

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD
3 - - - - - x
4 ZHUHAI COSMX BATTERY :
5 CO., LTD., :
6 Petitioner, : IPR2025-00524
7 v. : U.S. Patent No. 12,015,118
8 NINGDE AMPEREX :
9 TECHNOLOGY LTD., :
10 Patent Owner. :
11 - - - - - X

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14 Deposition of DEAN R. WHEELER, Ph.D.
15 Conducted Virtually
16 Monday, March 30, 2026
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1 Deposition of DEAN R. WHEELER, Ph.D., conducted
2 virtually.

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4
5 Pursuant to notice, before Debra Ann Whitehead,
6 E-Notary Public in and for the Commonwealth of
7 Virginia.

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C O N T E N T S

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By Mr. O'Connor	123

EXHIBITS MARKED IN TODAY'S SESSION

(None marked)

EXHIBITS MARKED IN PRIOR SESSIONS

(Not Attached)

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

2 DEAN R. WHEELER, Ph.D.,

3 having been duly sworn, testified as follows:

4 EXAMINATION BY COUNSEL FOR PETITIONER

5 BY MS. KELLY:

6 Q All right. Good morning, Dr. Wheeler.

7 A Good morning.

8 Q Thank you for being here.

9 Do you understand that you are here to
10 provide testimony in IPR2025-00524?

11 A Yes.

12 Q Have you ever given a deposition before?

13 A Yes.

14 Q About how many times?

15 A I gave two depositions in January.

16 Q Were those both as expert witnesses?

17 A Yes.

18 Q Were either of them specifically for an
19 IPR proceeding?

20 A Yes.

21 Q Were both of them?

22 A Yes.

1 Q Were either of them remote depositions?

2 A No.

3 Q Okay. So a remote deposition works a
4 little differently, but most of the basic premise
5 is the same.

6 So we'll start out with some
7 preliminaries about how depositions work. But
8 first for the remote aspect, where are you right
9 now?

10 A I'm at my office at Brigham Young
11 University in Provo, Utah.

12 Q Do you have, other than the computer that
13 you are using for this Zoom platform, do you have
14 any other electronic communications in the room
15 with you?

16 A No. I have my phone, which is silenced,
17 so ...

18 Q Is it possible to turn your phone off
19 during the deposition?

20 A Sure. I'll do that now.

21 Q Thank you. Is there anyone else in the
22 room with you?

1 A No.

2 Q Other than the Zoom platform, do you have
3 any other windows open on your computer?

4 A Yes; I have Adobe Acrobat open with some
5 of the documents that are pertaining to this case.

6 Q Other than documents pertaining to this
7 case, do you have any other documents open on your
8 computer or any other, you know, email client or
9 communication windows?

10 A Let's see. Let me close my -- I have
11 my -- one other client open. Let me close that.

12 Okay. Nothing else.

13 Q Are any of the documents you described as
14 pertaining to this case documents other than those
15 that have exhibit numbers for this IPR?

16 A There are -- they're all exhibit numbers
17 or paper numbers, yeah.

18 Q Do you have any other notes or reference
19 materials?

20 A No. I have a blank -- two blank sheets
21 of paper in front of me just for my own taking of
22 notes, but I don't have any other materials.

1 Q Okay. So for the deposition I obviously
2 hope not to go too long because I want to be
3 respectful of your time, but generally I will try
4 to take a break every hour, just the way you do in
5 a live deposition. And if for any reason you need
6 a break, you can always ask for one.

7 Usually if there is a question pending, I
8 will ask that you answer the pending question
9 first and then we can take a break.

10 Does that all make sense?

11 A Yes.

12 Q And just like in a live deposition, and
13 in fact even more important in the remote context,
14 it's important that we don't talk over each other
15 in order to get a clear record, especially on
16 Zoom. If two people talk at the same time often
17 one of their microphones doesn't pick up, and so
18 we want to make sure that everything you say gets
19 heard and is transcribed for the record.

20 Does that make sense?

21 A Yes.

22 Q And because it's a deposition, we need

1 all of your answers to be out loud and verbal,
2 which is why sometimes when I say things that are
3 a statement, I will then say, is that correct, in
4 order to give you a chance to give a verbal
5 response.

6 Do you understand?

7 A Yes.

8 Q Throughout the deposition your attorney
9 may make objections to some of the questions that
10 I ask. That is an exercise in preserving
11 objections for the record. But if you are able to
12 answer the question as I have asked it, then you
13 are still supposed to try to answer.

14 Does that make sense?

15 A Yes.

16 Q If there is a time that you don't
17 understand a question that I ask, you can always
18 ask for clarification. And if you don't ask for
19 clarification, then I will presume that you
20 understood the question as asked.

21 Does that make sense?

22 A Yes.

1 Q Do you understand that you are under oath
2 for this proceeding?

3 A Yes.

4 Q Is there any reason you cannot testify
5 fully and truthfully today?

6 A No.

7 Q About how long did you prepare for your
8 deposition today?

9 A What do you mean by "how long"?

10 Q About how many hours did you spend in
11 preparation specifically for this deposition; that
12 includes reviewing materials, meetings you may
13 have had with your attorneys dedicated to
14 preparing for this deposition?

15 A I'd say about ten to 20.

16 Q In your preparations for this deposition
17 did you review the deposition transcript of
18 Dr. Gido?

19 A Not -- not in its entirety, but I have --
20 I have previously reviewed it prior to this
21 preparation period.

22 Q When you say "not in its entirety," was

1 the entirety of the transcript given to you, or
2 were you only given portions?

3 A I have the entirety of the transcript.

4 Q During your preparations were there ever
5 any references or information that you wanted and
6 you asked for but you did not receive?

7 A No.

8 Q Can you please go to Exhibit 2058.
9 (Exhibit 2058, previously marked, not
10 attached.)

11 Q It is your supplemental declaration.

12 A Yes, I'm there.

13 Q Can you turn to Paragraph 18 on Page 6.

14 A Yes, I'm there.

15 Q In this paragraph you state that Dr. Gido
16 construes two terms in the '118 patent claims,
17 "compaction density" and "average particle size."

18 Do you see that?

19 A Yes.

20 Q Do you have any disagreement with the way
21 that Dr. Gido has interpreted the term "compaction
22 density"?

1 A Give me a moment to review.

2 I have no -- nothing to add to Dr. Guido's
3 explanation of compaction density.

4 Q Is there anything in his explanation of
5 compaction density that you say is erroneous or
6 that you disagree with?

7 MR. O'CONNOR: Object to form.

8 A I may disagree with his interpretation in
9 how that definition is applied to specific cases,
10 but I don't disagree with his general definition.

11 Q What about for average particle size?

12 A My testimony is that Dr. Guido's
13 definition of average particle size is ambiguous.

14 Q In what way is it ambiguous?

15 A Because there are different ways to
16 determine averages, and so you have to be very
17 particular in your definitions to -- so that
18 there's no ambiguity.

19 Q How would you propose to disambiguate
20 Dr. Guido's definition?

21 MR. O'CONNOR: Object to form.

22 A Again, it depends on the context of the

1 particular case where an average is being sought.

2 So if an average is being sought in a
3 particular reference, then it's important to
4 determine what the intention is of that reference
5 and how they intend to or describe how they are
6 making an average. And so you can't generalize
7 average until you know what someone has in mind or
8 what their intention is.

9 Q What would a person of ordinary skill
10 have in mind in reading the term "average particle
11 size" as it appears in the claims of the '118
12 patent?

13 A Can you direct me to a place where it
14 uses that term?

15 Q Sure.

16 MS. KELLY: Why don't we pull up the
17 patent, I believe it's Exhibit 1001.

18 (Exhibit 1001, previously marked, not
19 attached.)

20 A Okay, I have that.

21 Q So are you familiar with the structure of
22 a patent, where the claims are at the end?

1 A Yes.

2 Q All right. I can find an example, but
3 the -- I mean, if you go to the end of the claims,
4 the term "average particle size" should appear in
5 the independent claims.

6 Do you see it?

7 A Yes.

8 Do you have another question?

9 Q Well, so my question that I'm still
10 waiting on an answer to is, how would one of
11 ordinary skill in the art understand the term
12 "average particle size" as it appears in the
13 claims of the '118 patent?

14 A So in looking at the claims, one would
15 look to see if there's any particular definition
16 inside the claim itself. And if not, one would
17 look at the specification to see if there's
18 additional information that would suggest what the
19 reference is using to determine an average.

20 So in the '118 patent there is additional
21 information in the specifications that suggest
22 what they mean by average.

1 Q And what is that?

2 A It discusses a Dv50 value, that would be
3 someone would look at that as a potential meaning
4 of average.

5 Q So when you say someone would "look at
6 that as a potential meaning of average," are there
7 other potential meanings of average in the
8 specification?

9 A I don't see anything else.

10 Q So having nothing else to go on, would a
11 person of ordinary skill in the art equate the
12 average particle size used in the claims with the
13 Dv50 value described in the specification?

14 A Yes, they would equate the two if they
15 don't have any other information to base that on.

16 Q Can you go to Paragraph 22 of your
17 declaration on Page 9.

18 MR. O'CONNOR: Are we still on Exhibit
19 2058, Counsel?

20 MS. KELLY: Yes.

21 MR. O'CONNOR: Great.

22 A Paragraph 29?

1 Q Sorry, Paragraph 22, Page 9.

2 A Oh, sorry.

3 Yes, I'm there.

4 Q In Paragraph 22 you say, "I further
5 understand that for purposes of the Institution
6 Decision, the Board determined that no term of the
7 challenged claims requires construction beyond the
8 ordinary and customary meaning of the terms, as
9 understood by a person of ordinary skill in the
10 art at the time of the invention."

11 Do you see that?

12 A Yes.

13 Q Do you agree with the Board as you have
14 quoted them in that paragraph?

15 A My opinion was that I understood what the
16 Board had done. I haven't examined every decision
17 of the Board to see if I agree with it.

18 Q Did you examine this particular decision
19 of the Board to determine whether you agree with
20 it?

21 A I haven't looked at all the details of
22 the Institution Decision with respect to claim

1 construction, only the things that seemed
2 pertinent to me.

3 Q What things seemed pertinent to you?

4 A Anything that would relate to this
5 particular patent '118.

6 Q Do you agree that the interpretation of
7 average particle size that we just discussed
8 comports with the ordinary and customary meaning
9 of that term as referred to by the Board in --
10 that you quote in Paragraph 22?

11 MR. O'CONNOR: Object to form.

12 A So as I testified a few minutes ago, when
13 you see terms, you have to interpret them as
14 understood in the reference itself. And if
15 there's no information in the reference itself,
16 then you rely on your general knowledge of the
17 field as a POSITA would have. So that's my
18 position on the meaning of the terms in the '118
19 patent.

20 Q Do you agree that the term "average
21 particle size" does not require construction
22 beyond the ordinary and customary meaning of the

1 term as understood by a person of ordinary skill
2 in the art at the time of the invention?

3 MR. O'CONNOR: Object to form.

4 A I'm going to need a moment to review what
5 the Board said. Taking me a minute to find the
6 appropriate document.

7 Q If you're looking for the Institution
8 Decision, it's Paper 11.

9 A Thank you.

10 So I see in the Institution Decision that
11 they say in Paragraph -- or on Page 9, on claim
12 construction, that "no term of the challenged
13 claims requires construction beyond the ordinary
14 and customary meaning of the terms as understood
15 by a person of ordinary skill in the art at the
16 time of the invention."

17 Are you asking if I agree with that?

18 Q I am asking that specifically for the
19 term "average particle size."

20 Do you agree that average particle size
21 does not require construction beyond the ordinary
22 and customary meaning of that term as understood

1 by a person of ordinary skill in the art at the
2 time of the invention?

3 A I agree with that.

4 Q And is the ordinary and customary meaning
5 of the term "average particle size" consistent
6 with the Dv50 value that we discussed a few
7 moments ago?

8 A Again, as I said, it depends on the
9 context, so I wouldn't want to generalize that it
10 always means Dv50. But in the context of the '118
11 patent, I do agree that that's what it means.

12 Q For the term "compaction density," do you
13 agree that compaction density does not require
14 construction beyond the ordinary and customary
15 meaning of that term as understood by a person of
16 ordinary skill in the art at the time of the
17 invention?

18 MR. O'CONNOR: Object to form.

19 A Can you restate the question?

20 Q For the term "compaction density," do you
21 agree that compaction density does not require
22 construction beyond the ordinary and customary

1 meaning of that term as understood by a person of
2 ordinary skill in the art at the time of the
3 invention?

4 MR. O'CONNOR: Same objection.

5 A I agree.

6 Q Is the ordinary meaning of the term
7 "compaction density" consistent with the meaning
8 that Dr. Gido interprets that term as you and I
9 discussed a little while ago?

10 MR. O'CONNOR: Object to form.

11 A Can you point to his testimony on that?

12 Q So in -- let's see -- Exhibit 1010,
13 Paragraph 68, he discusses his interpretation of
14 the ordinary and customary meaning of the term
15 "compaction density."

16 (Exhibit 1010, previously marked, not
17 attached.)

18 A Dr. Gido states in his Paragraph 68 that
19 the plain and ordinary meaning of compaction
20 density refers to the density of the electrode --
21 the electrode active material layer, including all
22 components of this layer, active material powder,

1 binder, and polymer and conductive additive, after
2 it has been subjected to the compression step of
3 the electrode-formation process.

4 I would also note that there is some
5 other testimony that he gave in his deposition,
6 but what I see here I would agree with.

