22, 12:2, 12:10, 12:21,	13:6, 13:9, 13:16, 14:2, 14:4, 14:7, 14:13, 15:4, 15:13, 15:17, 15:20, 15:22, 16:4, 16:5, 16:12, 16:17, 17:1, 17:2, 17:8, 17:15, 18:5, 18:7, 18:13, 23:22, 27:7, 38:22, 42:17, 55:14, 57:8, 57:9, 57:15, 57:19, 57:21, 58:16, 63:19, 76:7, 76:18, 76:19, 91:17, 95:9, 106:13 declarations 7:14, 10:9, 10:13, 10:17, 10:19, 11:18, 13:13, 83:13 deep 36:4, 37:1 define 32:20, 50:21, 60:20, 61:20, 91:20, 104:22 defined 42:20, 43:18, 45:17, 62:3, 85:11, 85:14 defines 60:4, 93:11 definition 36:3, 37:8 definitions 56:22, 58:12 degrade 66:3 degree 25:7 demonstrate 77:16
--	---	---	--

demonstrated 107:5	30:8, 30:11, 30:15, 30:17,	96:16, 96:20, 97:8, 97:12	61:13, 64:8, 65:20, 66:3,
demonstrative 82:15	30:19, 32:2, 32:3, 33:3,	determines 100:12	66:11, 66:15, 66:21, 67:1,
department 20:7, 20:22, 21:8, 23:14	33:12, 43:12, 44:2, 44:19, 44:20, 45:14,	development 22:11, 22:13	69:21, 73:16, 73:21, 74:5,
depend 50:3, 50:12	46:6, 47:8, 53:3, 65:6,	deviates 84:15	75:2, 75:6, 92:21, 93:1,
depending 28:6, 38:20, 44:16, 70:3	68:6, 98:3, 98:5, 99:22, 105:9, 105:11,	device 26:10, 27:1, 27:11, 28:3,	99:13 differ 47:12, 57:1
depends 28:7, 31:18, 36:2, 37:6, 42:2, 48:18, 49:15, 61:15, 70:5, 71:15, 71:17, 75:22, 104:7	109:7, 109:9, 109:10, 109:15, 109:16, 109:22	31:10, 31:20, 33:18, 34:10, 34:21, 36:11, 36:15, 36:20, 37:1, 38:14, 38:21, 39:14, 39:15, 40:1, 42:19, 49:16, 50:10, 50:12, 50:18, 51:3, 51:9, 65:1, 69:18, 70:1, 71:16, 86:15, 88:3, 88:16, 88:21, 89:10, 90:1, 90:8, 90:15, 100:8, 101:1, 104:4	difference 46:3, 69:8 different 27:10, 30:9, 30:10, 34:5, 34:14, 35:2, 36:12, 43:5, 43:15, 50:20, 53:21, 59:17, 67:1, 67:2, 67:3, 69:17, 69:18, 70:8, 86:6, 86:9, 88:4, 89:18, 91:10, 95:19, 99:13, 99:16, 100:1, 100:11
deploying 49:17, 65:6	depths 70:8	described 54:9, 60:13	differentiates 99:17
depos 3:20, 11:5, 51:21, 52:3, 79:15	description 100:19	description 100:19	differentiation 100:9
deposed 5:13, 5:19	design 24:18, 25:21, 29:14, 32:6, 65:7, 66:18, 66:19, 81:10, 82:2	design 24:18, 25:21, 29:14, 32:6, 65:7, 66:18, 66:19, 81:10, 82:2	dimensions 74:14, 74:15
deposit 37:9, 41:13, 44:20, 45:5, 86:2	designed 25:5, 25:9, 26:1, 26:5, 26:12, 26:16, 28:6, 45:9	designed 25:5, 25:9, 26:1, 26:5, 26:12, 26:16, 28:6, 45:9	diode 27:18
deposited 35:19, 42:19, 44:7, 45:16, 95:5	designing 24:6, 24:14, 24:18, 24:21, 24:22, 25:4, 26:9, 66:10	designing 24:6, 24:14, 24:18, 24:21, 24:22, 25:4, 26:9, 66:10	directed 77:10, 77:11
depositing 33:4, 37:20, 40:5, 43:8	desired 32:18, 48:5, 63:9	desired 32:18, 48:5, 63:9	discrete 28:3, 31:20, 59:10, 85:20
deposition 1:14, 2:1, 5:22, 6:12, 6:14, 6:17, 7:8, 7:11, 8:16, 9:1, 9:15, 10:5, 10:14, 11:4, 30:1, 30:2, 30:3, 30:4,	desiring 93:9	desiring 93:9	discuss 43:22, 105:16
	desk 7:13	desk 7:13	discussed 56:6, 83:12, 94:10, 109:22
	determine 51:4, 59:19,	determine 51:4, 59:19,	discusses 62:20

discussing 53:9, 62:6, 84:5 discussion 56:13, 77:17, 99:1 dispensing 23:3 displace 27:21 display 1:5, 26:1, 26:2, 26:6, 26:8, 26:18, 27:6, 28:6, 28:8, 28:12, 28:14, 28:15, 29:3, 29:5, 29:12 displays 1:8, 109:13 distance 60:7, 60:22, 63:4, 63:7, 75:13, 76:3, 85:12, 85:14 documents 7:8, 7:10, 8:5, 8:10, 9:17 doe 21:2, 21:12, 21:16, 21:18, 21:19, 22:6, 23:2, 23:9 doing 22:11, 22:13, 38:16, 41:1, 41:10, 42:14, 44:5, 48:2, 62:13, 70:17 done 25:13, 37:14, 38:3, 53:18, 54:4, 105:6 dotted 76:20, 77:1, 78:12, 78:15, 79:4, 79:7,	80:1, 80:3, 80:11, 81:15, 81:17, 81:18, 82:22 double-check 57:14 down 36:17, 37:2, 37:4, 37:10, 38:2, 38:11, 39:18, 40:1, 42:16, 43:21, 48:15, 62:21, 67:6, 71:3, 84:10, 85:1, 85:16, 104:15 dozen 5:16 dr 5:8, 11:10, 52:5, 55:4, 76:17, 79:14, 79:17, 101:18, 106:7, 107:21 dramatically 88:4, 89:18 drawing 74:8, 74:11 drawn 74:13 drill 66:2 driving 37:21 due 84:17 duly 5:4, 109:8 during 5:22, 8:16, 9:1, 84:7, 105:15 E e-notary 2:13, 110:16 each 28:2, 28:3,	29:9, 34:4, 46:10, 48:1 earlier 56:6, 73:7, 91:15, 91:17, 94:10 easier 79:18 edge 78:16, 78:20, 79:5, 79:8, 79:9, 79:21, 80:12, 80:16, 82:10 edt 1:17, 109:20 educational 22:20, 24:4 effectively 21:17, 83:20 efficient 51:12 effort 20:11 egitto 7:14 either 8:6, 33:12, 40:16, 44:14, 57:10, 73:2, 107:20 electric 63:7, 66:1, 66:14, 84:16, 94:17 electrical 25:6, 34:20, 37:9, 64:10, 67:6, 84:18 electrically 34:4, 34:17, 39:19, 41:14, 78:9, 78:17, 94:4, 94:6, 95:16, 95:17, 96:12, 96:19, 97:3, 97:4, 97:9, 97:11,	97:13, 97:15, 100:17, 103:1, 103:8, 103:10, 103:14, 103:17, 103:22, 106:9, 106:20, 106:22, 107:1 electrode 37:2, 61:10, 61:13, 68:7, 69:22, 70:20, 73:18, 74:4, 78:21, 79:6, 79:22, 80:8, 82:9, 84:14, 92:7, 92:10, 92:12, 92:16, 92:19, 93:17, 93:18, 94:1, 94:2, 94:7, 94:8, 94:14, 94:15, 94:20, 94:21, 95:3, 95:4, 96:21, 98:21 electrodes 32:21, 34:8, 34:12, 35:20, 42:2, 60:1, 60:2, 60:3, 60:5, 60:13, 60:15, 60:22, 61:1, 61:5, 63:4, 64:4, 77:21, 79:9, 84:19, 85:12, 92:3, 93:4, 93:6, 93:20 electron 48:11 electronic 8:6, 59:2, 68:17, 69:2, 88:10, 88:14, 96:9 element 27:1, 27:2, 27:3, 27:15,
--	--	---	--

