

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG ENERGY SOLUTION, LTD.,
SAMSUNG ELECTRONICS CO, LTD.,
SAMSUNG ELECTRONICS AMERICA, INC.
Petitioner,

v.

MOLECULAR REBAR DESIGN, LLC,
Patent Owner

IPR2024-01006 (Patent 8,808,909 B2)
IPR2024-01011 (Patent 8,968,924 B2)
IPR2024-01013 (Patent 10,153,483 B2)

Record of Oral Hearing
Held: September 16, 2025

Before GRACE KARAFFA OBERMANN, KRISTINA M. KALAN, and
AVELYN M. ROSS, *Administrative Patent Judges*.

IPR2024-01006 (Patent 8,808,909 B2)
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IPR2024-01013 (Patent 10,153,483 B2)

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P R O C E E D I N G S

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JUDGE OBERMANN: Good morning and welcome to the PTAB again. I'm Judge Grace Obermann, and with me today we have Judge Avelyn Ross and Judge Kristina Kalan. These are the final hearings in IPRs 2024-01006, 2024-01011 and 2024-01013. Why don't we start with introductions again?

Mr. Renner, you're here? Yes, sir. For Petitioner?

MR. RENNER: Yes, ma'am. Good morning, Your Honors. Karl Renner on behalf of Petitioner, LG Energy Solution. And I'm joined by co-Counsel again, Dr. Hyun Jin In as well as co-Counsels Tim Riffe, Gretchen DeVries, and Daniel Jang. And from LG Energy Solution we have several representatives again. I'll read them into the record, please. Mr. Yonghan Lee, Ms. Soo Hyun Lee, Daniel Lee, A.J. Sutton, Adrian Mollo, and Kyle Vallecillo. Thank you.

JUDGE OBERMANN: Thank you. And, Mr. Renner, will you be doing the argument completely or will you be sharing the time?

MR. RENNER: Thank you for asking. We'll be talking a long time this morning. We'll actually have three of us presenting. I'll present some. I'll begin. And then Hyun Jin In will follow me and Gretchen DeVries will follow. Yeah.

JUDGE OBERMANN: Great. Okay. Thank you so much.

And, Mr. Zinda, would you like to introduce Counsel for Patent Owner?

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1 MR. ZINDA: Good morning, Your Honor. Yes, Stephen Zinda
2 here on behalf of Patent Owner, Molecular Rebar Design. I'm joined by co-
3 Counsel, Mr. James Glen. I will be doing all of the arguments today, so.

4 JUDGE OBERMANN: Thank you very much. I've looked at the
5 record and it appears to me that all the documents are public, and I wanted
6 just to remind everyone that we do have a public line. So please don't
7 disclose anything confidential. Each side has 90 minutes, and I will ask that
8 you divide them between your cases as you see fit. But we do ask you to
9 please make it clear for the record which case or cases are under discussion
10 at any given time, and try not to blend the records to the extent there's
11 something in one case that's not in the other. We just want to make sure that
12 we keep those records distinct.

13 And I'll ask that you please remember to refer to slide numbers as
14 you're speaking, both for the court reporter and also for us, because we can
15 -- we have everything in front of us. I thought that maybe because it's a long
16 hearing, we'll hear from Petitioner's Counsel first and then we'll hear from
17 Patent Owner's Counsel, and then maybe take a short break before the
18 rebuttal. And I'm going to ask the Petitioner's Counsel to let me know what
19 you'd like to reserve out of your 90 minutes for rebuttal.

20 MR. RENNER: Thank you, Your Honor. We will try to reserve
21 30 minutes. It may be a --

22 JUDGE OBERMANN: 30 minutes?

23 MR. RENNER: -- little shorter than that, but that would be --

24 JUDGE OBERMANN: Great.

25 MR. RENNER: -- a good starting point.

1 JUDGE OBERMANN: Okay. I put 60 on the clock in
2 anticipation.

3 And with that, is there anything that we need to discuss before we
4 start the hearing from either side? No?

5 MR. RENNER: Not for Petitioner, Your Honor.

6 JUDGE OBERMANN: Okay.

7 MR. ZINDA: Not for Patent Owner, Your Honor.

8 JUDGE OBERMANN: Okay. In that case, Mr. Renner, I just
9 want to wake up my computer to make sure I have everything I need. When
10 you're ready I will start your 60 minutes.

11 MR. RENNER: All set?

12 JUDGE OBERMANN: Yes.

13 MR. RENNER: Good morning, Your Honors. May it please the
14 Board. Karl Renner again on behalf of LG Energy Solution.
15 Administratively it might be helpful for Your Honors to have, to the extent
16 you're remote particularly, both of the presentation slide decks available.
17 We'll be referring to the slides within both the decks this morning as we go
18 through things.

19 And a few observations we thought we'd make at the outset of this
20 presentation. This hearing is similar and yet quite distinct from one that
21 we've had recently relating to the word distinct and patents that are also in
22 dispute between the parties. Yesterday we focused on, for instance, the
23 specification and the fact that the text in that specification, the '282 at that
24 time, that it spoke only indirectly to the separation between nanotubes, and
25 that was because it had referred, unlike this case, to an equivocation, if you

1 will, between -- or equalization between two words, the exfoliated word and
2 discrete word.

3 And there you saw that there wasn't a limitation otherwise on
4 discrete. It was, in fact, just the exfoliation term naked. It was not modified
5 by, for instance, fully exfoliated or otherwise limited. And to that point, we
6 had this conversation about what that meant. What did the specification call
7 for under those circumstances? And was there a preclusion, if you will,
8 from attachments to nanotubes that would come of the fully exfoliated. We
9 had a conversation there where we thought that was a very broad
10 modification of the term.

11 Today, unlike yesterday, we have a different set of words that
12 modify the same discrete in the specification. We want to focus on those.
13 And the '909, '924, and '483 patents, this time the specification offers
14 language that is more directly concerning. It's expressly concerning, that is
15 whether nanotubes need to be separated from each other. And in particular
16 in the '909 specification it clarifies a couple of things. That those discrete
17 nanotubes, they need not be separated from each other, but instead they're
18 merely needing to be capable of being separated. And said differently --

19 JUDGE OBERMANN: Mr. Renner, does that mean that in your
20 view, a completely tangled mess, sort of like you have in Kavan would be
21 discrete?