7 Q Can you please go to Paragraph 34 of your
8 declaration, Exhibit 2058. It starts on Page 14.

9 A Sorry, which paragraph?

10 Q Paragraph 34.

11 A Yes.

12 Q Starts on Page 14.

13 A Uh-huh. I'm there.

14 Q Towards the bottom of that paragraph
15 which is on Page 15 you say, "Dr. Gido's
16 suggestion that laser diffraction or scattering
17 devices using a particle diameter standard as a
18 volume standard would necessarily output
19 cumulative volume distributions is incorrect."

20 Do you see that?

21 A Yes.

22 Q Did Dr. Gido say that it would

1 necessarily output cumulative volume
2 distributions?

3 MR. O'CONNOR: Object to form.

4 A As I state here, he suggested that would
5 be the interpretation.

6 Q So I notice following that sentence there
7 is no citation.

8 Is that correct?

9 A That's correct, there's no citation at
10 the end of that paragraph.

11 Q So when you made that sentence
12 attributing that suggestion to Dr. Gido, did you
13 have anything in particular in mind to support
14 your characterization of Dr. Gido's suggestion?

15 MR. O'CONNOR: Object to form.

16 A Yes, I did have something in mind.

17 Q What did you have in mind?

18 A I had in mind his testimony about how to
19 interpret the language in Ishigaki.

20 Q Okay. But you don't actually cite
21 anything where Dr. Gido made this statement or
22 suggestion in your report?

1 A If you look above, if one looks above in
2 the -- my testimony in that declaration, there's
3 citation to what Dr. Gido stated about Ishigaki
4 that provides the context for someone to interpret
5 what I was saying.

6 Q Okay. That block quote does not use the
7 word "necessarily." Correct?

8 A So we're referring to the block quote
9 also in my Paragraph 34?

10 Q I was under the impression that that's
11 what you identified as support for the statement.
12 If that is not, then let me know.

13 MR. O'CONNOR: Counsel, is there a
14 question pending?

15 A So, yes, there -- the question that I
16 understand is does Dr. Gido use the word
17 "necessarily" in the block quote that I have in
18 Paragraph 34. And I don't see the word
19 "necessarily."

20 However, he uses -- he states, Ishigaki's
21 particle size is therefore measured by volume
22 which corresponds to Dv90, the volume standard.

1 When Dr. Guido uses the word "therefore"
2 and provides a scientific opinion, then that
3 implies that that's a necessary interpretation. I
4 disagree with that.

5 Q In the context of this paragraph where he
6 uses the word "therefore," do you understand him
7 to be referring specifically to Ishigaki's
8 particle size and not all laser
9 diffraction/scattering devices under all
10 circumstances?

11 A He is -- I understand Dr. Guido is taking
12 what he understands as a general principle, and
13 then is applying it to Ishigaki. And I disagree
14 with the -- his interpretation of the general
15 principle in the context of Ishigaki.

16 Q Do you agree that as a general principle,
17 laser diffraction and scattering devices using a
18 particle diameter standard as a volume standard
19 can output cumulative volume distributions?

20 A Yes, I agree that they -- the devices
21 that I'm aware of are able to output that
22 property.

1 Q Can you go to Paragraph 36 of your
2 declaration on the next page.

3 A Yes.

4 Q You cite in this paragraph in Exhibit
5 2018 a footnote that this is laser diffraction for
6 particle sizing.

7 Do you see that?

8 A I see that.

9 Q Is this one of the devices that you are
10 aware of that you mentioned just now?

11 MR. O'CONNOR: Object to form.

12 A Yes.

13 MS. KELLY: Can we pull up Exhibit 2018,
14 please.

15 (Exhibit 2018, previously marked, not
16 attached.)

17 A I have that exhibit.

18 Q So what is this exhibit?

19 A This exhibit is a document produced by a
20 company called Anton Paar that makes laser
21 diffraction particle sizing instruments, and it's
22 an explanation for potential users of those

1 instruments on the principles of operation.

2 Q Is this document a screen shot from a
3 website?

4 A Yes.

5 Q Was this exhibit presented to you for
6 your review as a screen shot for a website, or did
7 you navigate to this website yourself?

8 A I'm not sure what you mean by presented
9 to me.

10 Q Did you -- in the context of forming your
11 opinions in this case, did you review Exhibit 2018
12 in this form only, or did you navigate to this
13 website on the internet?

14 A I don't remember.

15 Q If you go to Page 9, do you see that
16 there is a hyperlinked phrase "particle size
17 distribution" that is underlined?

18 A I see on Page 9 "particle size
19 distribution" that's in red font as part of a
20 caption in Figure 11.

21 Is that what you're referring to?

22 Q Do you see that the difference in font

1 indicates that this is a hyperlink that you could
2 click on if you were navigating this page on the
3 internet?

4 A I do see that.

5 Q And I know you said you don't recall
6 whether you received this as a document or whether
7 you navigated to this page.

8 If you saw a hyperlinked phrase, would
9 you have clicked on it to get more information?

10 MR. O'CONNOR: Object to form.

11 A You mean in a general sense?

12 Q Yes. As your general practice, is that
13 something you likely would have done?

14 A I may or may not click on a hyperlink,
15 depending on the context of the situation.

16 Q Well, in the context of this situation,
17 the term "particle size distribution," if you saw
18 that in Exhibit 2018 the term "particle size
19 distribution" was a hyperlink, is that the type of
20 thing you would have clicked on if you were
21 navigating to this page?

22 A If I was uncertain about what that

1 meaning was or I needed additional information, I
2 would click on it.

3 Q And if you were reviewing this as a
4 document and you saw that it was hyperlinked,
5 would you have navigated to the page or asked your
6 counsel for more information?

7 A I can't state whether I would or would
8 not have as a hypothetical.

9 Q Well, as we're talking about it, has it
10 refreshed your recollection at all the context in
11 which you reviewed Exhibit 2018?

12 A If you're asking if I clicked on that
13 hyperlink, I don't recall if I did or did not.

14 Q All right. Can you pull up what is
15 marked Exhibit 1031.

16 (Exhibit 1031, previously marked, not
17 attached.)

18 MR. O'CONNOR: Can someone drop that in
19 the chat for me, please.

20 THE WITNESS: Yeah, so I don't see it in
21 my folder. So is that a new document?

22 MS. KELLY: It is a new document. So if

1 it is not in the folder, can we please put it in
2 the folder.

3 A/V TECHNICIAN: Yes. Stand by.

4 Exhibit 1031 is in the chat.

5 A Okay, I have downloaded that document.
6 I'm looking at it now.

7 Q Do you see from the URL of Exhibit 1031
8 that this is part of the Anton Paar website that
9 you were looking at in Exhibit 2018?

10 A Yes, it does look like it came from the
11 same website.

12 Q Do you recognize whether you have seen
13 this document before, or the web page that it
14 displays?

15 A I don't recall if I looked at this exact
16 page or not.

17 Q Does it appear to be the web page that
18 hyperlinks from the words "particle size
19 distribution" that I pointed out to you in Exhibit
20 2018?

21 A It does appear to be the destination of
22 that link, yes.

1 Q Do you see on Page 2 of Exhibit 1031,
2 where it says, "Different particle sizing
3 techniques will," and it goes on, and then says,
4 "give results that are intrinsically of a specific
5 weighing"?

6 A Are you referring to the text at the top
7 of the page of Page 2?

8 Q Yes. Where it says different
9 particles -- it starts, "Different particle sizing
10 techniques."

11 A Okay. So the bottom of Page 2. I see
12 that now.

13 Q Do you also see how the different
14 particle sizing techniques of Table 1 are
15 described immediately above Table 1?

16 A I see Table 1. What -- can you repeat
17 your question?

18 Q Do you see how the different particle
19 sizing techniques are described immediately above
20 Table 1?

21 A You mean above the caption of Table 1?

22 Q Well, do you see in Table 1 where it says

1 that the laser diffraction measurement technique
2 is intrinsically of a volume-weighted
3 distribution?

4 A I see in Table 1 a column stating
5 different measurement techniques. And then I see
6 another column stating a weighting.

7 Q And do you understand Table 1 to be
8 communicating that the laser diffraction
9 measurement technique is a volume-weighted
10 distribution?

11 A I see that that's what they're presenting
12 in this table, yes. But that doesn't make it a
13 limitation, that it can never be presented in any
14 other way.

15 Q And so Table 1 appears on Page 3, and
16 immediately before Table 1 on Page 2 do you see
17 where the different particle sizing techniques are
18 described?

19 A Can you refer to which paragraph you're
20 looking at?

21 Q Do you see the bottom of Page 2? I know
22 it's a little confusing, the way it printed out.

1 A Yeah. So okay, I'm at the bottom of Page
2 2.

3 Can you restate the question?

4 Q Are the different particle sizing
5 techniques of Table 1 described there?

6 MR. O'CONNOR: Object to form.

7 A Again, I'm not clear which paragraph you
8 want me to look at. Do you want the entirety of
9 Page 2?

10 Q Well, sure. If you just review through
11 Page 2, do you see where the different particle
12 sizing techniques of Table 1 are described?

13 A I see where Page 2 says at the top,
14 "Different measurement techniques 'see' the
15 particles in a different way, which translates to
16 a different weighting as the result. The main
17 weighting models used to analyze particle size
18 distribution are number-weighted distribution,
19 surface-weighted distribution, volume-weighted
20 distribution," and then it proceeds to give
21 additional explanation on these different possible
22 distributions.

1 I would note that toward the bottom of
2 Page 2 it says that "both representations have
3 their merits depending on what is required from a
4 measurement. For someone working in the mining
5 industry, it is important to know the size of the
6 particles in a given volume, while in microbiology
7 where individual cells are counted, the
8 number-based distribution is preferred. An
9 operator working on catalysts will certainly
10 choose the surface-weighted distribution, as the
11 catalyst's activity depends on the extent" -- the
12 extent, which is a misspelling, "of its contact
13 surface with the reactant."

14 So this -- my interpretation of the
15 language on Page 2 is there are different
16 distributions, and they have different merits and
17 values depending on the context of the area in
18 which you're working.

19 Q Is the invention of the '118 patent in
20 the field of microbiology?

21 A No.

22 Q Throughout the course of your review of

1 Exhibit 1031, did it refresh your recollection at
2 all as to whether you reviewed this page in the
3 course of forming your opinions in this
4 proceeding?

5 A No, it did not.

6 Q If you go back to Exhibit 2018.

7 On Page 10, do you see that there is an
8 international standard for particle size analysis,
9 and then laser-diffraction methods cited under the
10 Further References heading?

11 A Give me a moment.

12 Can you repeat your question?

13 Q Do you see on Page 10 that there is an
14 international standard for particle size analysis,
15 including laser-diffraction methods, cited under
16 the Further References heading?

17 A I see Further Reference 4, ISO 13320,
18 Particle size Analysis - Laser Diffraction
19 Methods.

20 Q Were you familiar with the international
21 standard for particle size analysis and
22 laser-diffraction methods when you formed your

1 opinions in this proceeding?

2 A I was familiar with it. I can't say that
3 I have read it in its entirety.

4 Q Have you read it in any capacity, even if
5 not in its entirety?

6 A I believe I've looked at summaries or
7 documents that summarize that method.

8 MS. KELLY: Can you bring up Exhibit
9 1032.

10 (Exhibit 1032, previously marked, not
11 attached.)

12 MS. KELLY: And can we put that into the
13 chat if it is not there.

14 MR. O'CONNOR: Thank you.

15 Counsel, t, looks like we're right around
16 an hour here. I'm not sure when you are getting
17 to a point that would be good for a break.

18 MS. KELLY: Sure. Why don't we take a
19 look at this exhibit -- it should only be a few
20 minutes -- and then we can break.

21 MR. O'CONNOR: Sounds great.

22 A/V TECHNICIAN: The exhibit is in the

1 chat.

2 Q Do you have Exhibit 1032 up in front of
3 you?

4 A I'm working on it. Thank you. All
5 right. It's taking me a minute. Every time I
6 download it I can't seem to find it on my folder.
7 Okay.

8 Okay, I have that document now.

9 Q Do you see from the title of Exhibit 1032
10 that this is the abstract of the ISO standard
11 referred to in Exhibit 2018?

12 A Yes, I see that.

13 Q Do you see where it says, "ISO 13320:2009
14 provides guidance on instrument qualification and
15 size distribution measurement of particles"?

16 A Yes, I see that.

17 Q And then it continues, "through the
18 analysis of their light-scattering properties."

19 Do you see that?

20 A On subsequent pages or still in the
21 abstract?

22 Q Still in the abstract.

1 A Can you repeat the question?

2 Q Do you see that the ISO standard goes on
3 to note that "the size distribution measurement of
4 particles happens through the analysis of their
5 light-scattering properties"?

6 A Yes, I see that.

7 Q Do you see where it notes that "for
8 nonspherical particles, a size distribution is
9 reported where the predicted scattering pattern
10 for the volumetric sum of spherical particles
11 matches the measured scattering pattern"?

12 A Yes, I see that.

13 Q Were you familiar with these teachings in
14 the ISO standard when you formed your opinions in
15 this proceeding?

16 A Yes.

17 MS. KELLY: All right. I promised a
18 break, so we will take a break.

19 (A recess was taken.)

20 MS. KELLY: All right. Can we bring up
21 Exhibit 2051, please.

22 (Exhibit 2051, previously marked, not

1 attached.)

2 A I see Exhibit 2051.

3 Q Let me know when you have it open.

4 A Yes, it's open.

5 Q What is Exhibit 2051?

6 A It's a product description for a
7 laser-diffraction analyzer.

8 Q Is it specifically a product data sheet
9 for the Microtrac Particle Size Analyzer S3500?

10 A Yes.

11 Q Is this document also a printout from a
12 website?

13 A It appears that way, although it could
14 have been in a different format when it was made
15 available on their website.