27:18, 44:12, 73:16, 73:18, 92:6, 92:9, 92:15, 92:18, 92:21 elements 92:2 else 6:22, 64:14, 77:12, 91:4 embodiment 53:17 employed 110:4 end 16:13, 37:15, 56:20, 82:8 ends 82:9, 82:19 energy 20:7, 20:22, 21:8, 23:15 engage 8:17 engaged 57:7, 58:1 engineer 35:5 engineerability 93:8 engineered 35:8 engineering 25:7, 74:8, 74:11 engineers 23:1 enough 67:5 ensuring 66:12 entire 25:12 entirely 34:13, 41:7, 41:16 epitaxy 30:13	especially 70:10 esquire 3:4, 3:12 essentially 28:15, 32:4, 40:4, 47:5, 100:11 etch 37:9, 38:9, 39:18, 40:10, 44:19, 44:21 etched 40:1, 45:8, 45:9 etching 30:2, 32:2, 37:20, 38:3, 38:9, 40:6 evaluated 65:4 evaluating 23:5 evaporative 30:4, 32:3 even 20:11, 25:7, 48:11, 50:19, 59:18, 66:14 eventually 31:14, 32:11 ever 26:1, 26:5, 26:16, 35:10 everyone 15:6 exactly 58:7, 86:16, 89:15, 99:10, 104:6 examination 4:2, 5:6, 106:5 examined 5:4 example 8:19, 14:21, 39:14, 41:11, 53:1, 63:16,	70:13, 98:8 except 32:20 exclusively 19:19 exhibit 4:9, 4:11, 4:13, 4:15, 11:4, 11:8, 11:12, 13:16, 15:8, 15:9, 15:11, 15:16, 15:21, 16:1, 16:4, 16:5, 18:13, 18:14, 18:15, 39:1, 51:19, 52:2, 52:6, 52:8, 55:15, 67:13, 83:5, 83:6, 83:11, 86:22, 95:10, 96:1, 106:13 exhibits 4:7 exists 41:3 expand 33:8, 42:15 expected 67:6 experience 19:7, 23:13, 24:6, 24:8, 24:14, 24:16, 104:3 expert 21:22 expires 110:12 explain 30:18, 39:10, 50:14, 65:18, 66:22, 79:3 explained 56:14 exposed 38:15, 44:15	extend 105:7 F faa 25:19 fabricate 31:19 fabricated 25:10, 25:17, 25:18, 29:15 fabricating 24:7, 24:15, 24:22 fabrication 25:14, 38:18 fact 32:20, 33:13 factor 60:9 fair 6:5, 23:17 falls 52:16 familiar 28:11, 29:2 fashion 52:22 feature 86:18 features 91:20 feel 11:10, 79:17 few 9:22, 42:15, 54:11, 95:9 field 19:16, 24:6, 24:14, 66:1, 66:14, 94:17 fields 63:7, 67:7 figure 22:8, 48:22, 67:17, 67:21, 68:5, 68:10, 68:16, 68:19,
---	---	---	--

68:20, 68:21, 69:3, 69:5, 69:19, 70:14, 70:19, 71:1, 71:3, 71:6, 72:15, 72:16, 73:1, 73:7, 73:10, 74:19, 74:20, 74:21, 75:1, 75:14, 76:12, 76:18, 76:19, 77:2, 77:15, 82:15, 85:17, 85:18, 91:21, 92:3, 94:12, 95:2, 95:7 figures 68:12, 68:13, 72:7, 75:17, 85:21, 91:14 filed 11:17 fills 38:5 film 83:18, 85:19, 86:4 filter 27:3 filtering 27:3 filters 27:5 final 35:18 finally 96:20, 97:12 financially 110:6 find 98:12 fine 108:8 finish 61:11, 64:21 finished 68:17, 73:8,	73:11 first 5:4, 10:22, 11:18, 11:21, 15:16, 37:22, 38:2, 41:4, 47:7, 54:21, 68:7, 69:22, 82:10, 82:11, 84:14, 84:18, 92:6, 94:7, 94:8, 94:15, 94:21, 95:3, 95:16, 96:11, 96:12, 96:17, 96:19, 96:21, 97:4, 97:9, 97:14, 106:9, 106:20, 107:1 flip 104:13 flow 30:20, 30:21, 94:18 flows 34:8 focus 78:11 folders 7:7, 7:12 follow-up 55:4 following 74:4 follows 5:5 form 8:7, 22:16, 31:5, 33:6, 38:6, 40:19, 41:12, 42:21, 46:15, 49:14, 49:20, 49:22, 50:7, 53:9, 53:11, 54:14, 55:10, 57:12, 58:6, 58:13, 61:12, 61:14,	62:9, 64:6, 70:21, 71:9, 73:4, 74:1, 74:6, 74:17, 75:4, 75:15, 78:18, 81:20, 82:14, 83:17, 85:13, 86:20, 87:15, 87:21, 88:12, 88:22, 89:5, 90:2, 90:9, 91:6, 91:18, 97:16, 97:22, 100:14, 103:13, 103:18, 104:1, 104:17, 105:2, 105:4, 107:2 formed 43:13, 63:3, 63:10, 63:11, 63:17, 68:22, 95:19 forming 64:17 forms 84:14 forth 109:8 forward 16:9 four 10:1, 27:22, 28:5 fractional 71:19 free 11:10, 79:17 frisch 3:4, 4:3, 5:7, 11:1, 11:7, 15:5, 51:17, 52:1, 54:20, 55:3, 79:13, 83:4, 101:3, 101:8, 101:11, 101:14, 105:19, 106:1, 107:2,	107:10, 107:19 front 67:14, 83:8, 106:12 full 5:10, 26:1, 26:2, 105:8 fully 9:11, 35:17 function 89:9, 94:13, 94:20, 99:7 functional 60:11, 100:21 functionality 36:11 functions 35:2 fundamental 59:18, 59:20, 61:4 fundamentally 60:12 fundamentals 59:21 funded 21:16 funding 21:12 further 76:20, 97:2, 107:17, 107:19, 109:12, 109:16, 109:21, 110:2 G gas 30:22 gases 31:8 general 74:20, 74:21, 87:11 generally 26:18, 33:3, 47:16, 49:3, 65:2, 66:8, 67:10, 69:13,
--	---	--	---

94:12, 104:10, 104:12, 104:14 generate 27:6, 27:22, 31:8, 77:19, 77:22, 94:17 generated 100:7 generating 43:10, 43:11, 47:19, 85:8 georgia 6:19, 13:3, 17:3 getting 88:7 give 9:7, 12:13, 53:20, 79:13 given 19:2, 56:16, 58:4, 81:16, 90:17, 104:3, 109:11 gives 93:8 go 18:13, 37:10, 37:17, 38:22, 41:15, 43:21, 46:20, 51:13, 55:14, 57:14, 60:10, 63:18, 65:15, 68:20, 69:5, 80:4, 83:22, 84:10, 85:6, 85:17, 90:21, 95:10, 95:22, 102:5, 105:21, 106:13 goes 36:4, 36:6, 42:18, 43:11, 43:13, 48:8, 69:21, 78:12, 78:20, 79:1, 81:1 going 6:3, 12:16,	16:8, 21:21, 22:18, 36:15, 37:13, 54:20, 77:17, 86:5, 98:12 good 5:8, 5:9, 11:16, 22:2, 31:11, 49:10 grad 23:7, 23:12 grants 21:19 gray 80:4, 80:7, 80:12, 80:20, 82:9 great 9:6, 24:3, 39:5, 101:8, 102:2 green 27:12, 27:13, 27:14, 27:19, 78:3, 78:5, 78:12, 79:21, 80:14, 80:21, 103:16, 105:13 greens 28:2 ground 5:20 grounds 90:17 grow 32:18, 39:13 growing 23:4 growth 32:17 guess 22:8, 22:22, 23:11, 27:10, 32:13, 36:19, 36:21, 38:10, 48:21, 51:2, 59:8, 69:18, 70:8, 71:12,	74:3, 82:15, 83:19, 91:7, 91:8, 91:19, 93:16, 99:10, 99:19, 104:12 H hanamura 7:13, 83:2, 83:4, 83:8, 83:12, 84:1, 84:21, 85:6, 85:11, 85:17, 85:18, 85:21, 86:2, 90:17, 90:20, 91:4, 91:11, 91:21, 92:4, 92:14, 94:13, 107:7 hanamura's 83:15, 84:5, 91:13 hand 74:12, 110:10 hands-on 22:19 happy 8:12, 57:17, 92:13 hard 7:12, 8:6, 8:13, 11:11, 12:12, 12:14, 12:17 hasei 7:15 head 20:11 heading 55:21 heard 7:19 heated 30:22 help 5:21, 57:18, 78:22, 98:13, 99:3	helped 14:9, 15:1, 56:7 helpful 39:3 helping 22:10, 22:13 helps 79:12, 92:14 here 19:3, 24:3, 24:12, 37:21, 39:5, 45:19, 46:5, 46:12, 47:12, 48:3, 48:20, 49:1, 49:13, 54:22, 55:6, 55:21, 57:16, 63:21, 64:12, 69:5, 72:1, 73:21, 75:13, 79:1, 80:16, 87:9, 98:11, 99:2, 99:9, 101:4, 102:20, 103:9, 104:11 hereby 109:5 herein 24:4, 24:10 hereinbefore 109:7 hereunto 110:9 high 20:10, 30:19, 48:12, 66:1 higher-level 23:11 hold 28:19, 29:8, 29:13 hole 38:5, 38:9, 38:11 home 6:20
--	---	--	--