22 MR. RENNER: That's a great question and we'll definitely get
23 into that. We think there needs to be, as we saw yesterday, consistent with
24 what discrete is being talked about by these authors. There needs to be
25 -- and some exfoliation is one of the words that is used as a comparable. So

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1 we'll get into the idea that a completely entangled mess, when you've got a
2 complete agglomeration, may not be ready for discreteness. It's got to have
3 some sort of exfoliation alongside of it.

4 So we think that there's a consistency as between these
5 specifications when it comes to this. And --

6 JUDGE OBERMANN: Where is this in your petition?

7 MR. RENNER: In the petition, what we do is we refer to the
8 specific language that's both in the '282 where we talk about that one, and
9 the association with the word exfoliated. And then here, it's the words that
10 we're speaking to now, which -- look at the Slide 8, I can show you those
11 words in there.

12 JUDGE OBERMANN: Okay. I just want to make clear, because
13 now I feel like you're making a -- an express construction that excludes
14 completely nested type carbon nanotubes, such as in Kavan. It has to be a
15 degree of exfoliation. And I'd assume you're going to get into that. That's
16 an -- that's not a plain and ordinary meaning, is it?

17 MR. RENNER: No, Your Honor. And what we're doing is we're
18 actually confronting what we believe to be the interpretation given by Patent
19 Owner.

20 JUDGE OBERMANN: Okay.

21 MR. RENNER: We're completely fine and we've made our papers
22 clear. We think that's plain and ordinary meaning that we do think --

23 JUDGE OBERMANN: What is the plain and ordinary meaning?

24 MR. RENNER: -- applies. And that's what the concern comes in.
25 We think the plain and ordinary meaning captures -- if you look at the '909

1 specification, it tells you what this author thinks the plain and ordinary
2 meaning ought to be. And the '282 further informs that. But here you have,
3 in the upper right hand corner of Slide 8 of the LGES presentation materials.
4 I'll wait for Your Honor to have that in front.

5 JUDGE OBERMANN: So now you'll update the slide --

6 MR. RENNER: Slide 8, yes, ma'am. You can see there a
7 reference to the specification of the '909 specification and the first two lines
8 here, I'm going to read all -- I'll go through all six lines that are before you in
9 the upper right hand text box because it's really important disclosure. It
10 speaks of carbon nanotubes, not the word discrete carbon nanotubes, but
11 carbon nanotubes. It says, as used in herein. Okay, so as this author is using
12 these words, They refer to allotropes of carbon with cylindrical
13 nanostructure. These words have been in great dispute, or attention has been
14 given to these words in -- the in the proceeding.

15 The next paragraph is where it gets really interesting, because here,
16 now they further talk about what it means to have a discrete carbon
17 nanotube. So if carbon nanotube is addressed in that first sentence that we
18 talked about, the discrete carbon nanotubes here are talked about. As used
19 herein again, refers to carbon nanotubes capable of being separated to give
20 individual tubes.

21 So the difference between the two is telling, we believe. The
22 difference between the two is actually speaking, therefore, to the word
23 discrete as a modifier to carbon nanotubes, and specifically when used to
24 modify carbon nanotubes, the author tells us here that carbon nanotubes are
25 capable of being separated. Importantly, it does not say that they are

1 separated. Just capable. In fact, it says just the opposite in saying that. It
2 says that a discrete carbon nanotube would include nanotubes that are
3 merely capable of being separated.

4 JUDGE OBERMANN: While you're there, is there any real
5 dispute on this record that Ohata describes discrete carbon nanotubes?

6 MR. RENNER: Your Honors, we believe that it does describe
7 discrete -- but my colleague Hyun Jin In be speaking to the application of
8 that prior art.

9 And whether this calls for -- our position is lexicography or it's just
10 an expression of clear intent. We think the outcome is the same, and that is
11 that the meaning of discrete carbon nanotubes is pretty clear to everybody,
12 we think in view of what this specification says. And we've been arguing
13 this since -- in the papers throughout the proceeding.

14 Now, if we go to MRD's Slide 11. So I mentioned we're going to
15 kind of go between a couple of slides. We'll try to keep up with that on our
16 side as well here in front of the room. You can see a table that was offered
17 by Patent Owner. It's just a good illustration to help us talk about some
18 things.

19 We see here that on the left hand side is what we're going to focus
20 on, MRD is open in its suggestion that you disregard really the statements
21 that we just looked at. Why? Because you can see here that they would
22 urge an interpretation of discrete that would require CNTs to be not only
23 separate, not capable of being separate, but separate. And that's the
24 disregard from each other. And therefore for them to not be attached to the
25 CNT.

1 JUDGE OBERMANN: In your petition, did you describe discrete
2 as fully isolated carbon nanotubes?

3 MR. RENNER: No, Your Honor. That's -- we're going to talk
4 about that a little later. We think -- so right now, I'll focus you on the left
5 hand side, what their allegation is. We'll come back to what they've said
6 about ours. And we don't believe that that is the case at all. In fact, we think
7 we've -- that's a -- it's a mischaracterization. It's an -- out of context and it's
8 not what was being conveyed by the petition. We think it's pretty clear.

9 But for their -- as you can see, what they are alleging, when you
10 look at how they want the claim to be interpreted, you can see how it is
11 inconsistent with what the specification wrote. They not only ask for the
12 claim to be encumbered by an unrecited negative limitation, which is
13 another attribute of that, not attached, a negative limitation. But they ask
14 you to change the critical language that you found, we just read in the
15 specification, and not only the language in the '909 but also when you look
16 back to the '282. It's also inconsistent with that language.

17 MR. ZINDA: Objection, Your Honor. Why are we talking about
18 the '282 patent? It's in a different family. I believe that's improper. It's --

19 JUDGE OBERMANN: That's true. I --

20 MR. ZINDA: This definition, if there is one, has nothing to do
21 with that proceeding. I'm sorry, Your Honor.

22 JUDGE OBERMANN: No, I'll take that objection. I -- that's true.
23 Would you give him leeway to talk about it as making clear that it's from
24 your case?