16 Q Do you recall whether you reviewed this
17 document as a printout document or whether you
18 reviewed it online?

19 A I don't recall.

20 Q If you go to the top of Page 5, do you
21 see that there appears to be a hyperlink to the
22 S3500?

1 A I see that there is a hyperlink on that
2 page, yes.

3 Q Do you recall whether you navigated to
4 this hyperlink in the course of reviewing this
5 exhibit to form your opinions in this proceeding?

6 A I don't recall.

7 Q Do you see that there is a Downloads tab?

8 A On Page 5?

9 Q I think so.

10 A In my -- in the version I have, Page 5 is
11 essentially blank, with only the hyperlink to the
12 Microtrac.com/S3500. I don't see any other
13 content on Page 5.

14 Q Oh, I'm sorry. Hold on.

15 MS. KELLY: Let's -- can we put into the
16 chat Exhibit 1033.

17 (Exhibit 1033, previously marked, not
18 attached.)

19 A/V TECHNICIAN: Yes. Stand by.

20 It's in the chat.

21 A Okay, I have Exhibit 1033 open.

22 Q Does it appear that this is the

1 hyperlink, or the destination of the hyperlink to
2 the S3500 from the product data sheet for the
3 Microtrac Particle Size Analyzer?

4 MR. O'CONNOR: Object to form.

5 A I can't tell that from the document
6 Exhibit 1033. I don't see a URL listed anywhere
7 on the document.

8 Q Do you recognize this document as
9 anything you reviewed in the course of rendering
10 your opinions in this proceeding?

11 A I don't recall reviewing this document.

12 Q Do you see on the first page that this
13 document was produced by the same manufacturer
14 that produced Exhibit 2051, Microtrac?

15 A Yes, I see that it appears to be from the
16 same manufacturer.

17 Q Can you go to Page 6 of Exhibit 1033.

18 Do you see where it says, "Laser
19 diffraction relates all signals to a sphere of
20 equal effect and thus provides volume-based
21 distributions"?

22 A I see where it says that.

1 Q Do you see where it says, "Laser
2 diffraction cannot determine number
3 distributions"?

4 A I see where it says in the second
5 sentence of that paragraph, "Since a collective
6 signal and not individual incidents are evaluated
7 here, laser diffraction cannot determine number
8 distributions."

9 Q Do you see further on where it says,
10 "Converting laser diffraction results to number
11 distributions is also possible, but since only a
12 simple spherical model is available here, this is
13 less accurate, and the volume distribution should
14 be used whenever possible"?

15 A I see where it says that, although it
16 does use the word "whenever."

17 Q Were you aware of any of these teachings
18 when you provided your opinions in this
19 proceeding, specifically as they relate to the
20 Microtrac Particle Size Analyzer S3500 in Exhibit
21 2051?

22 A As I said, I don't recall reading this

1 exhibit, so I'm not aware of the specific
2 teachings of this paragraph, although I am aware
3 of the general teachings of how laser diffraction
4 is performed and analyzed.

5 Q At the time you made your opinions in
6 this proceeding, was your awareness of the general
7 teachings of how laser diffraction is performed
8 and analyzed consistent with these teachings on
9 Page 6 of Exhibit 1033?

10 MR. O'CONNOR: Object to form.

11 A My understanding is consistent in
12 general, but not in some of the specific opinions
13 that are in this paragraph.

14 MS. KELLY: Can we put Exhibit 1034 into
15 the chat.

16 (Exhibit 1034, previously marked, not
17 attached.)

18 A/V TECHNICIAN: Yes. Stand by.

19 The exhibit is in the chat.

20 A I have Exhibit 1034 open now.

21 Q Does this exhibit appear to be a product
22 data sheet for the Microtrac Particle Size

1 Analyzer S3500?

2 A This document says, "Technical note.
3 Explanation of data reported by Microtrac
4 Instruments."

5 So it seems to be a --

6 Q Oh, yes, I'm sorry. You're right.

7 A -- a more general -- a more general
8 document than just one product.

9 Q Yeah. No. I had your -- I had Exhibit
10 2051 in front of me while I was asking that
11 question.

12 So, yes, do you see on Page 4 of Exhibit
13 1034 where it says, "Software selectable
14 percentile points show the percentage of the
15 volume that is smaller than the size indicated"?

16 A I see where it says, "Percentiles.
17 Software selectable percentile points in microns,
18 show the percentage of the volume (or weight if
19 the density for all particles is the same) that is
20 smaller than the size indicated."

21 Q Do you see where it says in the next
22 paragraph on Page 4, "The 50 percent point is the

1 median diameter or D50 and represents one type of
2 average particle size"?

3 A I see where it says that, yes. It's in
4 the same paragraph that I was reading from.

5 Q If you look back to the first page of
6 this exhibit, do you see that it was produced by
7 the same manufacturer who produced Exhibit 2051,
8 Microtrac?

9 A Yes, it -- it does appear to be from the
10 same manufacturer.

11 Q Based on your review of the disclosures
12 in this document, would you agree that this is an
13 example of the term "D50" as it is used on Page 4,
14 to refer to a volume-based distribution?

15 MR. O'CONNOR: Object to form.

16 A I agree that this is -- that this
17 manufacturer is stating that D50 can represent --
18 for their instrument can represent a volume-based
19 distribution. But I don't agree that that is
20 necessarily what is always the case, even for this
21 instrument.

22 Q Did you have the information that is

1 taught in Exhibit 1034 in mind when you were
2 forming your opinions in this proceeding,
3 specifically as they relate to the Microtrac
4 Particle Size Analyzer S3500 in Exhibit 2051?

5 MR. O'CONNOR: Object to form.

6 A I don't recall seeing Exhibit 1034 when I
7 was forming my opinion.

8 Q Understanding that you didn't have this
9 particular exhibit in front of you, was your
10 understanding of how the Microtrac Particle Size
11 Analyzer S3500 works consistent with the teaching
12 in Exhibit 1034?

13 MR. O'CONNOR: Object to form.

14 A I need a minute to review the document
15 that was used in my declaration.

16 Can you restate the question?

17 Q With the understanding that you didn't
18 have this particular exhibit in front of you, was
19 your understanding of how the Microtrac Particle
20 Size Analyzer S3500 works consistent with the
21 teaching of Exhibit 1034 when you rendered your
22 opinions in this proceeding?

1 MR. O'CONNOR: Same objection.

2 A I have not read through the entirety of
3 Exhibit 1034, so I can't make that statement.

4 Q Are you familiar with the concept of
5 primary particles and secondary particles?

6 A Yes, I'm familiar with that concept.

7 Q What are primary particles?

8 A In general, it means the smallest
9 particle size that would be created during a
10 manufacturing process, and it's -- doesn't really
11 have a meaning except in -- in the context of
12 primary and secondary, where a secondary particle
13 would be an agglomeration or aggregate of primary
14 particles to form a larger particle.

15 Q Why would primary particles agglomerate
16 into secondary particles?

17 A In general, there are attractive and
18 repulsive forces between particles. And so based
19 on attractive particle -- forces, those primary
20 particles may come together and form a larger
21 particle. That secondary particle may be somewhat
22 temporary in the sense that the forces are not

1 very strong, and so with some mild amount of
2 effort the secondary particles can be broken apart
3 back into smaller fragments. Or in some cases the
4 secondary particles might be more robust and
5 resist breaking.

6 It really depends on the manufacturing
7 process. It depends on the steps that are taken
8 during mixing and application of particles that --
9 as to whether those secondary particles might
10 break into primary particles.

11 But in general, the primary particles are
12 attracted to each other and form secondary
13 particles.

14 Q You mentioned that the secondary
15 particles can be broken apart back into smaller
16 fragments.

17 How can secondary particles be broken
18 apart back into smaller fragments?

19 A If, for instance, during a manufacturing
20 process where particles are handled, and they
21 collide with each other or collide with walls of
22 the container, then those forces might cause a

1 secondary particle to fracture. And of course
2 during battery operation after the manufacturing
3 process, then those -- there are mechanisms by
4 which a secondary particle might fracture.

5 Q Are you familiar with ultrasonication as
6 a technique?

7 A Yes, I am.

8 Q Is ultrasonication a way to deagglomerate
9 secondary particles into primary particles?

10 A It could. Again, it depends on the
11 context, but that could be one outcome of using
12 ultrasonication.

13 Q If one were to perform ultrasonication on
14 secondary particles in solution, would that
15 deagglomerate the secondary particles into primary
16 particles?

17 MR. O'CONNOR: Object to form.

18 A I would need to see a specific case in
19 order to make that judgment.

20 Q Would there be any reason to perform
21 ultrasonication on secondary particles in solution
22 other than to deagglomerate them?

1 MR. O'CONNOR: Objection. Calls for
2 speculation.

3 A Again, I would need to see the specific
4 case that you're referring to to make a judgment.

5 Q Can you think of any reason under any
6 circumstance that one would ultrasonicate
7 secondary particles in solution other than to
8 deagglomerate them?

9 MR. O'CONNOR: Objection. Speculation.

10 A I would need to see the specific case
11 that you're talking to -- about. But it is
12 possible that someone could have a motivation to
13 use ultrasonication for a variety of things.

14 Q What kinds of things are in that variety?

15 MR. O'CONNOR: Object to form.

16 A In general, ultrasonication adds energy
17 to the system in the form of acoustic waves. It
18 creates locally high pockets of high temperature.
19 These -- and it creates pressure waves. These
20 forces can have lots of benefits to a researcher
21 who is using ultrasound. Sometimes it's used to
22 clean materials, sometimes it's used to break

1 materials apart. It just depends on the context.

2 Q Other than cleaning materials or breaking
3 materials apart, is there anything else you're
4 familiar with that ultrasonication is used for?

5 MR. O'CONNOR: Object to form.

6 A It can also be used for chemical
7 reactions. Outside of a liquid solution, it can
8 be used as a welding technique.

9 Q Are there any other purposes for
10 ultrasonication secondary particles in a solution,
11 other than what you've mentioned so far?

12 MR. O'CONNOR: Objection. Speculation.

13 A In the context of battery solutions,
14 ultrasound can be used as just a general mixing
15 technique. It just depends on what the
16 practitioner has in mind.

17 They may intentionally want to break
18 secondary particles, or they may not. One of the
19 things that you can control with ultrasound is the
20 intensity and the time at which you're doing that
21 treatment.

22 And so depending on what you intend, you

1 could use a higher energy or a higher intensity,
2 and you could choose to use it for longer or
3 shorter periods, and that would determine -- or
4 would be based on what your intentions are for
5 that process.

6 Q Can I turn you back to Exhibit 2058, your
7 declaration.

8 A Hold on.

9 Okay.

10 Q Paragraph 39, which bridges Pages 20 and
11 21?

12 A Yes, I'm there.

13 Q The final sentence of that paragraph
14 says, "The terms D90 and D50 are not informative
15 of the distribution to which they correspond,
16 including whether the distribution is a
17 volume-based distribution, number-based
18 distribution, area-based distribution, or some
19 other type of distribution."

20 Do you see that?

21 A Yes, I see that.

22 Q When you say the terms "D90" and "D50"

1 are not informative in this sentence, are you
2 meaning that they are not informative in a vacuum,
3 or did you mean to say that they were not
4 informative in the context that you are discussing
5 in Paragraph 39?

6 MR. O'CONNOR: Object to form.

7 A So the context of this paragraph is
8 talking about laser diffraction, and particle
9 sizing using laser diffraction. And in general
10 D90 and D50 are not informative of the
11 distribution to which they correspond, as I
12 stated. They are generic terms. They can have
13 multiple meanings. That's my testimony.

14 Q So in the context of Paragraph 39, are
15 you discussing the terms "D90" and "D50" as they
16 are used in the Ishigaki reference or just in
17 general?

18 MR. O'CONNOR: Object to form.

19 A I'm talking in general. And the reason
20 for making that general statement is to show what
21 a POSITA would understand when reading the
22 Ishigaki reference without any additional

1 information from Ishigaki as to what Ishigaki
2 intends. A POSITA would have to understand things
3 in this general sense.

4 Q Is it your opinion that the Ishigaki
5 reference does not provide any additional
6 information as to what it intends by the terms
7 "D90" and "D50"?

8 A It provides some information about what
9 it means by the terms "D90" and "D50," but it does
10 not provide information telling the POSITA which
11 distribution is being used.

12 Q Is it your opinion that because Ishigaki
13 does not expressly state that the volume standard
14 is used to provide a volume-based distribution,
15 that the numbers Ishigaki discloses for D90 and
16 D50 are entirely uninformative to a person of
17 ordinary skill in the art?

18 MR. O'CONNOR: Object to form.

19 A So you're asking if those values have no
20 meaning?

21 Q Yes. I'm asking if it is your opinion
22 that those values provided in Ishigaki have no

1 meaning to a person of ordinary skill in the art
2 because Ishigaki does not expressly state whether
3 the volume standard is used to provide a
4 volume-based distribution?

5 A My position is that Ishigaki did not
6 provide sufficient information for a POSITA to
7 understand that the D90 and D50 values of Ishigaki
8 are based on a volume distribution. And, in fact,
9 in context of Ishigaki, a POSITA would see that
10 they are more likely to correspond to a
11 number-based distribution.

12 Q What is your basis for saying that the
13 context of Ishigaki indicates to a POSITA that
14 "they are more likely to correspond to a
15 number-based distribution"?