home-brew 51:8 honest 9:7 horizontal 70:16, 72:22 horizontally 71:3 horticulture 25:19, 25:20 host 88:15, 88:21, 89:9, 90:7 hosting 89:22 hot 65:22 hour 54:21 hours 9:22, 10:1, 13:11 however 6:13, 43:10 hundred 21:15, 21:16 hypothetical 103:3	78:13, 79:19, 81:5, 81:6, 81:11, 81:12, 102:9, 102:12, 102:15, 102:19, 103:3 implementation 101:2 implementations 53:14 important 60:4, 95:17 improperly 84:13 improve 34:22 in-person 6:15 inc 19:11, 19:14 includes 76:19 including 43:2 indicate 80:19 individual 26:22, 27:11, 27:15, 27:17, 28:19, 29:8, 59:11 induce 32:17 information 71:12 ingle 7:15, 76:13, 88:6 inkjet 53:2 inoperative 84:17 inspection 109:21 instance 22:10, 33:22, 72:10 instances 28:2, 63:11,	104:13 instead 69:16 insulates 93:4 insulating 33:5, 37:4, 37:22, 38:4 insulation 34:1 insulator 33:17 integrate 86:15 integrated 59:13, 59:15, 86:7, 86:11, 98:21 intended 77:16, 80:7, 88:15 intending 77:18 interested 110:6 intermixed 40:12 international 1:8, 109:13 interpreted 107:14 invented 55:8, 59:5 invention 52:17, 55:11, 95:18, 107:6, 107:15 investors 20:14 involved 32:16, 46:3, 46:21, 65:10, 74:14, 76:1, 90:15 ipr 1:11, 7:18, 56:16 irell 3:13	irregular 75:12, 76:3 issue 9:5, 50:13, 65:19 item 55:5, 101:13 items 43:2 itself 28:8, 90:22, 91:8
J			
jared 3:4 job 1:19, 21:21 judith 1:21, 2:11, 109:3 junction 34:9			
K			
kattamis 76:14, 76:17 keep 16:3, 86:4, 95:2 kind 20:4, 20:13, 20:16, 28:16, 29:18, 29:22, 30:5, 30:21, 32:14, 32:18, 33:18, 33:19, 34:16, 35:10, 35:18, 36:20, 36:22, 37:2, 37:19, 37:20, 38:11, 42:7, 42:11, 42:16, 44:16, 45:3, 45:12, 47:11, 47:15, 47:21, 50:1, 51:8, 54:1, 54:2,			
idea 38:10, 70:6 identification 11:8, 15:9, 51:19, 83:6, 101:16 identified 84:6, 84:22, 96:21, 96:22, 97:13, 97:14 identifies 76:2 identify 96:18, 97:9, 97:10 image 27:6, 74:16, 76:10, 78:4,			

59:10, 62:1, 63:8, 65:22, 67:2, 69:21, 70:9, 71:19, 74:8, 75:9, 78:19, 79:1, 81:13, 94:11, 98:3, 98:17, 98:20, 100:12 knowledge 18:18 known 57:2, 61:4, 61:6, 62:15, 65:9, 65:12	34:2, 36:16, 37:22, 38:1, 38:2, 38:4, 38:5, 39:19, 44:18, 45:11, 68:7, 68:9, 70:20, 78:3, 78:5, 78:9, 78:12, 78:17, 78:21, 79:21, 79:22, 80:5, 80:7, 80:12, 80:14, 80:20, 80:21, 82:19, 85:15, 92:21, 93:2, 95:16, 95:17, 96:12, 96:19, 96:21, 97:4, 97:10, 97:11, 97:14, 97:15, 97:21, 98:2, 98:4, 98:10, 98:18, 98:21, 99:17, 99:18, 99:21, 100:4, 100:5, 100:12, 100:17, 103:16, 103:21, 104:15, 104:18, 105:3, 105:5, 106:9, 106:21, 107:1 layers 31:12, 32:5, 32:7, 33:4, 33:14, 33:15, 33:22, 34:1, 34:5, 34:11, 34:17, 35:1, 35:2, 35:6, 35:11, 36:6, 36:16, 37:3, 38:14, 41:5, 42:18, 42:20, 44:1, 47:2, 48:4, 49:7, 52:21, 72:11, 85:15, 86:3,	88:14, 88:21, 89:2, 89:22, 90:7, 91:16, 95:19, 98:2, 99:2, 99:21, 100:6, 105:13 laying 38:4 lead 84:15, 92:3, 94:1, 94:8, 94:20, 94:21, 95:3 leadership 23:10 leading 107:10 learn 22:17 least 16:8, 19:4, 22:20, 24:13 leave 45:10, 91:12 led 26:16, 31:10, 31:20, 34:7, 34:10, 38:14, 41:11, 50:17 leds 26:13, 26:14 left 80:10, 80:16 legal 14:16, 14:21, 56:4, 56:8 less 13:14, 21:4, 28:20, 75:19, 83:21, 100:20 let's 5:20, 7:15, 10:22, 15:3, 17:16, 18:12, 23:12, 23:21, 24:19, 25:21, 38:22, 39:1, 39:13, 39:16,	39:20, 40:20, 51:15, 55:14, 58:15, 63:18, 66:10, 67:12, 70:13, 70:14, 72:15, 73:6, 76:6, 77:10, 78:2, 85:17, 86:21, 87:1, 88:1, 91:21, 95:8, 95:10 level 20:10, 30:19, 42:3, 74:18 levels 67:2 lexicography 57:2, 57:7, 58:1 lift 45:6 light 27:5, 44:7, 44:8, 44:10, 44:15, 46:2, 46:21, 100:7, 100:9 light-emitting 26:10, 26:11, 26:22 lighting 19:11, 19:14, 19:16, 20:8, 20:21, 21:2 lights 25:18, 25:19, 25:20 limitation 96:11, 96:17, 97:3, 97:8 limitations 106:10 line 52:20, 71:22, 76:20, 77:1, 78:12, 78:16, 79:5, 79:7, 79:8, 79:9,
L			
lab 22:22, 51:8 labeled 71:6 laid 22:15 large 47:18 larger 48:6 laser 50:19 lasers 25:3 last 5:17, 12:9, 48:15 later 35:4 lateral 34:13, 34:14 laterally 99:1 lattice 31:5 lawyer 89:6, 89:11, 90:13 lay 5:20, 104:15 layer 30:16, 30:19,			

80:1, 80:3, 80:11, 80:15, 80:17, 81:15, 81:17, 81:18, 82:22, 84:8, 84:11, 98:14 lined 22:5 lines 52:12, 62:21, 78:16, 80:11, 80:16, 83:22, 92:14 liquid 27:4 list 19:3, 19:5 little 11:15, 13:14, 28:20, 44:4, 45:22, 46:3, 51:1, 54:8, 75:6, 99:12 llp 3:5, 3:13 location 48:5 long 9:20, 13:8, 42:4, 59:7, 59:17, 61:4, 61:6 look 10:22, 15:3, 15:15, 39:1, 51:15, 52:11, 62:18, 67:11, 67:12, 67:16, 70:13, 72:15, 73:6, 78:2, 80:10, 86:21, 87:1, 87:19, 91:21, 92:13, 93:13, 95:8, 96:3, 97:17, 98:11, 101:12, 106:14 looked 101:13	looking 12:12, 12:14, 15:22, 23:17, 32:6, 40:2, 42:3, 67:5, 69:11, 69:12, 91:14, 98:15 looks 8:3, 11:14, 53:22, 74:12, 78:19, 79:1, 79:8, 80:2, 80:13 lose 63:8 lot 13:12, 30:4, 38:19, 42:5, 48:8, 48:13, 58:14 lots 34:14 lower 48:6 M machine 59:12 made 25:5, 25:19, 41:4, 59:13, 77:3, 77:6, 77:11, 77:13, 93:11, 107:7 majority 23:18 make 21:22, 22:14, 27:16, 31:9, 33:11, 34:19, 35:22, 36:16, 37:8, 38:13, 39:15, 40:16, 48:10, 51:8, 60:20, 62:2, 62:3, 64:10, 65:7, 72:9, 75:18, 77:8,	81:5, 81:13, 83:21, 87:22, 88:3, 90:3, 93:20 makes 79:18, 85:11, 92:17, 100:16 making 22:2, 25:1, 25:4, 38:11, 42:8, 49:6, 49:16, 60:10, 64:22, 81:2, 83:18, 83:19 manage 21:9, 22:10, 23:1 managed 21:11 management 23:10 manager 21:1 managing 21:2, 22:19, 24:8 manella 3:13 manufacture 104:4 manufactured 35:10 manufacturing 29:18, 30:6, 32:4, 33:3, 35:12, 39:8, 40:14, 68:14, 84:7, 85:7, 85:22, 104:3 many 5:15, 9:18, 21:17 marginal 82:20 marked 8:7, 11:3, 11:8, 15:9, 51:19, 83:6,	101:16 marriage 110:4 maryland 2:14, 109:5, 110:17 mask 42:20, 43:4, 43:5, 43:9, 43:12, 43:14, 43:18, 44:2, 44:10, 45:18, 46:1, 46:2, 46:6, 46:12, 46:20, 46:21, 47:7, 47:13, 47:16, 49:12, 54:2, 54:18, 91:16, 91:20, 104:21 masking 45:20, 46:12, 46:13, 54:9, 54:11, 54:17, 91:13 masks 46:17, 86:2 massively 42:8 match 48:16 material 30:14, 31:5, 32:2, 32:9, 32:10, 37:3, 37:4, 41:12, 43:9, 43:13, 44:6, 44:21, 61:1, 61:2, 66:12, 66:21, 67:4, 75:22, 93:8, 93:10, 98:4, 100:18, 103:8, 103:10, 103:15, 103:17, 103:22, 104:16, 104:19 materials 24:10, 30:2,
--	--	---	---