25 MR. ZINDA: Yes, Your Honor. I just wanted to be clear that we

1 --

2 JUDGE OBERMANN: Yes.

3 MR. ZINDA: -- don't believe that evidence is proper at this
4 proceeding.

5 JUDGE OBERMANN: All right. Thank you.

6 MR. RENNER: And Your Honor, we do agree, but we have also
7 statements by both parties that the construction that would be applied, it's
8 going to be in the construction process. That's why we're making reference.
9 And yesterday in the hearing, we did the same or actually more -- the Patent
10 Owner did the same.

11 JUDGE OBERMANN: For the record in this case, during
12 yesterday's hearing, involving a different patent both Counsel said that the
13 same definition of discrete applies across those -- that -- all the related cases
14 that are being heard today and tomorrow. With that said, the records are
15 distinct. So please keep that in mind.

16 MR. RENNER: Absolutely. Thank you, Your Honor. And as to
17 the -- so they ask you to disregard the critical language that's found in the
18 intrinsic record and the specifications. And I'll just throw a plural on that.
19 My comment on '282 as it relates to what is the '282 record, but to help -- if
20 Your Honors are willing to hear it, to keep these things straight, should I
21 -- I'll say that and maybe give Your Honors leeway to -- it's just that the fully
22 exfoliated be considered as an alternative to discrete, was what was being
23 proposed there. But it was just exfoliated. A very broad --

24 JUDGE OBERMANN: But that's not in this record.

25 MR. RENNER: That is correct, Your Honor. But I'm trying to

1 give the body of what the meaning of the term is, as it relates to both records
2 in the process, as the parties have alleged.

3 On the '909 patent and as it relates to its language, we see that the
4 clarity provided by the '909 specification that we just looked at, that the
5 same concerns are apparent that we had talked about earlier. And that is, the
6 specification calls for a very prescribed directive by the Patent Owner. That
7 is by the applicant when they filed their application. And the '909 tells us
8 that used herein, discrete carbon nanotypes are merely capable of being
9 separated. And yet MRD, they would have you interpret discrete nanotubes
10 in a contrary way.

11 Specifically, they urge you to interpret those discrete nanotubes as
12 separate. Remember, not capably of separate, separate and distinct from the
13 nanotube fibers and not attached. Now they can't justify that inconsistency
14 demanded by that interpretation, and to see that, one need to do little more
15 than ask, how can a nanotube be capable of being separated from another
16 nanotubes with which it's already separate and not attached?

17 So given the presence of this contrary specification text, how does
18 MRD justify introducing a negative limitation as here under the guise of
19 claim interpretation? Well, MRD offers a little more we find in this record
20 than an outdated and not relevant dictionary definition. Here we see that
21 MRD highlights its evidence generously. I'll get it from seven slides. That
22 is MRD Slides 12 to 14, 16 and 25 to 27. If we could look at the MRD Slide
23 12? Thank you. So MRD Slides 12, please.

24 So on Slides 12 and 13 -- Your Honors are with me? Slides 12 and
25 13 of MRD's slides, you can see produced are some sections from the

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1 specification of the -- I think it's the '909 patent. It's the 43 patent. But it's a
2 common specification across the three patents in dispute today. And
3 importantly, you'll find not a single mention of whether the nanotubes are
4 separate or not attached in this. They merely give you some background
5 information.

6 So when we look at the intrinsic record that is being referenced by
7 MRD here, we don't find support, importantly, for the construction they're
8 currently advancing. We don't find anything to confront that express
9 discussion that we saw in the patent specification earlier. We look at only
10 two other slides they have in their deck and they represent the evidence
11 they're looking to for intrinsic. Let's slide to 25 first. And then we'll go after
12 that to Slide 26 of the MRD deck.

13 And here we can see consideration is being framed on 25 of an
14 argument that it made about inventors knowing how to claim a capability. It
15 reproduces claims that reference trying to make that point. It references
16 trying to make that point. But MRD's position is, yet again, we believe,
17 undermined by the key disclosure in column 3, lines 44 to 49.

18 And again, through it, the specification indicates flatly that the
19 patent specification tells you about the word discrete and how the author
20 thinks of that word. That word is, in fact, to be capable of being separated.
21 And by claiming discrete, the inventors demonstrate that they're not without
22 an awareness of how to claim a capability. They've already told you about
23 one word that has a capability and they're simply describing it. In the
24 specification, their use of it herein this claim gives you a claim that talks
25 about capability. Besides which on Slide 25, MRD references claims that

1 recite altogether different terms. Terms that are dispersed and dispersible,
2 and unlike discrete, they were not clarified or defined by the specification of
3 the patent.

4 So we look to Slide 26. If you look at 26, you can see further
5 reference to intrinsic record by MRD and here they attempt to draw a
6 distinction among claim terms that appear in 43 patents. You can see the
7 record confirms that MRD lacks foundation for its argument, though, that
8 this -- the use of discrete non-agglomerated and exfoliated together in this
9 claim term supports its position. And why is that? It's because these
10 positions are inconsistent. The position of these things somehow come into
11 conflict is inconsistent with the testimony in the record by both experts in
12 this case. The experts, the people who know technology and what's going,
13 they understand. And they've given testimony, Dr. Chung, as well as Dr.
14 Zhu, that these terms are treated in this patent and specification as consistent
15 with one another. That is the group of terms, discrete, non-agglomerated
16 and exfoliated, is the same in the meeting as discrete. Here's what --

17 JUDGE KALAN: Counsel, so are these terms consistent or
18 synonymous?

19 MR. RENNER: Well, let me tell you what she said, Your Honor.
20 It's a great -- it's a great question. And I'll read for you some of the -- from
21 the transcript of the testimony that she gave, she says -- first, she
22 acknowledges that there is simply no difference, she says, between the
23 meaning of the, quote, discrete and the phrase discrete non-agglomerated
24 and exfoliated terms. And that's, again, Patent Owner's expert. She
25 continues to point out that if CNTs are discrete, CNTs are also non-

1 agglomerated and exfoliated.