16 A I provided argument to that in my
17 declaration. Give me a minute, and I will refer
18 to that.

19 So my main arguments are summarized in my
20 declaration. But to add to those, or to add
21 further explanation to those, if Ishigaki had
22 intended D50 or D90 to be based on a volume-based

1 distribution, they should have specified that more
2 carefully.

3 And in a patent where these details are
4 important because they have a significant effect
5 in how one could interpret the data, they should
6 have given that information if they had a -- if
7 they had an intention for it to be a volume-based
8 distribution.

9 But they did not, so that implies that
10 they did not see it that way.

11 Secondly, they do provide a description
12 of how to measure the volume -- sorry, to
13 distribute the sizes of the primary particles.
14 And so a POSITA would see that additional
15 description for the primary particles and would
16 infer that Ishigaki would have you interpret them
17 the same way as the secondary particles.

18 Q Why would a POSITA infer that you
19 interpret them the same way?

20 A Because Ishigaki is making a comparison
21 of or a point of saying that they have primary
22 particles of a certain size, secondary particles

1 of a certain size. And in order to make a
2 comparison between those two, or to see how they
3 might relate to each other, it would be beneficial
4 if they were measured or interpreted in a
5 distribution that is compatible.

6 Q What about that comparison indicates to a
7 POSITA that it must be a number-based
8 distribution?

9 A It seems clear that the number-based
10 distribution is used for the primary particles.
11 And so in order to make a comparison to the
12 secondary particles, a POSITA would infer that the
13 primary and secondary particles are being
14 described in using the same distribution.

15 Q And generally is the D90 of a
16 volume-based distribution expressed Dv90?

17 A I can't speak to every instance.
18 However, as I expressed my opinion, based on the
19 field of laser diffraction, "D50" or "D90" are
20 generic terms. And so if one is trying to be
21 careful as one should in a patent context, one
22 should specify what one means by that D50 or D90.

1 And by adding the term "V" onto the term, so Dv90,
2 for instance, that makes that specification more
3 clear.

4 Q Can you turn to Paragraph 52 of your
5 declaration, which spans Pages 27 and 28.

6 A Yes.

7 Q At the top of Page 28 you state that "The
8 only time Ishigaki discloses any density value for
9 a two-layer electrode structure, it is a single
10 mixture density value of 2.4 grams per cubic
11 centimeter."

12 Do you see that?

13 A I see that.

14 Q So even though Ishigaki has an example of
15 a two-layer structure, it only provides one number
16 to describe the density of that two-layer
17 structure.

18 Is that correct?

19 MR. O'CONNOR: Object to form.

20 A That's my understanding.

21 Q How would a person of ordinary skill in
22 the art understand a single number for density

1 describing a two-layer structure?

2 MR. O'CONNOR: Object to form.

3 A Well, it matters what Ishigaki said.
4 Generality doesn't have any value in this context.

5 Q So how would a person of ordinary skill
6 in the art understand Ishigaki's disclosure of a
7 single number for a density describing a two-layer
8 structure?

9 A So I'd like to review Ishigaki's language
10 in Paragraph 366.

11 Q Okay.

12 A Can you repeat your question?

13 Q How would a person of ordinary skill in
14 the art understand Ishigaki's disclosure of a
15 single number for the density describing a
16 two-layer structure?

17 A In the context of Ishigaki's Paragraph
18 366 describing that two-layered material, it says
19 The total weight of the mixture was 17 milligrams
20 per square centimeter, and the mixture density was
21 2.4 grams per cubic centimeter. And so a POSITA
22 would understand that to be an overall density of

1 the mixture, meaning combining both layers into
2 one measurement. That would be the mixture
3 density of that combined set of layers.

4 Q In order to achieve that mixture density
5 for the combined set of layers, if one layer had a
6 density less than 2.4 grams per cubic centimeter,
7 would the other layer need to have a density
8 greater than 2.4 grams per cubic centimeter to
9 compensate?

10 A Yes, that would be what a POSITA would --
11 would say.

12 Q If a POSITA knew the density of the
13 overall structure and also knew the density of one
14 of the layers, would it be simple math for a
15 POSITA to calculate the density of the other
16 layer?

17 A It's possible to make that calculation if
18 you also know the thicknesses of the layers. But
19 it is a calculation, so it's subject to some
20 uncertainties and errors that can be introduced,
21 depending on the quality of the data that went
22 into the calculation.

1 Q Can you go to Paragraph 57 of your
2 declaration on Page 31.

3 A Paragraph 57. Yes, I'm there.

4 Q Towards the bottom of that paragraph on
5 Page 31 you say that "Dr. Gido testified that
6 multiple layers of electrode materials are
7 analogous to multiple layers of paint, wherein a
8 first layer would generate a permanent skin that
9 would remain after the second layer is coated
10 thereon."

11 Do you see that?

12 A Yes, I see that.

13 Q Did Dr. Gido use the word "permanent" to
14 describe the skin that he talked about in his
15 analogy?

16 A Give me a moment to look at his
17 testimony.

18 I don't see the word "permanent" in
19 his -- the transcript of Dr. Gido's deposition.

20 Q Do you know whether, in applying multiple
21 coats of paint to a surface, the second coat
22 slightly rewets part of the first coat in order to

1 adhere?

2 A You're talking about paint specifically,
3 like acrylic paint or latex paint?

4 Q Yes.

5 A It's possible that a second coat could
6 rewet a first coat. Although in the -- for most
7 kinds of paint, the first coat -- you would not
8 put a second coat on until the first coat had
9 partially cured or dried. In which case it would
10 not be able -- be possible to completely rewet
11 that first layer.

12 And that's distinct from how a -- the
13 layers in a battery are -- are typically applied.

14 Q When you apply the layers in a battery,
15 do you put a second -- do you apply a second layer
16 after the first layer partially cures or dries?

17 MR. O'CONNOR: Object to form.

18 A Again, you can't generalize that to every
19 case. But in the most common scenario battery
20 materials are bound together with a polymeric
21 binder that is subject to interacting with
22 solvents. And when you place a first layer on,

1 you would normally dry that layer so that it's
2 stable.

3 But when you place a second layer that is
4 wet on top of that first layer, some of that
5 solvent will penetrate into the first layer and
6 have an effect on the first layer. And that's
7 because the first layer has not been cured; it's
8 been simply dried.

9 Q When the second layer is applied to the
10 first layer, does it result in the interface
11 between the two layers being slightly combined?

12 MR. O'CONNOR: Object to form.

13 A Again, the details would matter as to in
14 a particular instance. But to speak in
15 generalities, any time you put a coating on top of
16 a different coating, there's going to be an
17 interface between those two coatings. And that
18 interface will have complex behaviors. So it's
19 possible for there to be a -- where you transition
20 from one layer to the other, and it has its own
21 distinct properties.

22 Q Even though there may be a transition

1 area between the two layers, that does not stop
2 people in this art from describing electrodes as
3 having two-layer structures and providing
4 information such as density for those layers.

5 Correct?

6 MR. O'CONNOR: Object to form.

7 A Again, speaking in generalities, it's
8 common in science for people to make
9 simplifications in order to have a discussion
10 about a material. It would be generally
11 understood that there are complex behaviors in any
12 material where you're -- especially when you're
13 adding more than one layer.

14 I'll stop there.

15 Q Can you go to Paragraph 60 on Page 33 of
16 your declaration.

17 A Yes.

18 Q In Paragraph 60 you discuss Ishigaki's
19 two-layer system and the application of the second
20 layer to the first layer. Correct?

21 A Yes.

22 Q And you mentioned that "Complex

1 interactions develop between the two layers during
2 the manufacturing process that can result in
3 unexpected changes in density both before and
4 after compaction."

5 Do you see that?

6 A I see that.

7 Q Is it your opinion that these unexpected
8 changes in density would prevent a person of skill
9 in the art from understanding the numbers that
10 Ishigaki uses to describe its product?

11 MR. O'CONNOR: Object to form.

12 A Which numbers are you referring to?

13 Q The overall density of Ishigaki's
14 two-layer structure.

15 A Typically the overall density, if one
16 were to make a measurement of that, would require
17 that you measure the mass of the two-layer
18 structure and measure the total thickness of the
19 two-layer structure. And so an overall density
20 would not be affected by these complex
21 interactions.

22 Q Would using the process that Ishigaki

1 describes for forming a two-layer structure result
2 in the first layer being further compacted by the
3 process of adding and compacting the second layer?

4 MR. O'CONNOR: Object to form.

5 A I don't know all the details of
6 Ishigaki's procedure, so it would be difficult for
7 me to make definitive answer to that question.

8 However, based on what a POSITA would
9 understand, when you apply multiple layers, if the
10 second layer that you're adding rewets the first
11 layer, that can have significant -- which is
12 likely to happen if you don't have some exotic way
13 of doing it.

14 And if that happens, then the first
15 layer's density could be impacted when you go to
16 the process of adding a second layer. And so even
17 if you were to measure the density of the first
18 layer, if you then add a second layer it could
19 have an effect on that first layer. And that's
20 due to wetting.

21 In addition, when you compact the second
22 layer, it necessarily exerts a force on both

1 layers at the same time, and so that can have an
2 effect on the first layer and the second layer
3 when you're compacting after the second layer.

4 Q Would the effect that it has on the first
5 layer be to increase the density of the first
6 layer?

7 A It would -- generally in compacting,
8 you're putting a compressive force. So yes, that
9 would increase the density of the first layer.
10 But that's relative to what it was when it was
11 dried the second time.

12 So if you -- if someone purports to
13 measure the density of the first layer when it's
14 by itself and then they add a second layer, the
15 rewetting process could have an effect on that
16 first layer density.

17 It could, for instance, cause the first
18 layer's density to decrease during the wetting
19 process. Then when you compact -- when you dry
20 and then compact both layers together, yes, the
21 first layer's density would potentially increase.
22 But you don't know what the baseline or the

1 starting point was, because of the intervening
2 wetting process.

3 So that's part of what I'm getting at
4 with my testimony that these are complex
5 interactions. You can't assume that the first
6 layer's completely static throughout this process;
7 and it's affected by every step that involves
8 adding a second layer, drying a second time,
9 compacting a second time.

10 Q If the second layer as applied was denser
11 than the first layer, would the rewetting process
12 decrease the density of the first layer?

13 MR. O'CONNOR: Object to form.

14 A Again, we're talking generalities here.

15 If the first layer is rewet during the
16 application of the second layer, it's possible for
17 its density to decrease.

18 Q If the first layer is rewet by a second
19 layer that is denser, how would that decrease the
20 density of the first layer?

21 MR. O'CONNOR: Object to form.

22 A The rewetting process means that solvent

1 that was present in the second layer infiltrates
2 into the first layer.

3 That's not strongly dependent on whether
4 the second layer is more or less dense than the
5 first layer; it's more a factor that the second
6 layer is a slurry that contains solvent,
7 significant amount of solvent, and that solvent
8 will infiltrate into the first layer.

9 So your question about the second layer
10 being more dense is not highly relevant to that
11 process.

12 Q Can you go to Paragraph 64 of your
13 declaration on Page 36.

14 A Yes, I'm there.

15 Q In this paragraph you note that, "The
16 value 4.4 grams per cubic centimeter on which Dr.
17 Gido bases his calculations for his demonstratives
18 corresponds to a theoretical maximum calculated by
19 Dr. Gido based on the densities of the
20 components."

21 Do you see that?

22 A I see that.

1 Q Do you agree that the value 4.4 grams per
2 cubic centimeter corresponds to a theoretical
3 maximum for the density of the layer?

4 MR. O'CONNOR: Object to form.

5 A I agree that that's what Dr. Gido
6 intended to do. I don't agree that that
7 necessarily is the theoretical maximum.

8 Q What do you contend is the theoretical
9 maximum?

10 A Well, I haven't done that calculation.

11 Q What is it about Dr. Gido's calculation
12 that gives you doubt that 4.4 grams per cubic
13 centimeter is the theoretical maximum based on the
14 densities of the components?

15 A In Paragraph 68 and continuing below
16 that, I discuss the fact that secondary particles
17 have internal porosity, so therefore Dr. Gido's
18 calculation could be an error due to that fact.
19 That's one possibility.

20 The second is that when someone
21 calculates a theoretical maximum, it might give
22 the impression to someone not a POSITA, but one,

1 let's say a lawyer, that -- that it's possible to
2 achieve that density in a realistic electrode.

3 And so that value is not anywhere close
4 to what could be achieved in a realistic electrode
5 because it would essentially require compressing
6 the electrode down to zero porosity. And that
7 level of pressure would create extreme damage to
8 the electrode, would cause cracking, would cause
9 indentation of the current collector.

10 In addition to that, the -- the -- there
11 would be no porosity, and so ions would not be
12 able to transport through the electrode.

13 So nobody, including a POSITA, would
14 anticipate that you would go to that level of
15 compaction to achieve that so-called theoretical
16 value.

17 Q In your previous statement you say, "When
18 someone calculates a theoretical maximum, it might
19 give the impression to someone not a POSITA, but
20 one, let's say a lawyer, that it's possible to
21 achieve that density in a realistic electrode."

22 If we improve the world for a moment and

1 take lawyers out of it, would the calculation of a
2 theoretical maximum give the impression to a
3 POSITA that it's possible to achieve that density
4 in a realistic electrode?

5 MR. O'CONNOR: Object to form.

6 A If a POSITA saw a calculation that was
7 correctly performed, that -- and they saw how it
8 was calculated so that they knew what was meant,
9 and that POSITA saw that it was a theoretical
10 maximum, the POSITA would not assume that that
11 density could be achieved in a realistic
12 electrode.

13 Q So in my hypothetical lawyerless utopia,
14 could you still have an objection to the way that
15 Dr. Gido calculated his theoretical maximum for
16 the density of the layer?