33:5, 34:6, 40:13, 40:14, 47:3, 48:5, 52:21, 67:2, 67:9, 79:6, 85:1, 95:19, 100:2, 100:11, 100:20, 100:21, 103:1 matrix 28:12, 28:14, 28:22, 29:2, 29:5, 29:12 matter 21:21, 110:7 maybe 9:19, 9:22, 17:21, 20:18, 33:18, 36:3, 36:12, 37:16, 37:17, 38:8, 38:10, 42:15, 51:10, 53:13, 54:17, 63:15, 75:22, 78:22, 81:8, 98:13, 99:10, 99:14, 99:21 mean 11:14, 12:5, 27:8, 29:21, 31:18, 32:1, 32:12, 33:18, 34:3, 35:22, 36:19, 37:12, 39:10, 41:21, 42:5, 43:1, 45:15, 46:10, 48:8, 48:13, 50:14, 51:6, 53:21, 56:13, 61:15, 64:20, 65:13, 65:18, 66:22, 72:8, 75:6, 75:16, 79:3, 86:13, 90:12, 99:20 meaning 56:17, 57:1,	58:5 meaningful 22:2 meant 15:21, 43:17, 75:17, 103:9 meet 87:14, 87:16, 88:20 meetings 9:16, 9:18, 9:21 meets 96:16, 97:8 melting 75:9 memory 83:22 mention 7:19 mentioned 29:10, 30:7, 34:16, 90:10 mesa 38:9, 38:13, 39:16, 39:21, 41:12, 41:14 metal 33:21, 34:5, 34:17, 36:1, 36:7, 37:10, 37:20, 37:22, 38:2, 38:4, 43:8, 45:5, 100:4 metal-organic 30:8, 30:11, 30:12, 30:21, 31:2 metals 41:13 method 83:18, 88:10 microcavity 26:13 middle 73:1, 78:20, 79:2, 80:2,	80:15 might 27:13, 27:17, 32:19, 35:1, 35:2, 35:3, 35:4, 40:9, 41:3, 41:12, 57:1, 71:4, 72:9, 75:9, 85:1 milestones 22:2 millions 42:9, 47:20 mind 36:4, 36:10, 86:4 minimum 82:1 minor 82:16 minute 98:12 minutes 54:11, 95:9, 101:5 mis-sized 51:9 mitigated 65:3, 66:9 mitigation 65:11, 66:16, 66:20 mix 14:14, 48:16 mocdv 30:11 mocvd 30:1, 30:7, 31:15, 31:16, 32:15, 39:14 mode 9:4 modification 25:20, 77:3, 77:5, 77:9, 78:2 modified 76:12, 76:15, 76:17, 77:13,	77:15, 78:5, 79:19 modifies 76:20 molecules 31:1, 31:2 moment 15:3, 25:22, 39:1, 51:16, 52:11, 57:19, 67:13, 67:17, 68:21, 72:15, 83:3, 87:2, 99:5 money 22:3 monochromatic 27:2 monolayers 53:5 more 13:11, 14:17, 23:10, 42:12, 42:13, 44:4, 45:20, 46:13, 48:2, 51:1, 55:12, 75:19, 82:6, 94:11, 100:19 morgan 1:14, 2:1, 4:2, 4:13, 4:16, 5:3, 5:12, 15:18, 109:6, 109:17 morning 5:8, 5:9, 106:8 most 8:13, 35:15, 42:7, 45:9 mostly 14:15 motivate 87:17, 87:18 motivating 89:17 motivation 23:6, 87:7, 87:10, 90:3, 90:11
--	---	---	---

motivationally 51:7	normal 35:9	40:19, 46:15, 49:14, 49:22, 50:7, 53:11, 54:14, 55:10, 57:12, 58:6, 58:13, 61:14, 62:9, 64:6, 70:21, 71:9, 73:4, 74:1, 74:6, 74:17, 75:4, 75:15, 78:18, 81:20, 82:14, 83:17, 85:13, 86:20, 87:15, 87:21, 88:12, 88:22, 89:5, 90:2, 90:9, 91:6, 91:18, 97:16, 97:22, 100:14, 103:13, 103:18, 104:1, 104:17, 105:4, 107:2, 107:10	23:12, 24:3, 27:16, 45:12, 46:5, 52:16, 55:21, 58:3, 58:18, 67:16, 69:4, 76:9, 77:12, 80:4, 80:14, 88:8, 91:1, 91:13, 92:2, 95:12, 95:13, 99:9, 99:15, 101:12, 102:2, 103:9, 105:19, 106:17
move 99:15, 100:12	normally 36:13, 38:3	obscures 81:19	one 3:7, 6:1, 10:22, 13:13, 19:4, 20:1, 27:1, 27:18, 27:19, 36:16, 38:7, 42:14, 43:3, 47:22, 50:4, 53:21, 55:4, 56:17, 63:21, 64:4, 66:20, 72:18, 82:5, 84:21, 93:22, 94:4, 96:5, 99:17, 99:21, 100:3, 100:5, 100:12
much 19:1, 65:8	notary 109:1, 109:4	obvious 107:6	ongoing 20:6
multiple 28:9, 33:14, 34:5, 34:11, 35:1, 35:7, 36:6, 36:15, 37:3	note 74:11	obviousness 89:13, 89:16, 90:10, 90:12	only 77:2, 81:12, 101:22
myself 102:20	noted 74:10	occur 61:22	open 7:4
N	notes 105:21	occurred 109:17	operate 35:21
name 5:10, 11:15, 30:10	nothing 87:4	offer 89:12	operating 88:2
nanorod 32:17	nothing's 45:15	office 1:1, 7:2	opinion 57:22, 89:3, 95:14, 97:19
necessarily 33:7, 75:11	notice 2:11	oh 52:3	opinions 57:5, 89:12, 107:4, 107:7
necessary 36:10	noticeable 75:7	okay 6:10, 6:11, 8:9, 8:15, 8:20, 8:21, 12:15, 16:7, 17:7, 17:19, 18:8, 19:7, 19:17,	
need 6:8, 12:15, 33:10, 36:19, 37:1, 38:12, 40:18, 41:13, 50:11, 51:1, 51:5, 51:13, 61:17, 63:6, 77:19, 87:22, 100:22, 108:4	novel 55:8		
needs 50:20, 60:18	november 12:22, 19:20, 110:13		
never 76:2	nozzle 47:22		
new 19:4, 59:1	nozzle's 48:1		
next 43:21, 46:22, 86:14, 97:3	nozzles 48:1		
niece's 17:5	nuance 45:22		
nonsensical 71:19	nuanced 44:4		
	number 4:9, 4:11, 5:19, 12:3, 12:6, 26:19		
	numerous 48:9		
	nw 3:6, 3:14		
	O		
	object 22:16		
	objection 33:6, 38:6,		

opposite 61:12 opt 24:18 optical 25:3 optoelectronic 23:8, 24:7, 24:9, 24:15, 24:21, 25:10, 25:16, 29:16, 29:20, 29:21, 50:9, 50:12, 50:15, 51:3, 53:13, 86:14, 87:5, 87:9, 87:13, 88:15, 88:21, 89:9, 89:22, 90:8, 90:14, 100:7, 100:8 orange 103:9, 105:2, 105:5 order 40:9, 88:19, 96:16, 97:7 ordinary 56:16, 56:17, 58:5, 61:9, 62:15, 67:8, 75:20, 95:14, 97:20, 107:13 organic 26:14, 26:16, 31:2, 42:1 orient 31:3 original 17:2, 17:16, 18:12 other 8:18, 8:19, 9:1, 10:5, 15:4, 30:3, 32:12, 34:4, 40:7, 43:3, 46:16, 49:1, 57:9,	57:14, 61:13, 72:19, 82:19, 88:14, 90:18, 93:17, 94:6, 100:20 otherwise 6:3, 12:16, 57:2, 110:6 out 5:20, 22:8, 22:15, 37:9, 37:17, 37:20, 38:13, 39:6, 42:12, 46:9, 48:22, 53:17, 57:18, 62:1, 71:12, 86:11, 98:13 out-of-control 82:4 outcome 110:7 outlines 106:18 over 21:14, 21:15, 28:16, 30:22, 43:12, 54:16, 60:6, 61:18, 61:19, 64:7, 69:21, 81:3, 105:21 overlaid 69:2, 79:5, 94:3 overlap 72:11, 77:20, 80:20, 80:22, 81:19, 81:21, 81:22, 82:1, 82:17 overlapped 94:3 overlaps 74:19 own 11:11, 20:15 owner 1:9, 3:11, 4:8,	7:17, 8:2, 8:4, 13:17, 13:21, 17:9, 17:12, 17:14, 17:17, 17:20, 17:21, 18:2, 18:4, 18:9, 18:10, 101:20, 101:21, 102:1, 102:3, 102:6, 102:10, 106:5 owner's 7:20, 8:1 oxide 40:9 P packaged 35:17 packaging 34:22, 35:19, 36:8 pads 36:1 page 4:2, 4:7, 12:9, 12:10, 12:11, 12:12, 12:18, 15:16, 16:11, 16:12, 16:14, 18:14, 23:22, 39:2, 55:18, 58:16, 58:17, 62:21, 63:19, 76:7, 76:10, 95:11, 102:5, 102:6, 102:10, 106:14, 106:15 pages 1:20 palette 48:17 paragraph 23:21, 39:1, 39:5, 42:17, 43:17, 43:22, 45:19, 47:1, 47:6, 47:14,	48:3, 49:2, 55:18, 55:22, 56:20, 58:15, 58:19, 62:7, 62:18, 63:18, 63:22, 76:6, 76:9, 82:8, 95:10, 95:13, 98:14, 106:15, 106:18 parallel 42:8, 42:10, 47:19, 48:1, 60:15, 60:16, 60:21, 65:21, 66:13, 77:20 parallelization 47:16 parameter 60:7 parameters 61:20, 62:5, 62:8, 62:11, 62:14, 62:20 parentheses 53:4 parse 46:9 part 24:13, 25:6, 26:5, 26:8, 59:15, 84:1, 89:21, 90:11, 98:5 partial 98:2, 98:4, 98:10, 99:2, 99:11, 99:20 participate 21:7 particular 14:12, 22:9, 31:10, 58:19, 84:5, 90:16 parties 110:3, 110:5 parts 14:6, 14:9,
---	---	--	---