2 So Your Honor, I think what she's saying is the meaning of these
3 three terms is the same as the meaning of the word discrete. So there's not a
4 conflict that demands them to be. It's just the way they're used here. And
5 then we see from Dr. Zhu that he likewise points out that these terms are
6 interchangeable. Oh, by the way I should cite for you, that was LGES 1054,
7 page 22, line 23 to line -- page 23, line 21. That's where you found her
8 testimony. Dr. Zhu likewise points out that these terms are interchangeable
9 in the context of this patent. And each of the terms he says references
10 -- refers to the same stats. And for his testimony, you can look at MRD
11 2024 pages 11 to 13 and 15.

12 Now nevertheless, if we want to look past that agreement between
13 the experts who know what these terms mean, which we don't think would
14 be appropriate, and try to afford them different meaning, that still leaves us
15 no reason to do that at the expense of the express disclosure that's in the
16 specification. Nor does that give you any reason or us any reason to do it in
17 a way that would read into one of the terms, discrete, a negative limitation
18 that is somehow otherwise not found -- finding to support.

19 So turning away from the intrinsic evidence, because that's all we
20 see in the arguments that are given by MRD, we look at extrinsic evidence.
21 Let's see what supports -- if there's anything, and how good the information
22 is that supports their position there. Again they're asking for introduction of
23 the negative limitation to the word discrete, under the pressure of the
24 testimony and the intrinsic record otherwise.

25 MRD Slide 14, please.

1 Now here we can see a contested and rebutted dictionary
2 definition. A definition that is 10 years older than the priority date. A
3 definition that's old. It's also overly restrictive, and we demonstrate that by a
4 newer dictionary definition, a 2009 dictionary definition from Webster, that
5 reveals that there is no need to preclude attachment. And hence this is an
6 unreliable piece of evidence, we believe, at best.

7 JUDGE OBERMANN: Don't we need a definition that shows
8 what it would've meant at the time of the invention?

9 MR. RENNER: And that's what we gave. We gave an Exhibit
10 -- what's our exhibit for that? I'll get you a cite for that. I don't have it in my
11 notes. But we gave you an -- a dictionary definition from 2009, which is the
12 record. Whereas this one comes from 1999. And that's kind of one of the
13 points, Your Honor. If we're going to have -- if you're going to look at either
14 of the definitions -- but I would look to this specific intrinsic record, given
15 what it has said. But if you look outside to extrinsic definitions, we think
16 that you would look to the one that's contemporaneous, not one that's ten
17 years old and seems to have been found because they happened to find one
18 with the right attachment -- not attached.

19 If I go to MRD's Slide 16, here we see MRD attempt to rely on
20 deposition transcript testimony from the Petitioner, Dr. Zhu. But we believe
21 they badly mischaracterized Dr. Zhu's testimony. This is akin to what
22 happened in the Petition. You can see in the upper box that the underline
23 goes to the word yeah. But it's as if they're promoting that he's agreed with
24 what they've said. But you can see two things. One is when you look into
25 the testimony at and around this section, he's an agreeable fellow. And the

1 reality is he's agreeing that there's a question asked. Many people do this.
2 It's a nervous tick. And you'll see that that happens again and again.

3 You'll also see, though, the word follow the word yeah, because
4 after that, he says what he means and he means what he says. He says, I say,
5 it's disclosure -- it's discrete non-agglomerated and exfoliated carbon
6 nanotubes. That's what he's saying. He's not agreeing that what they've said
7 about fully isolated, he's not acknowledging that. He's repeating -- and if
8 you look into the testimony, over and over again, he goes back to calling this
9 out as discrete non-agglomerated and exfoliated. Not because it's fully
10 isolated.

11 Secondly -- well, I'll say he actually clarified this point because
12 have you seen what they did with his testimony here and the arguments, he
13 explained further in supplemental declaration evidence. That's LGES 1056,
14 paragraph 5, which is actually shown on our Slide 11. But I -- we'll get to
15 that perhaps a little later. But he clarifies his position explaining that, among
16 other things, that he simply identified the carbon nanotube in question,
17 because after all it exemplifies a discrete carbon nanotube despite the fact
18 that not all discrete carbon nanotubes have to be separated or unattached,
19 and he's express in saying that.

20 He also -- if you look, even at the bottom box, you can see the
21 same kind of pattern. They ask a question. He says, yeah. He
22 acknowledges the question. And then there you can see, baldly, he's
23 disagreeing with them. It's the most polite disagreement ever, but it's a
24 disagreement. Yeah, but I think more accurately, he says. That's pretty
25 much saying, no, you got that wrong. I'm going to create for you the

1 accurate testimony. So you can see that he's -- his yeahs don't mean, I agree
2 with what your question is. It means, I'm hearing you and I'm going to move
3 on and tell you in the upperbox. I'll tell you what I think in the bottom box,
4 I'm actually going to correct you.

5 Now notably and to avoid confusion, we see in MRD's slides,
6 before we get out of their evidence that's supposedly supportive, because this
7 is it. Their Slides 15 and 17 to 24 are also citing to arguments and some
8 record evidence, but that evidence is not being thrown up here as something
9 that affirmatively supports injection of words into a claim through a
10 definition, or plain meaning understanding, or a construction formal. That
11 testimony and those arguments are confronting our contests to what they've
12 tried to give you in terms of the construction.

13 Now of course MRD also tries to distract from the lack of evidence
14 they have. They've really been reduced to one dictionary definition that's
15 outdated, with criticisms of -- the attributed that -- to Petitioner arguments,
16 and it mischaracterizes our positions in doing so. And I'll mention just a
17 couple of those positions for Your Honors' sake. And in a minute, we'll be
18 going back to our slides and doing so.