17 A I did have an objection, as described in
18 Paragraphs 68 and below.

19 Q And that is the inherent porosity of
20 secondary particles?

21 A Correct.

22 Q But if you're calculating a theoretical

1 maximum, understanding that it is certainly not
2 the realistic maximum, wouldn't you just assume
3 the secondary particle has no porosity?

4 MR. O'CONNOR: Object to form.

5 A One could make that assumption and
6 would -- and if one makes that assumption and
7 everybody who's interpreting that result
8 understands that that assumption was made, then it
9 could be interpreted accordingly.

10 Q And if that was the assumption and the
11 understanding, would you have any objection to
12 Dr. Gido's calculation of the theoretical maximum
13 density of the layer?

14 A I don't object to his calculation as a
15 calculation, or even as an abstract concept. What
16 I object to is his application of that calculation
17 to the Ishigaki case, and implying that Ishigaki
18 is disclosing that density.

19 Q Do you agree that a POSA reading Ishigaki
20 would understand that no layer could possibly
21 exceed the density of the theoretical maximum?

22 A Ishigaki did not produce a theoretical

1 maximum, so no POSITA reading Ishigaki would have
2 that thought.

3 Q Would it be within the realm of
4 capability for a POSITA to calculate the
5 theoretical maximum of the density of the layer in
6 Ishigaki?

7 A I don't see any motivation for why a
8 POSITA would make that calculation based on the
9 information in Ishigaki.

10 Q My question was whether it was within the
11 capability of the POSITA.

12 A It's in the -- yes, it's in the
13 capability of a POSITA to make a calculation of a
14 theoretical maximum.

15 Q And the POSITA would understand that the
16 theoretical maximum would be an absolute upper
17 boundary on the density that could not physically
18 be exceeded. Correct?

19 MR. O'CONNOR: Object to form.

20 A A POSITA would understand that that
21 density could be achieved outside of the context
22 of a lithium battery; for instance, if you just

1 took the powders and put them in a high-pressure
2 apparatus. But would understand that it would not
3 necessarily lead to a practical battery to even
4 attempt to get to that density in the -- in a real
5 electrode.

6 Q Can you go to Paragraph 73 on Page 42 of
7 your declaration.

8 A Yes, I'm there.

9 Q The first sentence of Paragraph 73 says
10 that "Dr. Gido's demonstratives are based on the
11 assumption that the highest density achievable in
12 Ishigaki for a single layer is 4.4 grams per
13 centimeter."

14 Do you see that?

15 A Yes.

16 Q What in Dr. Gido's declaration or
17 testimony gave you the impression that he assumed
18 the theoretical maximum was an achievable density?

19 A So Gido's Demonstrative 8 that I
20 reproduce on Page 35 of my declaration would be an
21 example where he's giving a density that goes up
22 to 4.4 on Layer 1. And that implies to someone

1 looking at his testimony that he believes that's
2 a -- something that could happen in Ishigaki's
3 material.

4 Q When you say that implies to someone
5 looking at his testimony that he believes this,
6 who is the "someone" in that sentence?

7 A Well, certainly not a POSITA, because a
8 POSITA didn't do this calculation; Dr. Guido did.
9 But someone who is trying to understand what
10 Ishigaki is teaching and is relying on Dr. Guido's
11 testimony might be misled by this Demonstrative 8.

12 Q So who is the someone trying to
13 understand what Ishigaki is teaching and relying
14 on Dr. Guido's testimony that you are concerned
15 about?

16 A I suppose it would be the Board.

17 MR. O'CONNOR: Counsel, we're a little
18 over an hour now. Are we close to wrapping up
19 this line of questioning?

20 MS. KELLY: Yes. And I was sort of
21 pushing forward assuming that around noon we would
22 want a lunch break.

1 Does that work for everyone? And how
2 long would we like to take?

3 (A discussion was held off the record.)

4 (A recess was taken.)

5 BY MS. KELLY:

6 Q Dr. Wheeler, over our break did you
7 discuss your testimony with counsel at all?

8 A No.

9 Q Can I have you turn to Paragraph 89 on
10 Page 51 of your declaration.

11 MR. O'CONNOR: And just for the record,
12 Counsel, we're back on Exhibit 2058?

13 MS. KELLY: Yes.

14 MR. O'CONNOR: Great.

15 A Okay, I'm there.

16 Q This is where you discuss the Kim
17 reference. Correct?

18 A Correct.

19 Q Kim describes a press density value for
20 an electrode active material. Correct?

21 A Can you restate the question?

22 Q Kim describes a press density value for

1 an electrode active material. Correct?

2 A That's correct.

3 Q How would a POSA, or POSITA, understand
4 the difference between a press density and a
5 compaction density, as you understand those terms?

6 A Well, Kim is the party that defined press
7 density in their own patent. So a POSITA would
8 refer to Kim's description of press density and
9 understand how that is not the same as the
10 understanding of compaction density.

11 Q What do you contend is the difference
12 between press density as used in Kim and
13 compaction density as used in the '118 patent?

14 A Well, for that I would, again as a POSITA
15 would, I refer to the language in Kim.

16 Would you like me to recite that?

17 Q Well, Kim defines press density. I
18 understand that.

19 My question to you is, how does Kim's
20 press density compare to compaction density? How
21 do those two concepts relate to one another?

22 MR. O'CONNOR: Object to form.

1 A Well, they both have the word "density"
2 in them. That's about as much as you can say
3 about it. But they don't measure the same
4 property. Kim's press density is a measurement of
5 the active material powder under a high pressure
6 of 2.5 tons per square centimeter, and compaction
7 density would more typically be understood to be a
8 property of the entire electrode after it has been
9 compacted in a manner that one would use to create
10 a battery film.

11 Q In the portion of Paragraph 89 that goes
12 on to Page 52, you compare Kim's press density
13 with a value called tap density.

14 Do you see that?

15 A Yes.

16 Q What is the relationship between Kim's
17 press density and what you identify here as tap
18 density?

19 A "Tap density" is the term of art that's
20 used for people who want to know how compact a
21 powder might be able to be, but it's not yet
22 compacted.

1 So that you take a powder, you place it
2 in -- effectively you place it in a jar where the
3 powder is loosely placed in this jar, and you tap
4 it on the -- on a surface that gets out any air
5 bubbles or -- and lets the particles kind of
6 settle. And, but again, you are not exerting any
7 exterior force beyond gravity. And then you
8 calculate the density of that powder.

9 So when a vendor is potentially providing
10 a powder to a battery maker, they might say, Hey,
11 tell us the tap density of your powder, and so
12 they can make a judgment if they like that value
13 or don't.

14 Kim's press density is similar in the
15 sense that it's -- appears that Kim wants to know
16 what's the density of the active material powder,
17 but it's under a much higher pressure. And so it
18 wouldn't be the exact same, but it has a similar
19 origin of trying to get at what are the properties
20 of the active material.

21 Q 2.5 tons per centimeter square seems like
22 a lot of pressure.

1 Is that a very high pressure for this
2 context?

3 A In which context are you referring?

4 Q Kim's press density is defined as 2.5
5 tons per centimeter square.

6 A Right. It's certainly much higher than
7 would be experienced in tap density. It's
8 possible to go to much higher pressures than that.

9 Q What is Kim's purpose for measuring press
10 density?

11 A I don't entirely know. That's for Kim.
12 Kim is a -- has their own opinions, I'm sure, but
13 they -- I'm sure they see it as a value that can
14 teach someone how to produce a useful electrode by
15 looking at that value. But I can't speculate as
16 to why they chose that particular value.

17 Q Do you have any opinion on what a POSITA
18 would understand as the value of Kim's
19 press-density information?

20 MR. O'CONNOR: Object to form.

21 A Well, it's up to Kim to make the case for
22 what the value of their press density is and how

1 it would correlate with battery performance.

2 That -- they attempt to do that. A POSITA can
3 look at that evidence and decide for themselves if
4 they find it persuasive or not.

5 Speaking for my -- in my own role as a
6 battery maker, I don't use that property, but Kim
7 can do what they like.

8 Q Given Kim's press-density value, do you
9 have any opinion on what a POSITA reading Kim
10 would gain from that knowledge?

11 MR. O'CONNOR: Object to form.

12 A Again, I don't -- I can't speak for a
13 POSITA in general because they -- a POSITA might
14 have some objective in mind. That objective might
15 align with Kim's objective or it might not.

16 So if a POSITA reading Kim decides, Yes,
17 I want to implement that, Kim's description, then
18 they would want to use Kim's description of press
19 density as a means of replicating that.

20 So there's value in trying to replicate
21 Kim.

22 Q What do you understand to be the

1 objective of Kim that may or may not align with a
2 POSITA's objective?

3 A As I state in Paragraph 104, "In my
4 opinion, Kim aims to maximize energy density of
5 the active material by using a composite cathode
6 active material formed by mixing two different
7 active materials into an otherwise homogeneous
8 cathode."

9 Q In your previous answer you said there's
10 value in trying to replicate Kim. What, in your
11 opinion, is the value in trying to replicate Kim?

12 A I stated a POSITA might want to replicate
13 Kim, if they believed Kim to have value. And in
14 that case a POSITA would look carefully at what
15 Kim is describing and attempt to have that happen
16 in the -- in their own experiments.

17 Q In Paragraph 90 on Page 52 of your
18 declaration you observe in the middle of that
19 paragraph that "Kim does not provide guidance on
20 what pressure to apply when forming a complete
21 electrode."

22 Do you see that?

1 A Yes.

2 Q Do you know whether the '118 patent
3 specifies a pressure to apply when forming a
4 complete electrode?

5 A I don't recall off the top of my head. I
6 would have to look at that.

7 Q And Number 2 you say that "Kim provides
8 no guidance on what porosity to use for a complete
9 electrode."

10 Do you see that?

11 A Yes, I see that.

12 Q Do you recall whether the '118 patent
13 provides a porosity to use for a complete
14 electrode?

15 A I don't believe the '198 patent provides
16 that information.

17 Q It sounded like you said '198 patent.

18 Did you mean '118?

19 A Sorry, one one eight.

20 Q Do you agree that density and porosity in
21 this context have a generally inverse
22 relationship?

1 MR. O'CONNOR: Object to form.

2 A What context do you mean?

3 Q The context of compacting electrode
4 layers.

5 A I wouldn't describe it as inverse.

6 Q How would you describe it?

7 A The reason for not using the word
8 "inverse" is that has a very specific mathematical
9 meaning which isn't exactly followed by that
10 relationship. The relationship has a mathematical
11 basis that's not exactly inverse.

12 Q Do you agree that generally decreasing
13 the porosity will increase the density of a layer
14 and vice versa?

15 A Holding all other -- all other things
16 constant, such as the composition, et cetera, yes,
17 density will increase when porosity decreases.

18 Q In general, why do references describing
19 battery electrodes provide information like
20 density?

21 A In general, density relates to things
22 that battery people, battery makers, would want to

1 know because it affects the performance of the
2 batteries, so they're interested in any property
3 that has an effect on the performance of the
4 battery.

5 Q How does density affect the performance
6 of the battery?

7 A If density is a measure of how much
8 active material you have in a given volume, then
9 that relates to the amount of energy that can be
10 stored in that volume.

11 On the other hand, if the density is too
12 high, you may have difficulty accessing that
13 energy because there won't be a pathway for ions
14 to get to the active material. And so you're
15 seeking for the density that allows for energy to
16 be stored and to be retrieved in an appropriate
17 time frame.

18 Q Would a person of ordinary skill in the
19 art of battery materials and construction
20 understand the tradeoff between the energy density
21 of a battery and the ability for ions to flow
22 through the electrode?

1 A Yes.

2 Q Would a person of ordinary skill in this
3 art also understand rate performance to be another
4 tradeoff involved in this balance between energy
5 density and the ability for ions to flow through
6 the electrode?

7 MR. O'CONNOR: Object to form.

8 A What do you mean by "rate performance"?

9 Q Do you use that term?

10 A I may use it colloquially, but in this
11 context it needs to be nailed down a little more
12 scientifically.

13 Q What is your understanding of the term
14 "rate performance" when you use it?

15 A If it were used colloquially, it just
16 means everybody would love to be able to charge or
17 discharge their batteries at a faster rate, if
18 they can, and if it doesn't jeopardize some other
19 property they care about. And so people pay
20 attention to how quickly they can charge or
21 discharge the battery. That's generally under the
22 idea of a rate performance.

1 But as far as specifics, then you have to
2 get into the details of how you're conducting that
3 experiment to understand what is meant by rate
4 performance.

5 Q When you say, "if it doesn't jeopardize
6 some other property they care about," what are
7 other properties that a person of ordinary skill
8 in the art cares about that might be jeopardized
9 by pursuing rate performance?

10 A So batteries are complex devices, and
11 they are -- and we're attempting to, in
12 constructing batteries, balance lots of competing
13 behaviors. And so whenever you're trying to
14 balance competing behaviors, you have to decide
15 what you care about and what you're willing to
16 comprise on and what you're not willing to
17 compromise on. And so that determines how you are
18 going to balance these competing factors.

19 If your interest is in high rate
20 performance, then you can drive towards that. But
21 you may make it so that your battery is unsafe and
22 is more likely to cause injury or loss of the

1 device that it's used in. And so you have to
2 decide, Am I willing to pursue rate performance at
3 all costs, or do I need to balance it with other
4 things that I care about.

5 Q Is high energy capacity one of those
6 things that a person of ordinary skill in the art
7 might care about and try to balance?