14:12, 14:15, 69:18 party 109:12 pass 105:19 passive 28:11, 28:14, 28:22, 29:22, 59:1, 68:17, 88:10, 88:13, 96:9 patent 1:1, 1:3, 1:9, 1:12, 3:11, 4:8, 4:9, 4:11, 7:13, 7:14, 7:15, 7:16, 7:17, 7:20, 8:1, 8:2, 8:4, 12:3, 12:6, 12:7, 13:17, 13:21, 17:9, 17:12, 17:14, 17:17, 17:20, 17:21, 18:2, 18:4, 18:9, 18:10, 49:18, 49:21, 50:1, 50:5, 50:19, 51:15, 52:9, 52:17, 53:7, 53:17, 55:7, 57:7, 57:22, 58:4, 58:9, 58:22, 59:9, 62:16, 65:12, 65:13, 66:6, 66:17, 67:12, 70:18, 73:13, 75:8, 76:2, 86:8, 86:10, 86:22, 87:14, 87:20, 88:9, 88:17, 95:18, 96:1, 96:3, 97:21, 98:1, 98:7, 100:15, 100:16, 101:20,	101:21, 102:1, 102:3, 102:6, 102:10, 106:5, 106:10, 107:15 patent's 54:18, 59:4, 107:5 patents 91:10 path 100:6 pattern 31:13, 31:17, 32:5, 38:8, 39:16, 43:14, 44:14, 46:17, 47:17 patterned 33:1, 44:9, 44:11 patterning 31:21, 44:1, 46:18, 47:2, 48:4, 49:4, 49:5, 49:12, 91:15 patterns 32:16, 42:20, 43:18, 45:16, 46:19 pattison 1:14, 2:1, 4:2, 4:13, 4:16, 5:3, 5:8, 5:12, 11:10, 15:18, 52:5, 55:4, 79:14, 79:17, 101:18, 106:7, 107:21, 109:6, 109:17 paul 5:12 pdf 12:11, 12:13, 16:12, 18:14, 23:22, 39:2, 55:18, 58:16, 63:19, 76:7,	79:11, 95:11, 102:5, 106:15 pending 6:10 people 27:10, 30:9, 35:14, 48:10, 63:15, 69:13, 71:21 performance 31:11, 60:8, 60:17, 60:19, 60:20, 61:19, 61:20, 62:4, 93:12, 93:14 performing 23:8 periodically 6:8 permittivities 67:3 permittivity 60:9, 93:7 person 22:19, 61:9, 75:20, 95:14, 97:20, 107:13 personally 25:13, 25:17 persons 62:15, 67:8 perspective 21:12 pete 15:17 petition 7:17 petitioner 1:6, 3:3, 5:6, 107:5 ph 1:14, 2:1, 4:2, 4:14, 4:16, 5:3, 15:18, 22:18, 109:6, 109:17 phase 30:12 philip 3:12	phone 9:4 photolithographic 44:2, 44:5, 45:14, 46:6, 46:12, 47:8, 104:22 photolithographi- cally 45:16, 45:17 photolithography 25:2, 30:1, 32:1, 46:1, 49:3, 49:8 photoresist 44:8, 44:13, 44:16, 44:17, 45:1, 45:6, 45:8, 45:10 photovoltaic 50:17 physical 43:9, 44:10, 46:2, 46:20 physics 59:20 pick 59:11, 59:12 pictiva 1:8, 10:6, 10:11, 109:13 pictiva's 13:17, 13:20, 17:9, 17:11, 18:2, 18:8, 106:19 picture 74:13, 77:13 piece 40:5, 45:18 pixel 26:21, 27:14, 27:19, 28:1, 28:4 pixels 26:19, 28:9, 28:16, 28:20 place 41:4, 47:22,
--	---	--	--

72:2, 98:16 placed 43:12 places 41:9, 41:18, 44:14 plain 58:5 plan 69:5, 69:9, 69:12, 69:13, 69:15, 70:14, 72:16, 72:19 planar 39:17, 39:21, 39:22, 41:5, 68:3, 98:3, 98:5, 98:18, 105:9, 105:11 planet 3:20, 11:5, 51:21, 52:3, 79:15 plates 65:20 platform 7:5, 9:2 play 21:20 please 5:10, 6:2, 102:21 point 16:9, 81:5, 81:13, 81:21, 81:22, 84:8, 98:8 pointing 100:2 portion 39:17, 52:16, 55:17, 69:3, 78:13, 105:8, 105:11 portions 65:21, 66:13, 104:19, 105:1 position 84:15	positioned 84:13 possess 57:2 possible 70:12 potential 23:6 potentially 82:16 practical 60:10 practically 51:6, 63:17 practice 59:18 preamble 96:8 precision 65:5 precursors 30:22 preformed 32:14, 32:16, 32:18 preliminary 7:22, 13:17, 13:20, 17:20, 18:3, 18:9, 101:22 preparation 10:4, 10:14 prepare 9:14 prescribe 60:17 presence 70:19 present 3:19 pretty 19:1, 20:10, 28:1, 31:6, 35:9, 36:4, 36:6, 38:18, 40:11, 45:8, 48:12, 49:10, 50:2, 50:16,	54:4, 54:6, 59:17, 60:3, 82:20, 86:9, 88:4 previous 84:22 primarily 19:15 principals 74:20 print 42:1, 42:2, 46:19, 104:21 printing 41:22, 42:11, 42:21, 43:2, 43:6, 47:3, 47:9, 47:11, 47:21, 47:22, 48:5, 48:9, 48:10, 48:11, 49:12, 49:16, 49:19, 53:1, 53:2, 53:8, 53:15, 53:18, 53:22, 54:1, 54:2, 54:10, 54:12, 54:16, 55:8, 84:13, 85:8 printing's 46:22 prior 14:1, 17:15, 18:4, 62:16 probably 17:18 probes 36:2 problem 76:4, 84:5, 85:6 problems 82:6, 83:15, 84:21 proceeding 6:15, 10:9, 10:10, 10:20,	11:13, 57:6 process 31:9, 31:13, 31:15, 31:16, 33:12, 40:3, 40:7, 41:8, 41:15, 42:11, 42:13, 43:15, 43:19, 44:19, 44:21, 45:13, 46:21, 47:6, 48:2, 64:19, 75:9, 84:7, 85:7, 85:10, 91:13, 99:22, 104:14, 104:22 processes 29:19, 31:22, 32:4, 39:6, 41:10, 41:17, 41:19, 41:22, 42:7, 42:12, 49:1, 50:22, 65:10, 75:18, 84:22 processing 70:10 producing 88:10 professional 2:12 program 20:8, 77:8 progressing 22:1, 22:14 project 21:1, 22:9 projects 21:3, 21:8, 21:10, 21:11, 21:16, 22:1, 22:7 properties 100:21 proposed 106:19, 106:21 protect 39:17, 44:18
---	--	--	---

protectant 40:10	107:18, 107:19	recall 14:3, 18:6,	82:10, 82:11,
protected 44:22	R	68:6, 101:20,	99:11
provide 56:22, 57:5,	r&d 20:8, 20:11,	106:7	regions 102:22
57:21	21:20, 22:17,	recess 55:1, 101:9,	registered 2:12
provided 58:11, 59:9,	22:19, 23:8,	106:3	regular 72:6
72:9, 81:6,	24:8, 35:15,	recognize 11:12, 11:21,	related 110:2
81:12, 88:17	41:21	18:15, 52:8,	relationship 55:12, 79:21
ptab 57:16	r&d-funded 21:2	83:11	relationships 74:21
public 2:13, 109:1,	range 19:22, 20:3,	record 5:11, 9:3,	relay 36:7
109:4, 110:16	20:16, 25:12,	11:3, 15:7,	relevant 104:9
publication 19:4	48:17, 53:12	16:3, 105:22,	reliable 93:14
pull 57:18	ratio 31:8	108:9, 109:11,	remember 13:10
purpose 29:11, 93:1,	re-ask 17:22	110:1	remind 102:20
93:19	read 13:20, 14:1,	rectangle 71:6	remotely 6:12, 109:18
pursuant 2:11	17:11, 17:14,	red 27:12, 27:14,	remove 32:8, 44:14,
pursuing 63:15, 87:10	18:2, 18:8,	78:11, 78:15,	100:5
put 8:10, 8:11,	74:15, 74:18,	79:4, 79:7,	removed 35:4
9:4, 15:5,	74:19, 75:2,	80:1, 80:3,	removing 45:7
44:10, 44:13,	89:7, 102:3,	80:11, 80:15,	rendered 89:13
51:17, 71:21,	102:13	80:17, 81:15,	repeated 47:17
83:4, 85:1,	readily 45:8	81:17, 81:18,	repeating 28:1
86:14, 101:14	reading 109:21	82:22, 103:21,	report 76:15, 76:18
putting 14:1, 85:16	real 70:13	105:13	reported 1:21
Q	really 38:13, 38:17,	reduced 48:7, 48:21,	reporter 2:12, 2:13,
qualified 98:6	42:2, 47:15,	48:22	109:1, 109:3
question 6:4, 17:22,	48:15, 49:15,	refer 12:6, 27:7	represent 82:3, 103:6,
18:1, 51:2,	50:8, 72:5,	reference 64:11, 83:12,	
55:4, 56:11,	77:20, 81:8,	88:6, 90:18	
90:5, 99:16	82:5, 82:17,	references 10:16, 88:1,	
questions 6:1, 6:2, 6:10,	89:18, 100:1	89:13, 89:17	
9:11, 106:8,	realtime 2:13	referencing 64:13, 99:4	
	reason 9:6, 72:3,	referring 24:16, 46:11	
	72:6, 86:13	refined 31:6	
	reasons 34:5	region 69:20, 69:22,	