19 But first, MRD Slide 11, and this is the slide that, Judge
20 Obermann, you'd noticed on the right-hand side, the top portion goes to this
21 full -- fully isolated carbon nanotubes. What does that mean? Because I'll
22 have to tell you, when I saw that, I was a little alarmed myself. And I
23 thought, we didn't say that. Or at least it wasn't said for what this seems to
24 suggest it's being said for, where you've got discrete carbon nanotubes at the
25 top of the slide. It sure looks like they're trying to suggest there's been two

1 different constructions advanced by the Petitioner.

2 Well, Petitioner was not inconsistent. Notably in the 43 Petition,
3 we did not propose a construction at all for discrete, first of all. Rather, the
4 43 explained, much like we saw from Dr. Zhu in the testimony we reviewed
5 a few minutes ago, we explained that a fully isolated nanotube is merely an
6 example. It's an example of a nanotube that has been -- that is discrete non-
7 agglomerated and exfoliated. And you can see that in Petition page 36.

8 JUDGE OBERMANN: I have a question.

9 MR. RENNER: Yes.

10 JUDGE OBERMANN: So when they say that the Petition, and
11 they don't say Petitioner, they say it's in the Petition, fully isolated carbon
12 nanotubes, what are they citing for that?

13 MR. RENNER: There is an example of a nanotube that's been
14 looked upon, it's pointed to, and it's an example of a fully -- a discrete non-
15 agglomerated exfoliated --

16 JUDGE OBERMANN: So it's nothing more than --

17 MR. RENNER: -- nanotube.

18 JUDGE OBERMANN: -- just like your witness saying, yeah,
19 when it --

20 MR. RENNER: That's right.

21 JUDGE OBERMANN: -- when it's non-agglomerated --

22 MR. RENNER: That's exactly right --

23 JUDGE OBERMANN: -- and discrete, it is discrete.

24 MR. RENNER: That's exactly right, Your Honor. So it's not a
25 construction. It's not advancing that all carbon nanotubes need to be fully

1 isolated at all. No. It's not that at all. It's just saying, if I see one that's out
2 there and it's sitting alone like that, well, then sure, that one happens to be
3 these attributes. And that would make sense. It's an easy example for
4 everyone to get their arms around, and so he points to it.

5 But they're representing here, it seems to be, that there's -- that's
6 somehow attributing to us that we think that all -- it doesn't work. And yeah,
7 it's an accurate statement, we believe, yeah, there you go, I'm like the
8 witness. That it's an accurate portrayal, we believe, of exactly what you're
9 looking at. That's what our expert said. That's what we said in the Petition,
10 and there's no backtracking on that. We continue to believe that's an
11 accurate -- it's an example. That's about all that it is.

12 So we think it's neither inaccurate nor inconsistent with the key
13 positions and portions of the specification that we've been talking about at
14 column 3, lines 44 and -- to 49. Now at the bottom of the slide, you can see
15 some citations here and I'll skip through them pretty quickly because you
16 seem to, with those questions, have gotten the point. But I was going to turn
17 us back to Zhu's declaration evidence and actually look more to see why he
18 also, when looking at the lone nanotube in the Ohata Figure 1B, identified
19 by a red arrow, that he was also clear in his testimony. Not agreeing with
20 them and also just looking at that as an example. I don't think we need to
21 take the time to do that, however.

22 LGES -- let's go back to our slides, if we could. Slide 11, please.
23 Thank you.

24 Now -- and to clarify, once seeing the Patent Owner's response, his
25 testimony, Dr. Zhu, you can see, has offered further testimony to supplement

1 his declaration. So first of all, he looks at the one example, and he says,
2 that's an example, which is, I think, pretty reasonable. And two, because he
3 sees that it seems like he's being characterized as doing more than that, he
4 gives us this supplemental declaration evidence. And he explains very
5 expressly that it's just a description of a particular illustrated example. And
6 while the discrete surely encompasses individual isolated nanotubes, it is not
7 to only individual isolated nanotubes.

8 And MRD's position, of course, is that Dr. Zhu's identification of
9 that fully isolated nanotube as discrete demands that all discrete nanotubes
10 are necessarily fully isolated. And we think there's a logical break in that.
11 It's not the case that all rectangles will -- just as not all rectangles are
12 squares, but all squares are rectangles. It's the same here that not all discrete
13 nanotubes are fully isolated, even though all fully isolated nanotubes are
14 discrete.

15 Can we go to our Slide 8, please?

16 Now as to the interpretation of discrete, we want to back up for just
17 a moment. Petitioner has clearly acknowledged that discrete is, as the
18 specification tells us, capable of being separated per the '909 specification
19 and the other patents, which is also repeated. And this is, we believe, to be
20 highly consistent with non-agglomerated exfoliated, but not necessarily fully
21 exfoliated, detangled. You could name a variety of ways of describing this.
22 It's just not consistent with MRD's attempts to inject a requirement that all of
23 the carbon nanotubes be separated or that the requirement that they preclude
24 carbon nanotubes from being attached. After all, how can a carbon nanotube
25 be separated from something to which it's not even attached?

1 LGES Slide 9, please.

2 And this relates to MRD's Slide 19 to 21. But here we address
3 -- thank you. Here we address the contentions that the specification does not
4 limit discrete carbon nanotubes if only requiring capable of being separated
5 as shown in the left. The specification MRD says that based on the capable
6 of separating language, the specification -- any CNT would qualify, is what
7 they say. They try to say that this is a not limitation, basically. If you do
8 recognize capable of, you haven't really done any work, is the way I'd kind
9 of phrase that.

10 But in doing so, they urge the disregard of the specification. They
11 urge that we actually just look past it and that we -- despite the clarity that it
12 represents the applicant's directive otherwise, that we just -- you know, we're
13 going to put that on the side. And we believe that, whatever is decided, that
14 seems like the wrong answer. We need to take on that specification support,
15 we believe. And even still, regardless of that point, we should dig in and see
16 that they're just wrong. There is limitation here. Some CNTs are
17 agglomerated, and this goes to the very first question I believe you asked.
18 Some CNTs are agglomerated and not yet capable of being separated. This
19 is just a -- an artifact of life.