8 MR. O'CONNOR: Object to form.

9 A Again, we're talking generalities here.

10 In general, capacity and rate performance
11 are measured differently, but they are connected.
12 So you can't completely say I want one without the
13 other. They have some connection to each other.

14 But it's possible for someone to say, I
15 want my battery to be a pacemaker battery. I'm
16 going to implant it in someone, and it needs to
17 last for years. I need to have a high amount of
18 energy density, but I don't need it to be a
19 fast-acting battery, because it will be used over
20 the course of a long period of time, so therefore
21 I don't care about that rate performance.

22 On the other hand, someone might say, I'm

1 putting this battery in a car. I need it to have
2 high energy density, but I can't completely
3 compromise on power density because occasionally
4 that car needs to go fast. And so they will try
5 to balance those objectives.

6 Q If there is a way to increase energy
7 density of a battery without compromising anything
8 else, is that generally something positive to
9 pursue?

10 MR. O'CONNOR: Object to form.

11 A Well, you made a stipulation, "without
12 compromising anything else," which I would reject.
13 It's not possible to do, to maximize energy
14 density without compromising something else.

15 Q I understand. I am just trying to
16 establish for context, higher energy density is
17 better than lower energy density as far as what
18 somebody would pursue.

19 Is that correct?

20 A Yes.

21 MR. O'CONNOR: Object to form.

22 Q Just in general to understand, you know,

1 like higher energy density is good for batteries,
2 but, you know, maybe for your blood pressure lower
3 is better.

4 A Right.

5 Q If you understand what I mean.

6 A I understood the question, yeah.

7 Q Is higher energy density associated with
8 high electrical capacity?

9 A Again, in different contexts those terms
10 might have distinct meanings. Meaning when you
11 ask what's the capacity of the battery, someone
12 has to define their terms; you know, what do you
13 mean per unit -- capacity per unit mass, capacity
14 per unit volume, capacity per unit area.

15 And so, but just in general, capacity is
16 considered a way of measuring energy that's stored
17 in the battery. It's not a complete measurement,
18 but it's getting at that measurement.

19 The other part is the voltage of the
20 battery, so the -- basically the capacity
21 multiplied by the voltage gets you to the energy.
22 And so if you have information about the voltage

1 and if you have information about the capacity,
2 then you can get some -- some idea of what the
3 energy is stored.

4 Q Would a person of ordinary skill in this
5 art understand high electrical capacity to be a
6 way of achieving high energy density?

7 MR. O'CONNOR: Object to form.

8 A If -- if you were working on a particular
9 chemistry, so you've already decided I want to use
10 this particular active material in my cathode,
11 active material in my anode, and so that's fixed,
12 then capacity and energy would be considered
13 something that when you improve one, you improve
14 the other.

15 But it's complicated. Because, again,
16 voltage is part of that picture. And if you go
17 too fast in your charging or discharging, you --
18 the voltage might drop and you'd start to lose
19 energy that's available to you. And so you have
20 to balance things.

21 But to your original point, capacity and
22 energy are sometimes equated to each other, but

1 it's a -- it's a complicated topic, so you have to
2 be careful.

3 Q Can you go to Paragraph 113 of your
4 declaration on Page 66.

5 A Okay. Just a moment.

6 Okay, I'm there.

7 Q In Paragraph 113 you comment that the
8 '118 patent is directed to a different problem
9 than Ishigaki.

10 Do you see that?

11 A Yes.

12 Q And a different problem than Kim as well.

13 Do you see that?

14 A Yes.

15 Q I don't read this paragraph as suggesting
16 that Ishigaki and Kim are directed to -- never
17 mind.

18 What role did the problem that Ishigaki
19 and Kim were trying to solve play in your analysis
20 of whether one would combine their teachings?

21 MR. O'CONNOR: Object to form.

22 A You used the word "problem," as if they

1 have the same problem, which they don't.

2 But, yes, my analysis of whether you
3 would combine these two pays attention to which
4 problems they are each respectively attempting to
5 address.

6 Q I don't read this paragraph as suggesting
7 that Ishigaki and Kim are directed to problems
8 that are mutually exclusive or incompatible.

9 Is that fair?

10 MR. O'CONNOR: Object to form.

11 A What part of this paragraph are you
12 referring?

13 Q The entire paragraph, because my
14 understanding is it's something you're not saying.

15 A So you want me to compare Kim and
16 Ishigaki as to what they -- what problems they're
17 solving and whether they're mutually incompatible?

18 Q Right. My understanding of your opinion
19 is that Ishigaki and Kim's disclosures are
20 directed to solving different problems, but not
21 that they are mutually exclusive or incompatible
22 purposes.

1 Is that a fair reading of your opinion?

2 MR. O'CONNOR: Objection.

3 Mischaracterizes testimony.

4 A That's not -- right, that's not a fair
5 comparison -- characterization of my testimony.

6 Taken in its entirety, my testimony is
7 that batteries are complex devices. And as I
8 stated a few minutes ago, there's competing
9 effects that you must compromise on. And so you
10 don't get to have your cake and eat it too. You
11 have to choose what things you value and what
12 things you're willing to compromise on.

13 When you have an objective like Ishigaki,
14 where you are trying to protect from contact
15 between the electrodes, the positive and negative
16 electrodes due to puncturing; or if you're Kim and
17 you just want to increase electrical capacity,
18 then those starting points mean you're going to
19 drive toward a different solution.

20 And in making those tradeoffs and those
21 compromises you will end up in a different place,
22 and you won't be paying attention to what the

1 other patent is trying to do, because it doesn't
2 make sense for your objective.

3 Q So even though Ishigaki and Kim and the
4 '118 patent might have different priorities,
5 they're all dealing with similar tradeoffs.

6 Correct?

7 MR. O'CONNOR: Object to form.

8 A So the tradeoffs are in some sense
9 universal but in some sense very particular to the
10 materials that you're using.

11 So once you start specifying things about
12 your battery composition, which active materials
13 you want to use, which separator, which form
14 factor you want to use, whether you want it to be
15 a jelly roll or a prismatic cell or whatever
16 you're trying to make, once you start specifying
17 those factors, then there's no more universality.
18 You have to make decisions.

19 And then you test the batteries. Because
20 you don't always know in advance what the tradeoff
21 will be until you build the cells and start
22 testing them.

1 In each of these cases of Ishigaki and
2 Kim, they had an objective, they started down that
3 path, they started making things, and they find
4 out that their solution is -- works for them. But
5 that doesn't mean that a POSITA would want to
6 combine the two, because they're addressing
7 different problems in different ways.

8 Q When you said before that "the tradeoffs
9 are in some sense universal," in what sense are
10 they universal?

11 A In the sense that if you drive toward,
12 for instance, higher energy density, you're
13 probably going to have to sacrifice safety. And
14 so you might say, I'm not willing to compromise on
15 safety, therefore I'm not going to get the highest
16 possible energy density. And that's fairly
17 universal.

18 As to where that compromise lies, that
19 gets into the particulars of each battery design.

20 Q Can you go to Paragraph 121 of your
21 declaration on Page 69.

22 A Okay.

1 Q This is the portion of your declaration
2 where you discuss the combination of the Wang and
3 Ishigaki references. Correct?

4 A Correct.

5 Q You state in the second sentence of this
6 paragraph that, "A POSA would not need to have a
7 desired density in mind, because density values
8 would be redundant characteristics of a cathode."

9 Do you see that?

10 A Yes, I see that.

11 Q Do you interpret Dr. Gido to require that
12 a POSITA have a desired density in mind?

13 A Could you restate the question?

14 Q When you say in this sentence that "a
15 POSITA would not need to have a desired density in
16 mind," what are you rebutting here?

17 MR. O'CONNOR: Object to form.

18 A I believe that's referring to something
19 that the petitioner stated in a prior -- prior
20 document. That phrase sticks in my mind because
21 it was used in a prior document, but I don't --
22 right now I can't point to it exactly. Let's see

1 if we can find it in the exhibit that Dr. Guido
2 has.

3 Okay. Here we are in Dr. Guido's
4 declaration, Exhibit 1010, Paragraph 276. He
5 says, "Wang assumes the reader already has a
6 desired density in mind and teaches the method one
7 would use to achieve any such density."

8 Q Do you disagree with the statement that
9 Wang teaches a method one could use to achieve any
10 density?

11 A I disagree that Wang's method could
12 achieve any density.

13 Q Does Wang itself purport to teach a
14 method that could be used to achieve any desired
15 density?

16 A In my opinion, any desired density is a
17 pretty broad term. And, no, Wang does not teach
18 that it could get any desired density.

19 Q Would a POSA understand Wang to be
20 teaching a method that could be used to get any
21 realistic desired density?

22 MR. O'CONNOR: Object to form.

1 A So that's a very broad categorical
2 statement. So again, I would have to say no.

3 Q Would you agree that Wang says that it
4 can be used to achieve any desired density?

5 MR. O'CONNOR: Object to form.

6 A I will need to refer to Wang to find an
7 answer to that question.

8 Q If you look at Paragraph 122 of your
9 declaration.

10 A Uh-huh.

11 Q Do you --

12 A I see that.

13 Q -- quote a portion of Wang that discusses
14 a process for achieving a desired net density?

15 A No, that's not what I said. I said
16 Paragraph 67 and 73 of Wang describe the
17 compression process used to reach those porosity
18 targets.

19 Q In the block quote that follows the
20 sentence you have in Paragraph 122, the bolded
21 language describes net density as the thing that
22 is desired, and not porosity. Correct?

1 MR. O'CONNOR: Object to form.

2 A This paragraph quoted from Wang says, the
3 bold text says, "The particles may be compressed
4 using compression techniques, for example, a
5 calendaring process, to achieve a desired net
6 density of compacted particles while planarizing
7 the surface of the layer."

8 Q Does this teaching of Wang suggest that
9 net density is the target that is desired, and
10 manipulating the porosity through compression is
11 the means for achieving that desired density?

12 MR. O'CONNOR: Object to form.

13 A It's not clear from Wang's statement
14 whether they are driving towards a particular
15 density or a particular porosity. But in the
16 context of Wang, if they really, really cared
17 about density, they would have stated the
18 densities that they achieved, and compared those
19 to other densities that were not desirable.

20 Instead, Wang in their embodiments uses
21 density as the primary way of comparing outcome.
22 And so that's teaching the POSITA what Wang cares

1 about.

2 This language in Wang is not surprising
3 because it's just stating that if you have a
4 density that you want, you can get to it, or you
5 can try to get to it. But that's not what Wang is
6 doing in their examples.

7 Q Wang does not describe any particular
8 porosity as being desired or not desired.

9 Correct?

10 A If you look at Wang's embodiments, as a
11 POSITA you would start to develop an appreciation
12 for what Wang desires or doesn't desire.

13 Q But as far as Wang's use of terminology,
14 the adjective "desired" only ever describes
15 density. Correct? It never describes porosity?

16 A Well, that's getting into semantics. But
17 again, a POSITA looking at Wang is going to decide
18 what -- what is desirable or not desirable in the
19 context of Wang's teachings about different
20 battery designs and how well they perform.

21 Q And do you think a POSITA looking at Wang
22 and deciding what is desirable or not desirable

1 would be influenced by the fact that Wang talks
2 about a desired net density?

3 MR. O'CONNOR: Object to form.

4 A As I said before, I don't think that a
5 POSITA would be particularly influenced by that
6 statement because it's well understood in the
7 field that some people care about density.

8 That doesn't necessarily --

9 Q If you go to --

10 A That doesn't necessarily describe Wang,
11 however, because Wang is focused more on porosity.

12 Go ahead.

13 Q If you go to Paragraph 123 of your
14 declaration, paragraph -- or on Page 71, you
15 state, "It is my understanding that the Board held
16 that Wang's Paragraph 67 directly invites those of
17 ordinary skill in the art to select a compaction
18 density that best suits their needs."

19 Do you see that?

20 A Yes, I see that.

21 Q Do you think the Board is wrong?

22 A I think that the Board is overstating the

1 teaching of Wang in that regard, yes.

2 Q What about the Board's finding do you
3 think overstates the teaching of Wang?

4 A Again, it won't be surprising to a POSITA
5 that some people care about density. But when you
6 look at Wang and what Wang is doing with their
7 design of electrodes, they're not focused on
8 density; they're looking at porosity. So they --
9 if they -- if Wang really believed porosity was
10 insufficient, then they would have provided
11 additional information. But they did not, because
12 they considered porosity to be a sufficient metric
13 by which to judge that their electrodes are
14 functioning and are constructed in a conceivable
15 way.

16 So it sort of relates back to looking at
17 the embodiments and looking at the overall
18 teachings, rather than cherry-picking one
19 statement that really isn't that earth-shattering.

20 Q Do you agree that Wang teaches a method
21 that manipulates porosity in order to achieve a
22 desired density?

1 A I disagree with that statement.

2 MR. O'CONNOR: Object to form.

3 Q Do you agree that Wang says that it
4 teaches a method that manipulates porosity in
5 order to achieve a desired density?

6 A Wang is manipulating porosity in order to
7 achieve a desired result of battery performance.
8 They do not see density as a means to itself.

9 Q Do you agree that Wang describes density
10 as desired for its battery performance?

11 MR. O'CONNOR: Object to form.

12 A Wang is describing in this quoted
13 paragraph that, for example, a calendaring process
14 to achieve a desired net density of being
15 compacted particles.

16 So if someone has a desired net density,
17 they would have understood even before they got to
18 Wang that you can do that by -- by calendaring.
19 Everybody knows that.

20 If you want -- if you have a desired net
21 density, you can attempt to get there. You may
22 not because there's a lot of problems with getting

1 a density that you want. But if you want to
2 attempt it, go for it. Do your calendaring and
3 see what you get.