103:10 representative 21:18 represented 109:14 represents 102:19 require 90:14 required 21:19, 88:9, 90:7 requirement 89:4 requires 97:2 requiring 89:21 research 22:9, 22:11, 22:13, 51:11 resistors 29:7 resolution 28:22, 42:3, 48:7, 48:12, 48:21, 49:4, 49:5, 49:9, 49:11, 49:19, 53:9, 54:7, 65:9, 86:5, 88:5 resonant 26:13 respect 80:1, 90:16, 91:4 response 4:8, 7:17, 7:20, 8:1, 8:2, 8:4, 13:17, 13:21, 17:9, 17:12, 17:14, 17:17, 17:20, 17:21, 18:3, 18:4, 18:9, 18:10, 101:20, 101:21, 102:1, 102:3, 102:6,	102:10, 102:13 responsive 99:9 result 84:17 results 22:4, 23:5 review 10:13, 10:16, 24:9, 57:15 reviewed 9:17 ringgold 6:19, 13:2, 17:3 risk 63:22, 64:16, 64:18, 65:2, 66:5, 66:8 robust 67:5 role 21:20, 23:10, 23:11 rounded 73:22, 74:2, 74:3, 74:9, 75:3, 75:10, 75:11, 75:19 rounding 75:11 rounding's 75:5 row-and-column 28:16 rpr 1:22 rules 5:20 runs 77:1 S sacrificial 35:3 said 29:15, 40:12, 41:16, 43:18,	47:20, 54:9, 61:3, 74:7, 80:15, 90:13, 109:22 same 30:12, 44:9, 65:15, 88:2, 105:5, 105:12 sams 53:3 samsung 1:5 san 25:5 sandwich 33:16 saved 7:7 say 5:16, 13:8, 20:3, 22:6, 23:17, 36:4, 39:13, 39:16, 39:20, 42:18, 43:7, 46:5, 46:20, 47:1, 48:3, 48:20, 54:3, 56:21, 63:10, 63:13, 65:5, 65:14, 66:11, 66:20, 69:10, 70:5, 75:7, 75:10, 77:10, 79:1, 82:8, 88:1, 89:6, 95:14, 98:9, 99:22, 100:18 saying 37:17, 39:6, 54:19, 87:12, 88:19, 89:15 says 15:17, 24:3, 24:12, 53:18, 54:15, 55:22, 57:16, 58:8, 63:3, 84:12,	87:4, 87:20, 89:1, 103:7, 103:14 scale 36:9, 88:2, 88:5 scale's 86:9 scales 89:19 schedule 22:15 schematic 73:10 scratch 69:14 screen 8:11, 11:6, 15:17, 53:2, 53:22, 54:15, 84:12, 84:13, 85:8 screen-printing 85:10 scroll 11:15, 12:11 search 99:7 second 11:19, 38:4, 47:7, 72:20, 78:3, 78:9, 78:16, 79:22, 84:12, 84:15, 84:19, 92:18, 94:1, 94:2, 94:13, 94:20, 95:3, 95:16, 97:3, 97:11, 97:13, 106:9, 106:22 section 14:22, 56:3, 56:8, 56:21, 84:2, 84:4 section's 84:1 see 7:15, 11:15,
---	--	--	--

17:16, 24:19, 39:4, 40:20, 52:3, 52:15, 62:20, 63:1, 63:20, 69:19, 69:20, 70:3, 70:19, 70:22, 71:4, 71:7, 71:14, 72:3, 73:2, 76:8, 76:9, 78:4, 78:13, 79:18, 80:4, 81:7, 102:9, 104:18, 106:18, 107:3 seeing 51:22, 99:10 seen 102:12 selection 21:9 selectively 95:5 self-assembling 53:4 sell 51:12 semiconductor 23:9, 24:7, 24:15, 24:21, 25:1, 25:2, 25:6, 29:15, 29:19, 30:5, 33:2, 34:20, 35:12, 36:14, 37:3, 38:18, 39:6, 41:9, 41:19, 42:6, 42:19, 43:8, 59:14, 62:13, 64:19, 65:1, 70:10, 72:4 semiconductor-wi- se 47:18 semiconductors 33:10, 42:1, 44:22, 65:1,	104:4 sense 72:10, 92:17, 100:9 sensor 100:8 sentence 48:16, 62:19, 62:21, 65:15 serial 42:13, 48:2 served 17:8 services 19:11, 19:14, 20:21 session 8:19 set 28:18, 109:7, 110:9 shadow 43:4, 43:5, 45:20, 46:13, 54:2, 54:9, 54:11, 54:17, 91:20, 104:21 shadow-masking 43:19 shape 40:2 shapes 72:19 short 34:1, 34:10, 93:21 short-circuit 64:1, 64:3, 64:12, 66:3, 84:6, 85:3 short-circuited 94:14, 94:21 short-circuiting 95:4 shorthand 109:1 shorting 84:18	shorts 62:12 should 9:5, 12:13, 52:1, 52:2, 58:4, 79:16, 101:19 shouldn't 70:11 show 71:19, 71:22, 72:5, 72:8, 72:11, 72:12, 78:1, 81:7, 81:22, 82:17 showing 69:17, 70:1, 71:18, 74:8, 105:8, 105:11 shown 67:21, 68:5, 68:10, 68:14, 71:5, 72:18, 73:21, 74:4, 82:9, 94:12, 103:3, 104:11 shows 73:8, 73:9, 82:18, 85:18, 85:22, 103:19 shutter 27:4 side 61:13, 69:11, 78:15, 78:19, 80:11, 93:22, 94:4, 94:6 sign 16:16 signature 12:19, 16:13 signature-plkal 110:14 signed 12:21, 13:2, 16:19, 17:1, 17:2 signing 109:22	similar 68:8, 88:2 similarly 94:19, 105:6 simply 83:19 simultaneously 42:10, 47:21 since 10:8, 19:3, 19:20, 20:8, 21:15, 25:10 single 27:13 singles 53:17 singular 33:15 size 36:9, 42:4, 50:20, 51:4, 54:7, 88:4, 89:19 size-wise 50:11 sizing 104:7 skill 56:17, 61:9, 62:15, 67:8, 75:20, 95:15, 97:20, 107:14 slightly 30:10, 74:2 slow 48:14 small 81:1 solely 42:12 solicitation 21:9 solid 19:10, 19:14, 20:20 solution 23:3 solve 82:7, 83:16
---	---	--	---

solving 85:6 some 5:20, 9:17, 10:18, 25:18, 25:19, 31:6, 31:20, 32:10, 32:15, 33:18, 34:12, 35:3, 35:7, 40:6, 41:22, 42:6, 42:11, 42:21, 43:2, 43:9, 45:10, 45:11, 51:8, 51:11, 53:13, 54:17, 59:1, 59:8, 60:2, 60:3, 60:13, 63:14, 72:2, 74:18, 75:11, 76:16, 80:20, 81:9, 81:22, 82:16, 93:7, 93:8, 104:13, 106:8, 106:10 somebody 77:12, 81:6 someone 8:22, 69:15 something 14:22, 27:8, 34:18, 36:8, 36:22, 37:7, 40:22, 41:2, 41:3, 44:20, 51:11, 64:13, 70:7, 96:16, 97:8, 100:17, 101:21 sometimes 20:10, 20:12, 25:15, 27:21, 32:15, 33:10, 33:11, 33:14, 35:14, 38:12, 40:8, 56:22, 71:21	somewhat 35:3, 74:2, 75:9 sophisticated 28:21 sorry 37:10, 37:12, 51:21, 64:20, 78:22, 96:2, 99:13 sort 31:21, 34:13, 35:7, 43:9, 45:11, 54:17, 60:2, 60:13, 104:13 space 54:6, 95:5 spacing 60:5, 93:16 span 25:11 speak 10:5 speaking 51:6, 51:7, 63:17 speaks 87:10 spec 88:16, 89:1, 98:9, 100:1 special 56:22, 58:11 specialty 25:18 specific 14:14, 36:3, 37:7, 42:12, 55:13, 85:9 specifically 7:11, 23:8, 52:12, 55:16, 68:1, 106:14 specification 87:19, 88:17, 89:8, 98:6, 99:20	specifics 50:10 spending 22:3 spent 13:8, 23:18 spill 64:7 spoken 10:9 spot 65:22, 66:1 standard 33:19, 48:14, 57:16, 108:5 standards 14:22, 56:4, 56:8 start 39:6, 40:22, 69:14, 88:18, 95:13, 104:10 started 20:20 starting 31:4, 55:17, 98:14 starts 62:21, 84:11 state 2:14, 5:10, 19:10, 19:14, 20:21, 29:9, 35:17, 109:4, 110:17 states 1:1, 4:9, 4:11, 52:21 stenographer 108:3, 108:7 stenographically 1:21 step 84:13 steps 68:14, 85:22 still 19:7, 20:12, 37:13, 41:13, 106:12 strategic 23:11 strategy 22:5 street 3:6, 3:14 strikes 54:16 structure 32:14, 32:19, 34:11, 34:13, 35:8, 36:5, 38:14, 38:21, 39:14, 39:16, 39:17, 39:18, 39:22, 40:16, 45:6, 49:7, 69:11, 69:19, 74:9, 85:9, 105:8 structured 52:22 structures 31:10, 37:1, 40:15, 47:20, 72:6, 88:3 student 23:7, 23:13 stuff 32:22, 38:19, 56:14, 62:12 style 54:2, 54:10 sub-elements 98:18 sub-layers 98:19 subject 21:21 sublayers 32:8 submerged 37:5 submitted 10:8, 10:19, 13:16
---	---	--