20 At the right, Dr. Zhu in his deposition testimony explains that the
21 ability to separate nanotubes is, in fact, a function of, among other things,
22 the processing of the nanotubes. And he explains that whether the nanotubes
23 are capable of being separated depends on many things, like what the
24 preparation procedure is. And, you'll see elsewhere, the initial state of them.
25 For instance, he tells us that some nanotubes are so entangled that

1 exfoliation is in fact required, as I was mentioning at the front end of the
2 presentation, to resolve separate carbon nanotubes. And that is discrete
3 carbon nanotubes. Separable. Separable.

4 By contrast, one processing -- exfoliation, that is. Once
5 processing, that is exfoliation, has been applied, the nanotubes are now in a
6 state that allows for their separation. And these exfoliated nanotubes are
7 now capable of being separated, that is, discrete. And notably that
8 exfoliation is what renders the nanotubes separable and therefore discrete.
9 And that's consistent, again, with the '282. Not to bring that in but just to
10 mention, this is all harmonizing. It all comes together and it makes sense.
11 Because after all, it's the process of exfoliating that gets you from an
12 agglomerated, potentially not discrete state to now you exfoliate and you've
13 got them into this now individualized state.

14 An example, we thought, and it's a bit soft mark, but I'll throw it on
15 the table. It might help to illustrate the point. It's strange, yes. I'm just
16 trying to find some example. You've got some mozzarella curd coming in
17 some ball together, right? And it's not -- you're not going to pull any strands
18 off of that, but if you pull it apart and pull it apart and pull it apart, which is
19 the process by which you end up creating this cheese, at some point, your
20 exfoliating process allows you to actually get to discrete strands of cheese.

21 JUDGE OBERMANN: I don't understand how we can get there,
22 but this record, I don't think would have proof about this exfoliation process,
23 do we? I mean, where is it argued in the brief?

24 MR. RENNER: Which part, Your Honor? Sorry.

25 JUDGE OBERMANN: Exfoliation, in this case.

1 MR. RENNER: So Your Honor, we continue to argue the words
2 that are in the specification that -- oh, I see. You're trying to contrast this
3 with the '282 specification?

4 JUDGE OBERMANN: Well, you keep talking about exfoliation,
5 but I'm not seeing that anywhere.

6 MR. RENNER: I'm just trying to harmonize for Your Honors.
7 Again, we said that these constructions that go -- both parties say across
8 those --

9 JUDGE OBERMANN: Yeah. We're not going to be able to cite
10 to evidence --

11 MR. RENNER: Understood.

12 JUDGE OBERMANN: -- in this case that establishes what is a
13 ball that's capable of separation if you keep relating that to exfoliation --

14 MR. RENNER: Yeah.

15 JUDGE OBERMANN: -- which I don't think we have in this
16 record.

17 MR. RENNER: I understand. Sorry. Sorry, Your Honor. I'm
18 trying to make sure you don't see an inconsistency as between our positions.
19 Since we've said that they are consistent I will -- I'll take your comments as
20 they are.

21 So our point is that when you have the specification and you have
22 it calling very specifically for capable of being separated, you know that
23 there isn't already separation. You know there needs to be something that
24 happens before separation is our position.

25 JUDGE OBERMANN: And under your view of things, and

1 obviously the Petitioner, and you bear the burden, you're saying that
2 whatever we have in Ohata after these carbon nanotubes are mixed with this
3 resin material, that it meets the discrete limitation in Claim 1?

4 MR. RENNER: Correct, Your Honor. Yes, ma'am.

5 JUDGE OBERMANN: And do we really need to get into
6 anything about exfoliation here?

7 MR. RENNER: No. No, Your Honor, we don't think so. We
8 think that the directive that the patent applicant gave us is sufficient. We
9 just don't think we should look past it. And all of this is to say --

10 JUDGE OBERMANN: We do. You're halfway in and what I'm
11 really, really interested in is how this resin coated nanotube in Ohata, if it's
12 pre-oxidized, how are you going to -- you know, have you demonstrated that
13 layers or crystals of lithium ions are attached to their surface?

14 MR. RENNER: Yeah. Good, good. I'll wrap up this quickly and
15 get my colleague up here to address that question. I'll preview for you that
16 there's a solvent that's put in with a particular material that is active
17 ingredient, and that solvent takes that resin off of those fibers --

18 JUDGE OBERMANN: And that's only in your reply. That's not
19 in your petition.

20 MR. RENNER: I'll have Dr. Jin speak to that, Your Honor.

21 JUDGE OBERMANN: All right.

22 MR. RENNER: Yep.

23 JUDGE OBERMANN: Thank you.

24 MR. RENNER: So a few just minor points here to close since
25 we're going to move to that. And that is that we pointed out in LGES Slide

1 14, please, that the infringement contentions here reinforce that the Patent
2 Owner is also looking at this -- their claims as ones that encompass things
3 that, in fact, have attachment or touching. They outlined -- and you can see
4 in highlight, touching, we believe, between these cells is what they've said,
5 and our expert confirms it. Although it's a 2D, you can see in the upper right
6 there's testimony here that is cited to in the argument. That although it's a
7 2D figure, we can see through the clarity of the specific things in the 2D,
8 some of them are clear and together consistent with one another, and
9 therefore you can tell they're in the same plane. He was asked questions
10 about this, and under deposition, held that point of view.

11 LGES 12, we can see the same is true of Figure 1, which is called
12 out. This is Figure 1, of course, of the patent in question, the '909 patent.
13 And it's called out by the Patent Owner as a nanolayer on discrete carbon
14 nanotubes. And again, you have them embracing, we believe here, the same.

15 So, Your Honor, you seem to be very interested in a question, and I
16 appreciate you giving me that insight. We'll get Dr. Jin up here and continue
17 the conversation.

18 JUDGE OBERMANN: Thank you, Mr. Renner.

19 MR. RENNER: Of course.

20 DR. JIN IN: Good morning, Your Honors.

21 Thank you, Karl.

22 If we go to Slide 15, please?

23 So as Mr. Renner just discussed, I'll be going over some of the key
24 issues here regarding the Ohata-Kavan combination, which, again, as Your
25 Honor -- as Your Honors know, span across all three proceedings.