4 But Wang is not teaching anything that
5 would say, Here's the value you want.

6 Q Do you agree that the Saka and Li
7 references teach specific values for desired
8 densities?

9 A That's a very broad statement. I would
10 need to get into the specifics of Saka and Li.

11 Would you like to point me to something?

12 Q Well, let's just start with Saka.

13 Is your understanding of Saka that it
14 teaches various cathode structures and discloses
15 specific density values for those cathodes?

16 A My understanding, based on Saka's
17 embodiments, that certain density values are
18 desirable.

19 Q And how about Li; is it your
20 understanding of Li that it teaches a cathode
21 structure and discloses specific density values
22 for that cathode?

1 A Li discloses a single compaction density
2 value of 4.1 grams per cc for its electrode
3 structure. But Li does not tie that density value
4 to how that would affect performance.

5 So density is measured and is reported,
6 but is not connecting -- Li is not connecting that
7 to other things that people might care about.

8 Q What does Li care about?

9 A Li is trying to figure out how to bend an
10 electrode around tight corners and not have it
11 delaminate or have other problems.

12 Q Would a POSA, reading Li, understand that
13 the compaction density value Li discloses would
14 achieve an energy density for the resulting
15 cathode?

16 MR. O'CONNOR: Object to form.

17 A As you stated the question, a POSITA,
18 reading Li, would not understand that Li's density
19 value would correspond to any particular energy
20 density.

21 Q But a POSITA, reading Li, would
22 understand that the energy density of the

1 resulting battery would be a function of Li's
2 compaction density value. Correct?

3 MR. O'CONNOR: Object to form.

4 A Again, Li is not attempting to consider
5 energy density in terms of compaction density. So
6 a POSITA, reading Li, might understand that, as
7 they would even without reading Li, that density
8 has some influence on energy. That's about as far
9 as it goes.

10 Q A POSITA, reading Li, and seeing that
11 numeric value for the compaction density, would
12 they understand that compaction value to reflect
13 Li's balancing of tradeoffs between energy density
14 and ions flowing through the cathode?

15 MR. O'CONNOR: Object to form.

16 A I don't believe a POSITA would read that
17 into Li. That's not the focus of Li. That's not
18 Li's objective.

19 Q Would a POSITA understand that any
20 functional battery must have some balance among
21 the tradeoffs between energy density, ion
22 flow-through, rate performance, things like that?

1 MR. O'CONNOR: Object to form.

2 A My testimony has been that those are
3 important things for a battery designer to
4 consider. That's outside of Li or any other
5 reference. That would be base knowledge that a
6 POSITA would have, that you need to trade off
7 these complex behaviors in order to achieve an
8 objective.

9 But knowing that there's a tradeoff is
10 far, far different than actually deciding what
11 value you're going to use in that tradeoff.
12 That's getting into the specifics and particulars
13 that -- where it really matters what active
14 material you're using and whether you're trying to
15 do something that's more on the safety side or
16 more on the high energy side, or whether you were
17 trying to prevent a specific safety problem from
18 occurring.

19 So once you get into the particulars, it
20 has a big effect on what value you would pick.
21 And so outside of that context, Li's value of
22 density of 4.1 has no meaning to anyone except

1 that it's what they happened to pick.

2 Q When you say "it's what they happened to
3 pick," is it fair to say that 4.1 is what Li
4 picked based on Li's priorities for balancing
5 those tradeoffs?

6 MR. O'CONNOR: Object to form.

7 A I don't know if Li was caring about
8 balancing those tradeoffs. Li was -- is concerned
9 with solving a problem of how do you get the
10 electrode to bend around corners in a -- in its
11 enclosure. And so they vary the thickness of the
12 electrode, but so that it can bend around corners.

13 There's no evidence in Li that they're
14 thinking about other battery problems at the same
15 time.

16 Q Well, would a POSA understand that
17 solving the problem of bending an electrode around
18 corners does nobody any good if the resulting
19 battery is nonfunctional?

20 A Well, apparently Li's battery is
21 functional enough for Li to want to get a patent
22 on it. But there's no evidence that Li's battery

1 is the best battery that everyone wants.

2 Q Does a person of ordinary skill in the
3 art need to believe that Li's battery is the best
4 battery that everyone wants in order to be
5 motivated to combine Li's teaching with other
6 references?

7 MR. O'CONNOR: Object to form.

8 A A POSITA would need to see in Li that
9 Li's objectives are aligned with what the POSITA
10 wants. And then someone would consider using Li's
11 teachings.

12 But as for combining Li with any other
13 reference, that would require -- that's a higher
14 burden than just saying, Oh, I'm kind of
15 interested in Li. To combine Li with something
16 else requires that you see that there's an overlap
17 and that the -- that there would be a benefit to
18 using Li's procedure in the -- in combining with
19 another reference.

20 I don't see any evidence that Li's
21 teachings would particularly combine with any
22 other reference. It's just not -- there's just

1 not enough detail in Li to -- for someone to make
2 that kind of judgment. Someone reading Li is
3 going to say, Oh, that's a cool idea, to make the
4 battery so that you can bend around corner -- the
5 electrode around corners, but they're not going to
6 see Li as solving other problems or as having
7 anything to teach about other problems that are
8 unconnected with the problem of bending around
9 corners.

10 Q If someone reading Li said to themselves,
11 That's a cool idea, to make the battery so you can
12 bend around corners, and was therefore motivated
13 to try and practice Li, would they understand that
14 Wang's calendaring process is something they could
15 use to make the battery of Li?

16 A Not necessarily. There's too many
17 differences and complications.

18 Q Would they understand in general that a
19 calendaring process could be useful for making the
20 battery described in Li?

21 A So calendaring is almost universally
22 done. So saying that, Hey, you could calendar an

1 electrode, there's nothing new in that.

2 Q Is there something specific about the
3 calendaring process of Wang that makes it
4 incompatible with the battery of Li?

5 MR. O'CONNOR: Object to form.

6 A Well, a POSITA, reading both of these,
7 would not necessarily jump to the conclusion that
8 they are compatible. A POSITA would know, given
9 the complexities of all these variables that a
10 battery maker has to contend with, would know that
11 it might work, it might not work. And you won't
12 know unless you start experimenting and trying
13 things.

14 But there's no reason to believe that you
15 could just take what Li did, Li's density value,
16 and that that would just plug into Wang's
17 procedure. There is nothing that would suggest
18 that that would work. There are too many
19 differences between the -- the two different
20 procedures.

21 Q Can you go to Paragraph 131 of your
22 declaration on Page 77.

1 In that first sentence you say that
2 "Saka's disclosure expressly teaches away from
3 using a compaction density greater than 3.2 grams
4 per cubic centimeter."

5 Do you see that?

6 A I see that.

7 Q Is it your opinion that Saka expressly
8 teaches away from compaction densities over that
9 value because Saka doesn't have a specific example
10 of a compaction density over that value?

11 A That's part of it. But it's more than
12 just that Saka doesn't have that density.

13 It's that if you look at Saka's
14 densities, you -- as a POSITA you would -- you
15 don't see any evidence that going -- that going to
16 density values greater than Saka does in their
17 embodiments would lead to any benefit.

18 Q Do you agree that in other parts of its
19 teachings, not these specific examples, Saka
20 teaches a density range up to 3.5 grams per cubic
21 centimeter?

22 MR. O'CONNOR: Object to form.

1 A Can you point me to a specific part of
2 Saka?

3 Q Well, if you go to the next sentence of
4 your declaration you say -- you identify Saka's
5 density range between 2.5 grams per cubic
6 centimeter and 3.5 grams per cubic centimeter.

7 Do you see that?

8 A I see that. And Saka does -- does
9 mention that as a possible range of values that
10 someone might use.

11 But then when you get to the embodiments,
12 as a POSITA would, you discover Saka never even
13 measured that full range of densities. A POSITA
14 would ask themselves why. Why would I want to go
15 up to that high density? There's nothing in Saka
16 that would motivate that.

17 Because if you look at Saka's
18 embodiments, they don't even go above 3.0. And
19 even at that, there is evidence in Saka's
20 embodiments that lower densities are preferable.

21 And so a POSITA would say, Let's go to
22 the lower end of that range, if I'm going to -- if

1 I'm going to explore that range, the lower end is
2 where I want to be, based on the evidence in Saka.

3 Q Does Saka ever expressly say, Don't
4 exceed 3.2 grams per cubic centimeter?

5 A No, I don't believe Saka does say that.
6 But we're looking at the overall teachings of
7 Saka, not just one isolated statement.

8 Q Does Saka ever expressly identify a
9 problem with exceeding 3.2 grams per cubic
10 centimeter?

11 A I don't believe Saka expressly identifies
12 a problem with exceeding 3.2. However, as with
13 all battery design decisions, as we've discussed,
14 there are tradeoffs, there are things that can go
15 wrong when you go to too high of a density. There
16 are things that can go wrong if you go to too low
17 of a density.

18 And so you have to consider the evidence
19 in Saka for what works and what doesn't work. And
20 Saka doesn't even explore any densities above 3.0
21 in their embodiments. Which suggests to a POSITA
22 there's nothing interesting up there, don't bother

1 going up there. Saka is exploring a much narrower
2 and restricted density range of 3.0 or below. And
3 within that range that Saka explores there's
4 evidence that going lower can lead to better
5 outcomes.

6 Q Does Saka ever expressly say that lower
7 densities lead to better outcomes?

8 A As I reference in Paragraph 132 of my
9 declaration, Saka teaches that superior battery
10 performance was achieved with a cathode compaction
11 density of 2.8 grams per cc, and that its measured
12 battery performance decreased when density values
13 reached 3.0 grams per cc. So I'm using the
14 teachings of Saka in their entirety, which, as any
15 good scientist would do, looks at the data that
16 they present, not just the words that they
17 present.

18 In addition, as I state in that
19 paragraph, Saka talks about collapse of pores
20 during pressing, and that that can result in
21 problems.

22 MS. KELLY: Why don't we do a five-minute

1 break.

2 THE WITNESS: Sure.

3 MR. O'CONNOR: Sounds good.

4 (A recess was taken.)

5 BY MS. KELLY:

6 Q Can I direct you to Paragraph 145 of your
7 declaration on Page 86.

8 A Okay.

9 Q Throughout Paragraph 145 you reproduce
10 multiple quotations of Dr. Gido's testimony.

11 Correct?

12 A Yes.

13 Q And one example quotation in the middle
14 of Page 86 you quote Gido as saying, "So as you
15 reduce the porosity, certain characteristics like
16 that degrade. So there is some lower value, but,
17 you know, these are tradeoffs."

18 Do you see that?

19 A Yes, I see that quote.

20 Q And in the next quote he talks more about
21 tradeoffs among different characteristics
22 depending on what one is trying to achieve.

1 Do you see that?

2 A Yes, I see that.

3 Q When taken together, do these quotes
4 indicate to you that Dr. Gido understood the
5 tradeoffs that a POSITA needs to deal with in
6 constructing a battery?

7 A I can't generalize that to all tradeoffs.
8 I can only interpret the language that he gave
9 here in this context. He's understanding that
10 there are tradeoffs.

11 Q And he identified tradeoffs including
12 rate performance and energy density and the
13 ability of ions to flow through the electrode.

14 Correct?

15 A What I see in this quote is he said,
16 Certain characteristics to do with safety or rate
17 performance or something like this. So he
18 understands there are some tradeoffs, but I
19 wouldn't say that he said everything that you put
20 in your question.

21 Q In reviewing Dr. Gido's explanations, did
22 you identify any tradeoffs that you think are

1 important that he did not consider?

2 MR. O'CONNOR: Object to form.

3 A Do you mean that he did not consider in
4 his testimony that's quoted here?

5 Q At all.

6 A Well, I can't generalize to say that
7 he -- that all his consideration of tradeoffs is
8 accurate and true. It's obvious that he
9 understands the principle of tradeoffs. But when
10 it gets to the particulars, especially as applied
11 to specific cases, then we might have something to
12 disagree about.

13 Q Can you please go to Paragraph 170 on
14 Page 102 of your declaration.

15 A Okay.

16 Q A final sentence of Paragraph 170 says
17 that "A POSITA would have understood that Li's
18 compaction density ranges are not immediately
19 combinable with Wang's gradient cathode
20 structure."

21 Do you see that?

22 A Yes.

1 Q What do you mean by "immediately
2 combinable"?

3 A Meaning it would require undue
4 experimentation in order to combine.

5 Q What experimentation would it require?

6 A You would have to basically start over,
7 start making electrodes with different
8 compositions and thicknesses and densities and see
9 what you get.

10 Q When you say you would "have to start
11 over," what do you mean? Start over from what?

12 A Meaning you couldn't just take Wang's
13 compositions and teachings and say, I know this
14 will work in Li's -- with Li's compaction density.
15 You don't know that. There's too many things
16 different between the two references. So you have
17 to start over by building electrodes and
18 attempting to get those compaction densities and
19 seeing what happens when you do that.

20 And in my experience, and what a POSITA
21 would see, is that lots of things can go wrong,
22 and lots of things can be outside of the range

1 of -- of well-performing electrodes. And so then
2 you would have to go back and make adjustments and
3 start over with building new electrodes, testing
4 them, seeing how those adjustments go.

5 That's what I mean.

6 Q If a POSITA started with the electrode
7 material and density disclosed in Li, would they
8 be able to use a calendaring process similar to
9 the one disclosed in Wang to make that electrode?

10 MR. O'CONNOR: Object to form.

11 A I don't think a POSITA would necessarily
12 believe that you could just use one, Wang's method
13 to achieve Li's outcome or vice versa.