submitting 19:3 subpixel 27:8, 27:9, 27:11, 27:17, 28:3 subpixels 27:20, 27:22, 28:5, 28:17, 29:8, 29:9 subsection 56:12 subsequent 44:19 substance 105:16 substrate 31:1, 31:3, 31:5, 31:6, 39:21, 43:12, 43:14, 53:1, 67:22, 68:2, 68:4, 68:9, 69:3, 96:13, 96:18, 96:22, 103:4, 104:11, 106:21 subtle 75:6 subtract 41:12 subtracting 41:2 subtractive 39:7, 40:3, 40:7, 40:9, 40:17, 40:22, 41:1, 41:10, 45:3, 45:13 sufficient 49:19, 53:8 suite 3:15, 30:5 summary 52:17 super 99:9 supplement 15:21	supplemental 4:15, 11:19, 15:13, 15:17, 16:5, 16:12, 16:16, 16:22, 17:8, 17:15, 18:5, 57:15, 57:19, 57:21, 95:9, 106:13 support 13:16, 14:17, 17:8 suppose 50:19, 67:11 supposed 103:4 sure 5:12, 11:7, 21:22, 22:14, 27:16, 85:11, 91:8, 92:17, 93:20, 101:7, 106:1 switch 31:8, 83:2 sworn 5:4, 109:8 symbol 69:1, 69:2 system 62:13 T tab 4:8, 11:2, 11:3, 15:5, 15:7, 51:17, 51:22, 52:1, 83:5, 86:22, 101:14, 101:16, 101:19 take 6:7, 6:10, 10:22, 15:3, 32:8, 32:9, 32:10, 32:22, 37:16, 40:14, 51:15, 54:21, 57:19, 70:14, 71:15, 73:6, 78:2, 86:21, 87:1, 91:1, 95:8, 98:12, 99:8, 101:3, 101:12, 105:20 taken 55:1, 58:8, 70:4, 101:9, 106:3, 109:10 takes 42:5, 44:7 taking 6:12, 6:17, 35:16, 37:19, 40:6 talk 23:12, 25:21, 47:1, 49:13, 58:20, 62:7, 65:16, 75:8, 87:8, 99:20 talked 11:17, 29:14, 31:22, 32:1, 42:16, 54:11, 73:7, 86:8, 86:12, 88:5, 91:16, 93:3, 93:6, 98:1 talking 20:5, 36:20, 39:12, 43:1, 44:9, 45:19, 45:21, 47:6, 47:12, 47:13, 49:1, 55:5, 62:19, 63:22, 85:9, 86:16, 87:7, 89:8, 91:3, 91:11, 94:11, 98:9, 98:17, 98:22, 99:12 talks 19:2, 65:13, 98:10	team 22:12 technical 14:15, 19:15, 21:22, 24:5 technician 3:20, 11:5, 51:21, 52:3, 79:15 technicians 22:22 technique 30:1, 30:2, 40:7, 40:17, 41:2, 46:7, 46:13, 46:14, 47:13, 49:5, 49:17, 55:13, 65:6 techniques 30:6, 39:8, 44:2, 44:5, 48:11, 48:17, 53:8, 53:21, 55:8, 55:12, 65:11, 66:16, 66:21 technologies 19:16, 89:19 technology 87:11 temporary 20:13, 44:18 ten 101:5, 108:7 ten-minute 105:21 tend 19:2 tenth 3:6 term 57:1, 97:21 terminology 16:7, 16:8, 36:13, 37:16 terms 45:4, 56:15,
--	---	---

57:1, 58:4, 58:12, 59:21, 91:3 test 35:22, 83:22 testified 5:5 testimony 9:8, 24:4, 24:13, 105:16, 109:11 testing 35:20 text 52:16 th 3:14, 12:22, 16:17, 110:10 thank 11:7, 108:2 thanks 101:8, 106:2 themselves 31:3 therefore 82:11 therewith 84:16 thermal 35:14 thick 83:18, 85:19, 86:4 thickness 79:6, 81:4, 93:10 thing 42:5, 42:14, 44:9, 46:22, 51:11, 99:4 things 32:12, 42:16, 50:5, 63:21, 69:18, 72:18, 72:19, 87:8, 91:2 think 7:19, 9:19,	13:11, 13:12, 19:1, 30:7, 32:14, 33:9, 34:16, 35:9, 37:14, 40:12, 40:21, 41:7, 47:15, 50:18, 51:7, 51:13, 54:9, 54:20, 55:11, 58:2, 58:7, 58:10, 63:16, 69:22, 72:13, 75:16, 75:18, 76:14, 81:8, 82:20, 90:20, 90:21, 91:7, 98:16, 105:6 thinking 36:21, 99:11 third 47:5, 47:9, 72:20 thomas 7:16 thought 54:10 thousands 42:9, 47:20 three 5:18, 9:19, 9:22, 10:2, 28:4 through 8:18, 8:19, 9:2, 12:17, 27:5, 34:9, 36:6, 37:3, 37:4, 38:3, 40:6, 43:11, 43:13, 52:12, 56:14, 66:2, 68:12, 77:2, 78:12, 78:20, 79:2, 80:15, 85:21, 92:13 throughout 27:7 throw 11:2	time 5:17, 22:19, 42:14, 49:18, 58:22, 59:17, 61:4, 61:7, 65:12, 66:6, 66:17, 107:15, 107:21, 108:6 times 5:15, 5:20 timing 42:4 today 5:21, 6:7, 6:18, 7:1, 7:8, 8:10, 9:8, 9:11, 12:6, 16:3, 105:15, 107:22 today's 7:11, 8:16, 9:14, 10:4, 10:14, 11:3 together 14:2, 27:12, 51:14, 86:15 tolerance 65:8 tolerances 64:9, 65:9, 74:14, 86:5 took 70:16, 70:18, 71:2, 71:4, 72:22 tool 30:21 tools 25:1, 25:3 top 38:1, 38:5, 44:20, 45:5, 61:11, 68:9, 68:19, 69:12, 70:18, 71:5, 72:13, 74:9, 78:5 topic 38:19	total 9:21, 10:2, 21:5 touching 64:4, 93:4 toward 100:3 towards 70:18, 71:5, 84:15 trade-off 54:6 trademark 1:1 trades-off 43:16 trained 22:21 transcript 4:6, 11:9, 15:10, 51:20, 83:7, 101:17 transistor 28:18 transistors 28:19, 29:6 transparency 35:5 transparent 100:3, 100:6 treated 6:14 treats 73:13 trenches 72:20, 73:3 trial 1:3 true 9:7, 56:11, 57:13, 105:12, 109:10 truthfully 9:11 try 6:3, 6:7, 16:8, 37:16, 82:2, 83:21, 98:13
---	--	--	--