1 Slide 16, please?

2 So here we can see some of the key issues that are in the slides.

3 But of course, I'll be focusing on what's most sort of at issue here today.

4 And given the discussions we just had about the term discrete, if it's okay

5 with you, Your Honors, we'll start with issue 2B, and then we'll come back

6 to issue 2A. Issue 2B here, of course, concerning why we think the carbon

7 nanotubes in Ohata-Kavan are discrete. Just a moment before we get there.

8 I -- go to -- if we could go to Slide 18, just to make sure we're all

9 sort of on the same page about how Ohata works.

10 As you can see here, Ohata is directed to making an electrode for

11 battery that is supposed to be superior in conductivity. And it says that it

12 does this by, among other things, taking nanotubes that are, and I quote,

13 tangled and twisted, as you can see on Figure 1(a) on the left side of the

14 slide. And then making these nanotubes to be, and I again quote, unraveled

15 and straightened. And you can see that on the right side, in Figure 1(b).

16 Looking a little bit more closely at Figure 1(b), you can also see

17 how the individual nanotube fibers here, yeah, have been detangled.

18 Basically, separated from its initial form, the entangled form that you see on

19 the left, to have these essentially very well dispersed nanotubes that you see

20 there. Again, Figure 1(b). And again, that is what Ohata was intentionally

21 going after. If you look at the figure, you know, a little bit more closely, you

22 can see that there may be some nanotubes that appear to be touching each

23 other at some points. But of course, that's not surprising since Ohata is

24 trying to improve conductivity in its electrode material by adding these

25 nanotubes. But overall, look -- looking at the nanotubes here as shown and

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IPR2024-01013 (Patent 10,153,483 B2)

1 also described elsewhere as discussed in Ohata, they are consistently shown
2 and described as being unraveled and well dispersed. And of course, Ohata
3 says that this unraveled and straightened nature of its nanotubes is what
4 gives rise to its increased mechanical strength and electrical conductivity,
5 which were well known benefits of adding nanotubes to battery electrodes.

6 In Slide 20, briefly, we can see Kavan's disclosure regarding its
7 functionalization of carbon nanotubes with carboxylic groups, which
8 basically essentially creates oxidized carbon nanotubes. And as we
9 explained early in our petition, such oxidation can give rise to increased
10 affinity to active materials, as well as improve dispersibility of the nanotubes
11 and many other a benefits that we discussed.

12 So with that, Your Honors, if we could skip ahead to Slide 49?
13 Here, again, we can see how the term discrete here is used in all three
14 patents at issue here. And it's -- on Slide 50, again, Ohata takes nanotubes
15 that are tangled and twisted, and then it separates them out to make these
16 unraveled straightened, well dispersed nanotubes tubes. All words that are
17 used in Ohata itself. You know, it -- it's not quite like yesterday's
18 proceeding, Your Honor, where the references literally said the word
19 discrete. But here, we think these figures, along with the descriptions of
20 Ohata that we mentioned are really quite consistent with how the term
21 discrete carbon nanotubes are used in these patents, and aligned with what
22 Mr. Renner just talked about here.

23 Slide 53.

24 So granted, Patent Owner, you know, doesn't seem to agree that
25 nanotubes in Ohata are discrete. And, you know, for example, as seen here,

1 when presented with this, what we think is a very clear representation of the
2 nanotube configuration that Ohata was seeking, Patent Owner, you know,
3 says that this is only a schematic. That it doesn't give you much information
4 beyond that.

5 Next slide, please. Slide 54.

6 But as we highlight here on the slide, POSITA, looking at Figure
7 1(b), and also looking at the descriptions that Ohata provides about this
8 detangled state of its nanotube. Where it started out as tangled, bundled.
9 Now, it's in this unraveled, straightened, well dispersed form. And
10 accompanied by the schematic that the inventor was trying to tell us here, we
11 think that POSITA would have understood that these nanotubes in Ohata are
12 indeed discrete.

13 If we could go to Slide 56?

14 Patent owner also seems to contend that the nanotube in Ohata
15 can't be discrete because they form and I quote, A continuous network of
16 nanotubes that is intended to improve electrical conductivity. A couple of
17 issues here, Your Honors. Now, first of all, that term, continuous network,
18 is not something that is from Ohata. It's from the Patent Owners themselves.
19 And while we agree that Ohata for sure seeks to improve electro-- electrical
20 conductivity in its electrodes by adding these carbon nanotubes, as we see
21 around -- on Slide 56 and also Slide 57, the patents at issue here also do the
22 same thing. They add discrete carbon nanotubes to create this
23 interconnected network structure, nanotube structure that improves electrical
24 conductivity. And as we discussed yesterday, and it's also part of the record
25 here, Patent Owner's expert, Dr. Chung, confirmed -- basically confirmed

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IPR2024-01013 (Patent 10,153,483 B2)

1 this during deposition. And I will quote. You need to have a plurality of
2 nanotubes coming together and making electrical contact between one
3 another. That is touching one another -- one another -- in order to create an
4 electrically conductive structure. And that is from her dep. testimony for the
5 '909 patent. One -- Exhibit 1033, page 36, line 18.

6 So with that, unless Your Honors have any questions, I will go
7 back to issue 2A concerning the attachment issue. Okay. Thank you.

8 Slide 22, please?

9 So again, looking at the claim language here, we can see that all
10 three patents at issue here require lithium-ion active materials that are
11 attached to these nanotubes.

12 Next slide, Slide 23.

13 And as Your Honors may recall from my earlier discussion, Ohata
14 discloses a battery electrode that has these lithium-ion active materials. And
15 as I also discussed, it adds these unraveled, straightened, well dispersed
16 carbon nanotubes to that -- into that mix to get what it refers to as improved
17 conductivity in that electrode -- in that final electrode form. And while
18 Ohata doesn't get into all of the details of the nature of attachment between
19 its active materials and nanotubes and so forth, Kavan, which was brought
20 up earlier, you can see that on the right side of Slide 23, it very clearly
21 explains that the surface oxidation of these types of nanotubes is one way in
22 which -- and I will quote, Optimum attachment between the surfaces of the
23 nanotubes and the active materials can be achieved.