14 Q If a POSITA started with the electrode
15 material and density disclosed in Saka, would they
16 be able to use a calendaring process similar to
17 the one disclosed in Wang to make that electrode?

18 A Are you -- you're asking if someone using
19 Saka's densities could use Wang's calendaring
20 method?

21 Q If someone could use Wang's calendaring
22 method to achieve the densities disclosed in Saka

1 in making an electrode like the one disclosed in
2 Saka?

3 MR. O'CONNOR: Object to form.

4 A There are too many things different about
5 those references to be able to combine that way.

6 MS. KELLY: I don't think I have any
7 further questions.

8 MR. O'CONNOR: All right. Can we take a
9 ten-minute break? I'm going to organize some
10 thoughts.

11 MS. KELLY: Sure.

12 MR. O'CONNOR: That's great.

13 (A recess was taken.)

14 EXAMINATION BY COUNSEL FOR PATENT OWNER

15 BY MR. O'CONNOR:

16 Q Good morning, Dr. Wheeler.

17 A It's only barely morning for you, but not
18 for us.

19 MS. KELLY: I was about to say, that is
20 not the flex on me that you think it is.

21 Q Do you recall discussing some new
22 exhibits, Exhibit 1032, Exhibit 1033, and Exhibit

1 1034?

2 A Yes.

3 MR. O'CONNOR: Can we go ahead and bring
4 up Exhibit 1033.

5 A Okay.

6 Q And I'd like to direct your attention to
7 Page 6.

8 A Okay.

9 Q In the second paragraph in this section,
10 entitled 9. Types of Distribution (Number,
11 Volume, Intensity), the last sentence there, can
12 you go ahead and read that to me.

13 A The last sentence of the second
14 paragraph?

15 Q Correct.

16 A "Converting laser diffraction results to
17 number distributions is also possible, but since
18 only a simple spherical model is available here,
19 this is less accurate, and the volume distribution
20 should be used whenever possible."

21 Q Would a POSITA interpret this sentence as
22 suggesting laser-diffraction devices can output

1 number distributions?

2 A Yes, that would be a -- something that
3 any common laser-diffraction instrument is capable
4 of outputting. It simply requires looking at the
5 software settings once you open the software that
6 controls the instrument and click on the output
7 that you want.

8 Q And can we turn briefly to Exhibit 1051.
9 Do you recall discussing that one earlier
10 as well?

11 A 1051?

12 Q I'm sorry, Exhibit 2051. Two zero five
13 one.

14 A Exhibit 2051. Yes, I will open that up.
15 I have that.

16 Q And I'd like to direct your attention to
17 Page 4 of this document.

18 A Okay.

19 Q This is the table entitled Technical
20 Data. Correct?

21 A Correct.

22 Q And Line 6 is a line entitled Data.

1 Is that correct?

2 A Yeah, Row 6. Uh-huh.

3 Q Row 6. Correct.

4 And can you read the additional
5 information in that row?

6 A Under row that says, Data it says,
7 "Volume, number and area distributions as well as
8 percentile and other summary data."

9 Q Would a POSITA interpret this information
10 as suggesting that a laser-distribution device,
11 specifically the Microtrac Particle Analyzer
12 S3500, can output volume number and/or area
13 distribution information?

14 A Yes, a POSITA would interpret this as
15 saying it has all those capabilities, and it would
16 be a simple matter of, as I said, making a
17 selection in software.

18 Q And now I'd like to turn to Exhibit 1034.
19 And we'll start on Page 2.

20 A Okay, Exhibit 1034, Page 2.

21 Q And this is a section entitled Summary
22 Data.

1 Is that correct?

2 A That's correct.

3 Q And there are bolded terms at the
4 beginning of each of the paragraphs on this page.

5 Is that correct?

6 A That's correct.

7 Q And the first bolded term is MV.

8 Is that correct?

9 A Correct.

10 Q And what does that refer to?

11 A Within that paragraph it says "MV, mean
12 diameter in microns of the volume distribution,
13 represents the center of gravity of the
14 distribution."

15 Would you like me to continue?

16 Q No. That's fine, thank you for that.
17 And in the second paragraph it starts,
18 "MI."

19 Is that correct?

20 A Correct.

21 Q And what does that refer to?

22 A MI refers to mean diameter of the

1 intensity distribution. Intensity distribution is
2 not calculated using Mie theory or Modified Mie
3 theory.

4 Q And for clarity, so that's Mie, M-I-E,
5 not M-Y?

6 A Correct.

7 Q The next paragraph starts with the bolded
8 term "MN."

9 Is that correct?

10 A Correct.

11 Q And what does that refer to?

12 A Mean diameter, in microns, of the number
13 distribution is calculated using the volume
14 distribution data and is weighted to the smaller
15 particles in the distribution. This type of
16 average is related to population or counting of
17 particles.

18 So basically MN is produced in software
19 and is available to the user.

20 Q And then last one of this line of
21 questioning. The next paragraph is MA.

22 Is that correct?

1 A Correct.

2 Q And what does that refer to?

3 A Mean diameter, in microns, of the area
4 distribution is calculated from the volume
5 distribution. "This area mean is a type average
6 that is less weighted (also less sensitive) than
7 the MV to changes in the amount of coarse
8 particles in the distribution."

9 Q And so a POSITA, reviewing this document,
10 and specifically the paragraphs starting in MV,
11 MI, MN, and MA, would interpret this as suggesting
12 a laser-diffraction device would be capable of
13 outputting any of these mean values.

14 Is that correct?

15 A Correct. Although the second paragraph
16 seems specified as occurring for only one of their
17 instruments, but the other three MV, MN, and MA,
18 would be readily available on any of their
19 instruments. And I might add would be common to
20 any manufacturer's instruments. These are all
21 very commonly used distributions.

22 Q Now I'd like to divert your attention

1 back to Page 1 of that same document.

2 And you see a screen shot of an output on
3 this page.

4 Is that right?

5 A That's right.

6 Q And in that screen shot there are several
7 sections shown here in a gray bar, one of which is
8 Summary, the next Percentiles, the following Size
9 Percent, and the last is Mode Summary.

10 Do you see that?

11 A Yes.

12 Q And under the Summary section, do you see
13 the data rows entitled MI, MN, and MA?

14 A I do. Although it doesn't show data for
15 MA here, it appears; just MI and MN.

16 Q On the third row there is MA, parentheses
17 MN --

18 A Oh, I'm sorry. I was just looking at the
19 mode part, but yes.

20 Q Thank you.

21 A There is a third row that gives a summary
22 value, yes.

1 Q And what would a POSITA interpret --
2 sorry, scratch that.

3 In your opinion, what would a POSITA
4 interpret these three data rows as representing?

5 A They would correspond to the values that
6 are described, as we discussed, on Page 2 of this
7 document.

8 And so in this column, Summary column, it
9 says MI and it gives a value in nanometers, and MN
10 gives a value in nanometers, MA gives a value in
11 nanometers. And a POSITA would readily associate
12 those values with the mean values discussed on
13 Page 2.

14 Q And would a POSITA interpret this screen
15 shot as suggesting a lasered fraction device can
16 output each of these types of data?

17 A Yes.

18 Q Now I would like --

19 A Not only can you output it, but it's
20 extremely convenient to -- to look at all these
21 values.

22 Q I'd like to direct your attention back to

1 your declaration, Exhibit 2058. And specifically
2 Paragraph 123.

3 A Sorry, you said 123?

4 Q Correct.

5 A Okay.

6 Q Do you recall discussing this paragraph?

7 A Yes.

8 Q And this paragraph reads, "It is my
9 understanding that the Board held that Wang's
10 Paragraph 67 directly invites those of ordinary
11 skill in the art to select a compaction density
12 that best suits their needs."

13 And you have a quote there. And then,
14 "However, a POSITA need not look beyond the
15 explicit disclosure of Wang for identifying a
16 compaction density."

17 Is that correct?

18 A Correct.

19 Q Why do you state that "a POSITA need not
20 look beyond the explicit disclosure of Wang for
21 identifying a compaction density"?

22 MR. O'CONNOR: Object to form.

1 A So I stated that to mean that Wang
2 provides all the information a POSITA would need
3 in order to construct Wang's electrodes and
4 achieve Wang's outcomes. And if a POSITA sees
5 Wang as having some benefit, they can proceed with
6 the information already contained within Wang and
7 produce the electrodes described by Wang and
8 achieve the benefits described by Wang.

9 There's no need for a POSITA to go to
10 some outside reference trying to find some value
11 of density that would allow them to get a benefit
12 that they don't already see in Wang.

13 Q And so is it your opinion that a POSITA
14 need not have a desired density in mind in order
15 to reproduce a cathode as disclosed in Wang?

16 A Correct. A POSITA would see the
17 constructions in Wang and the potential benefits
18 of Wang as being self-contained, not needing any
19 outside reference to -- to achieve the benefits
20 that Wang describes.

21 Q Now I'd like to direct your attention to
22 Paragraph 132 of your declaration, Exhibit 2058.

1 A Okay.

2 Q Do you recall discussing Saka's teaching
3 of compaction-density values?

4 A Yes.

5 Q And do you recall testifying that Saka
6 does not teach any compaction-density values above
7 3.0 grams per cubic centimeter?

8 A Yes.

9 Q And do you recall discussing that the
10 collapse in pores during pressing may result in
11 decreased battery performance as disclosed in
12 Saka?

13 A Yes.

14 Q And can you tell me, does a higher
15 pressing result in a higher density of a cathode?

16 MS. KELLY: Object to form.

17 A Again, that's a very general statement.
18 But if you press an electrode, you will -- you
19 will get a higher density as long as you overcome
20 the resisting forces that the electrode is
21 producing, so. But that's typically what is done,
22 that you calendar or press an electrode in order

1 to make it more compact.

2 MR. O'CONNOR: Can we go ahead and pull
3 up Saka. So that's Exhibit 1006.

4 (Exhibit 1006, previously marked, not
5 attached.)

6 Q And take a look at Paragraph 179.

7 A Okay.

8 Q Okay. Just one second, my computer froze
9 up for a second. But getting there as well.

10 And can you look at the last sentence of
11 Paragraph 179. It starts with, "The reason is not
12 clear at the moment" --

13 A Yes.

14 Q -- "but it is presumed to be as follows."

15 A Yes, I see that.

16 Would you like me to read it?

17 Q In that sentence it discusses that the
18 pores are likely to be collapsed during the
19 pressing of the positive electrode mixture layer.

20 Do you see that?

21 A Yes.

22 Q And is it your opinion that increasing

1 the pressing would result in increased density and
2 also increased pore collapse?

3 MS. KELLY: Object to form. Object to
4 scope.

5 A In the context of Saka, when you -- and
6 in the context of this paragraph, Saka is teaching
7 that when you compress the LFP, that you collapse
8 the pores and has an effect on properties that
9 Saka is interested in. And so that would be --
10 that would necessarily mean when you collapse
11 pores, that you're increasing the density.

12 Q And is it your opinion that as you
13 increase the density above 3.0 grams per cubic
14 centimeter, you would have higher levels of pore
15 collapse?

16 MS. KELLY: Object to form and scope.

17 A If you continued to compress the
18 electrode past the point that Saka is specifying
19 here, then, yes, you would continue to collapse
20 the pores in the manner that Saka is saying. And
21 that would also increase the density.

22 Q Would that be desirable or undesirable?

1 MS. KELLY: Object to form. Scope.

2 A So if you're believing the -- if you're a
3 POSITA and you're reading these teachings of Saka,
4 you would say it's undesirable because they're
5 already identifying an undesirable aspect that is
6 occurring at -- at this level, in this paragraph.
7 And then if you continue to go past that, a POSITA
8 would understand that those undesirable aspects
9 would only grow in magnitude.

10 When you collapse the pores, according to
11 Saka, you affect the BET surface area, you affect
12 the amount of gas that's generated, which Saka has
13 this particular interest in generating gas during
14 overcharge so that the safety feature of the cell
15 will activate and prevent that from continuing to
16 occur.

17 So for someone reading Saka and motivated
18 to follow Saka's teachings, they would say, No,
19 don't -- don't go past this point. In fact, keep
20 your densities low.

21 MR. O'CONNOR: All right. I have no
22 further questions.

1 MS. KELLY: I do not have any recross.

2 (Off the record at 2:34 p.m. EST.)

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ACKNOWLEDGMENT OF DEPONENT

I, DEAN R. WHEELER, Ph.D., do hereby
acknowledge that I have read and examined the
foregoing testimony, and the same is a true,
correct and complete transcription of the
testimony given by me, and any corrections appear
on the attached Errata sheet signed by me.

(DATE)

(SIGNATURE)

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C E R T I F I C A T E

I, Debra Ann Whitehead, E-Notary Public in and for
the Commonwealth of Virginia, do hereby certify:

That DEAN R. WHEELER, Ph.D., the witness
whose deposition is hereinbefore set forth, was duly
sworn by me before the commencement of such
deposition and that such deposition was taken
virtually and is a true record of the testimony
given by such witness.

I further certify that the adverse party,
NINGDE AMPEREX TECHNOLOGY LTD., was represented by
counsel at the deposition.

I further certify that the deposition of
DEAN R. WHEELER, Ph.D., occurred virtually, on
Monday, March 30, 2026, from 9:36 a.m. to 2:34 p.m.
EST.

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

7
8 IN WITNESS WHEREOF, I have hereunto set my
9 hand this 9th day of April, 2026.

10
11 My commission expires:
12 October 31, 2027

13
14  _____



15 E-NOTARY PUBLIC IN AND FOR THE
16 COMMONWEALTH OF VIRGINIA

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