trying 22:8, 31:19, 32:13, 37:14, 38:20, 40:21, 46:9, 48:19, 48:22, 51:12, 60:20, 61:16, 62:2, 62:3, 63:9, 70:6, 71:10, 71:18, 72:5, 72:8, 72:10, 72:12, 81:5, 81:7, 83:16, 88:3 tunnel 37:2, 38:11 turn 12:9, 16:11, 18:12, 23:21, 55:16, 58:15, 76:6, 96:1 turnaround 108:6 twice 76:17 two 5:18, 10:19, 11:17, 21:4, 33:21, 34:8, 34:12, 34:17, 35:11, 60:1, 60:13, 60:15, 60:21, 61:5, 62:21, 64:4, 77:21, 79:5, 91:10 type 20:1, 26:11, 30:14, 49:16, 51:3, 54:10, 59:1, 86:6, 104:13 types 41:19, 48:9, 50:16, 50:21, 54:5, 54:17, 91:2 typical 28:1, 35:6	typically 28:22, 31:20, 33:17, 34:11, 35:18, 44:17, 60:6, 63:3, 63:10 U uc 25:5 uh-huh 70:15 ultimately 36:8, 68:16 umbrella 19:22, 20:16 unclear 16:9, 88:19 unconventional 63:14 under 19:22, 52:17, 67:6, 88:2 undergrad 25:5 underlying 45:7 understand 6:1, 6:13, 9:10, 12:5, 12:8, 13:15, 17:7, 56:15, 56:21, 61:10, 61:16, 61:17, 95:15, 97:20 understanding 23:5, 67:20, 78:8, 85:5, 90:6, 100:10, 106:19, 107:13 understood 6:4, 56:17 undesirable 61:22 uneven 63:7 unevenness 65:19	unexpectedly 84:14 uniform 60:6 unformed 63:4 united 1:1, 4:9, 4:11 unless 34:3 unlike 80:14 until 24:20 upper 73:18, 80:8 use 8:10, 8:11, 8:12, 11:11, 16:7, 16:8, 27:22, 28:1, 35:1, 35:2, 35:14, 40:18, 40:21, 46:17, 69:13, 69:15, 77:8, 79:11, 100:3 uses 46:1 using 7:5, 25:2, 31:12, 36:12, 40:16, 41:9, 49:12, 53:18, 85:10, 86:2, 91:19 usually 27:1, 32:21, 33:15, 36:4 utilities 7:3 V vacuum 43:10 vapor 30:8, 30:11, 30:12	variety 50:2 various 25:10, 55:12 vcsel 50:20 ventures 20:15 version 79:11 versions 8:7, 8:8 vertical 34:13 vertically 37:1, 77:2 via 34:18, 34:19, 35:11, 35:13, 36:3, 36:4, 36:18, 36:21, 36:22, 37:8, 38:10, 49:19, 109:18 vias 35:14, 35:17 view 68:19, 69:5, 69:9, 69:12, 69:14, 69:15, 70:14, 72:13, 72:16, 72:19, 73:9, 73:11, 107:6, 107:8 virginia 16:20, 17:2, 17:5 virtually 1:15, 2:2 voltage 93:13 W want 18:13, 33:22, 34:9, 36:16, 39:15, 39:19, 51:10, 52:11,
---	---	---	---

55:16, 62:1, 64:21, 67:16, 77:20, 78:11, 79:10, 81:3, 81:4, 83:2, 93:13, 95:22, 102:2, 102:5 wanted 21:20, 34:3, 38:1 wanting 35:4, 38:13, 38:15 warrick 3:12, 4:4, 9:17, 22:16, 33:6, 38:6, 40:19, 46:15, 49:14, 49:22, 50:7, 53:11, 54:14, 55:10, 57:12, 58:6, 58:13, 61:14, 62:9, 64:6, 70:21, 71:9, 73:4, 74:1, 74:6, 74:17, 75:4, 75:15, 78:18, 81:20, 82:14, 83:17, 85:13, 86:20, 87:15, 87:21, 88:12, 88:22, 89:5, 90:2, 90:9, 91:6, 91:18, 97:16, 97:22, 100:14, 103:13, 103:18, 104:1, 104:17, 105:4, 105:20, 106:2, 106:6, 107:17, 108:2, 108:3, 108:5, 108:8 washington 3:8, 3:16 way 8:11, 12:13,	33:1, 35:16, 38:7, 38:16, 41:4, 59:13, 63:11, 63:12, 63:17, 72:13, 98:21, 110:6 ways 34:14, 38:19, 41:21, 45:7, 46:16, 76:16 we'll 105:22 we're 6:12, 7:5, 69:10, 69:12 we've 54:20 wedding 17:6 wednesday 1:16, 109:19 weeks 5:18 weird 70:9 well-known 64:16, 64:18, 66:5 welsh 3:20, 11:1 went 23:14, 56:14, 80:15 west 16:20, 17:2, 17:5 whatever 8:13, 23:4, 49:7 whereas 47:21 whereof 110:9 whether 75:2, 89:12, 107:4 whichever 65:6	white 27:3 whole 30:5, 34:10, 48:17, 86:13 wide 20:16 width 81:16, 82:21 within 20:15, 31:14, 34:20, 38:21, 59:14, 60:19, 66:15, 75:7, 89:7, 93:5, 99:21, 100:19, 109:4 witness 101:7, 105:19, 108:1, 109:7, 109:11, 110:9 wording 90:13 work 19:7, 19:10, 19:13, 23:7, 35:15, 40:10, 42:6, 60:19, 101:5 worked 19:19, 20:9, 26:8 working 13:9, 17:4, 20:14, 20:15, 20:20, 21:2, 22:6, 22:12, 25:1, 73:14, 88:1 works 30:19 world 34:21 worried 51:13 wouldn't 32:19, 63:16, 71:7, 73:2,	74:15, 75:7, 91:1, 94:17 write 14:4, 14:6, 14:10, 14:13 writing 17:15, 18:4, 18:7 wrong 17:22 y yeah 9:4, 11:14, 19:5, 20:1, 22:17, 23:20, 25:11, 27:21, 29:4, 30:3, 30:4, 30:16, 30:20, 32:7, 32:21, 33:9, 33:20, 34:7, 34:9, 35:9, 35:19, 37:8, 37:10, 37:11, 40:8, 40:12, 42:1, 43:3, 43:7, 43:15, 43:20, 44:4, 44:13, 45:3, 45:22, 46:5, 46:18, 46:20, 47:22, 48:8, 50:8, 51:1, 51:11, 54:3, 54:7, 56:13, 57:11, 57:16, 60:15, 61:15, 62:10, 63:6, 64:7, 64:9, 64:22, 65:13, 66:18, 68:3, 68:19, 68:20, 69:1, 71:17, 72:8, 73:5, 73:10, 73:12, 74:2, 74:7, 74:9, 74:20,
---	--	---	---

75:10, 76:14, 80:13, 84:3, 84:8, 85:15, 86:13, 87:3, 88:13, 88:16, 90:21, 91:7, 91:11, 91:19, 92:11, 94:4, 94:16, 95:7, 97:17, 98:16, 98:20, 99:8, 99:10, 99:13, 103:15, 104:20, 105:9 years 21:4, 24:5, 24:8, 24:14, 24:16 yep 67:19, 92:1 yourself 14:7, 14:10, 14:13, 29:16	55:1, 55:2, 86:22, 95:11 1001 4:9, 51:19, 52:2, 52:6, 52:8, 67:13, 86:22, 96:1 1008 4:11, 83:5, 83:6, 83:11 101 4:8 106 4:4 11 4:13, 16:11, 98:14, 101:9, 101:10, 106:3 110 1:20 12 39:2, 92:2, 94:8, 94:21, 95:4, 95:11, 99:12, 106:4, 108:9 13 16:12, 92:2, 94:1, 94:20, 95:3 14 58:16, 92:6, 93:18, 94:7, 94:15 15 4:15, 39:2, 52:12, 52:20, 62:21, 92:21, 93:2 16 83:5, 92:18, 94:2, 94:14, 96:3, 96:8, 96:11, 97:2, 102:5, 102:10 17 3:14, 58:17 18 55:18, 56:1	19 52:13, 52:20 1i 76:12, 78:5 2 20 1:16, 12:22, 49:7, 87:1, 92:9, 92:15, 94:1, 109:19 2000 25:3 20001 3:8 20006 3:16 2001 4:13, 11:4, 11:8, 11:12, 16:1, 16:4, 18:13, 39:1, 55:15 2005 4:15, 15:8, 15:9, 15:11, 15:16, 15:21, 16:5, 95:10, 106:13 2006 21:15, 25:3, 25:11 2007 19:20 2008 20:8 202.662 3:9 202.777 3:17 2024 1:11, 12:22 2025 1:16, 16:17, 109:19, 110:10 2028 110:13 21 106:16, 106:18	22 96:2, 102:6 24 12:22 25 1:16, 109:19 27 110:10 28 16:17, 73:16 3 30 95:10, 95:14 32 55:1 33 1:17, 109:20 34 76:7 35 76:10 37 39:2, 39:5, 42:17, 43:17, 76:7 38 43:22, 45:19, 47:1, 47:6, 47:14, 48:3, 49:2, 63:19, 70:20, 70:22, 71:4, 71:6, 71:7, 73:18, 74:4 4 40 13:11, 72:20, 73:3 41 63:19 42 72:20, 73:3, 101:9 44 55:2 45 12:10, 12:18,
---	---	--	--

58:15, 62:7, 62:18 48 12:11 49 18:14, 83:22 492 7:16, 12:7, 49:18, 49:21, 50:1, 50:5, 51:15, 52:9, 52:17, 53:7, 53:17, 55:7, 57:6, 57:22, 58:4, 58:22, 59:4, 62:16, 65:12, 65:13, 66:6, 66:17, 67:12, 73:13, 76:2, 86:8, 86:10, 86:21, 87:14, 87:19, 88:9, 95:18, 95:22, 96:2, 97:21, 98:1, 98:7, 100:16, 106:10, 107:5, 107:14	8 83 4:11, 76:6, 76:10, 82:8 850 3:6, 3:15 87 63:18, 63:22 9 9 1:17, 109:20 9,257,492 1:12, 4:10, 12:3, 12:6 92 25:8 96 24:19, 24:20, 24:22	
5 5,691,877 4:12 51 4:9 52 101:10 53 84:11 57 84:9, 106:3 58 92:14 59 83:22, 92:15 595442 1:19		
7 750 3:14		