24 JUDGE OBERMANN: Kavan doesn't take account of a nanotube
25 that's basically coated in a resin though, right?

1 DR. JIN IN: Sure. Yeah. Great question, Your Honor. We'll get
2 to that. But we don't believe Ohata's process as described would lead to
3 nanotubes that remain fully encapsulated. If you could just give me a little
4 bit of time here, I think we'll get to that very soon. But I realize that is a
5 critical question here that Your Honors have.

6 Slide 25, please.

7 Going back to this attachment in Kavan, Dr. Zhu explained that
8 there can be various types of attachments that lead to that active material
9 being stuck to be surfaced of nanotubes --

10 JUDGE OBERMANN: Not to beat a dead horse --

11 DR. JIN IN: Yes?

12 JUDGE OBERMANN: -- but I believe your witness was asked
13 whether he took into account the resin and what that would do. And I
14 thought he said no, that he wasn't aware of that. He's talking about these
15 forces that would exist in the process of Kavan, correct?

16 DR. JIN IN: Sure. And that process -- the nanotubes, as processed
17 in Kavan, would be what would -- are used in our combination, based on
18 Ohata. Because as we explained, there are many benefits that come from
19 having these surface oxidation groups on nanotubes. Granted, if the
20 nanotubes in Ohata are fully encapsulated by an insulator for some reason,
21 that benefit may be frustrated.

22 JUDGE OBERMANN: Well, I want to -- I want to really hone in
23 on that.

24 DR. JIN IN: Yeah.

25 JUDGE OBERMANN: Is your position that if they are fully

1 encapsulated that the attachment will occur anyway?

2 DR. JIN IN: So I don't think we've said on -- during these papers
3 earlier, you know, where we had to explicitly address that. But there's
4 certainly nothing there that says that wouldn't happen, for instance, the Van
5 der Waals-type attachment.

6 JUDGE OBERMANN: So your position is that those forces would
7 take place, even if the nanotube is fully encapsulated in the resin?

8 DR. JIN IN: I don't believe we've taken that position in the papers,
9 Your Honor. But again, there's nothing that would prevent that. Any --

10 JUDGE OBERMANN: Well, you have --

11 DR. JIN IN: That would be aligned with what Dr. Zhu is
12 describing.

13 JUDGE OBERMANN: Well, you are the Petitioner. And it's the
14 Petitioner's burden to demonstrate the attachment that's in claim one.

15 DR. JIN IN: Yes. I hear you.

16 JUDGE OBERMANN: And if we find that these nanotubes in
17 Ohata's Kavan combination are fully embedded, have you met your burden
18 of showing attachment?

19 DR. JIN IN: If Your Honors determine that the nanotubes in
20 Ohata are fully encapsulated by a resin insulating material, then I don't
21 believe we've said anything on the record to say attachment will still occur.

22 JUDGE OBERMANN: Thank you very much. I appreciate your
23 candor.

24 DR. JIN IN: Yeah. But that said, I think that really begs the
25 bigger question of why would Ohata, which is designed to use conductive

1 nanotubes to improve conductivity in a battery electrode, keep their
2 nanotubes, again, which were added to improve conductivity, keep them
3 locked up in an insulated material?

4 JUDGE OBERMANN: I understand. And I also understand that,
5 please correct me if I'm wrong, that the proportion of resin to nanotubes in
6 this combination would be about 20 percent nanotubes to 80 percent resin in
7 the best case scenario for you; is that right?

8 DR. JIN IN: I'm sorry. Which context are we talking about here?

9 JUDGE OBERMANN: I'm talking about the combination that
10 you're relying on, which is Ohata-Kavan. And were clear in your petition
11 that you're relying on Ohata for the nanotube resin material. And I thought I
12 read that the range of proportion of carbon nanotube to resin, to the -- is it
13 the fluoro --

14 DR. JIN IN: PVDF. Yeah.

15 JUDGE OBERMANN: Yes. Right. But that proportion is about
16 20 percent carbon nanotubes to 80 percent resin?

17 DR. JIN IN: Yeah. I -- I'll confirm, but that sounds right. But that
18 will be in the --

19 JUDGE OBERMANN: There's a lot more resin than --

20 DR. JIN IN: Yeah.

21 JUDGE OBERMANN: -- there is --

22 DR. JIN IN: In the masterbatch stage, Your Honor. So I think
23 next slide, Slide 27, I think you're maybe -- it may be, I think, beneficial to
24 quickly go over the actual process in Ohata.

25 JUDGE OBERMANN: Thank you. Yeah.

1 DR. JIN IN: So here, we can see what Ohata does with these
2 materials. So it first forms something which I just mentioned, that it calls a
3 masterbatch. And this is where nanotubes, these, you know, conductive
4 nanotubes are dispersed within a resin material. For instance, PVDF, like
5 you just mentioned. And this -- what that does is, it helps make sure that
6 these nanotubes are sort of well dispersed in 3D space.

7 And as you also see on here, on Slide 27, lithium-ion active
8 materials are added. And also to this mixture, a powerful solvent, in this
9 case, NMP, is also added. And there's a very specific reason that NMP is
10 added, and that is to dissolve the resin material. It is not disputed that NMP
11 or that PVDF is highly soluble within an -- NMP. And that addition of
12 NMP, you know, is a well-known process to get rid of PVDF.

13 And again, in the final electrodes form that Ohata was trying to get
14 at by adding these nanotubes and going through this process, this is after,
15 you know, NMP is added. All the PVDF is gone. You want to maintain that
16 highly electrically conductive, you know, structure that was formed as a
17 result of adding those nanotubes. And there's really nothing here in the
18 record to suggest that when you're trying to make a conductive electrode
19 using conductive nanotubes, you would keep them locked up. I mean, there
20 has to be an electrical connection between the nanotubes and the active
21 particles for -- they're -- for current to flow through this electrode structure.

22 And as Dr. Chung, you know, agreed to, as I read earlier, you have
23 to make contact for there to be electrical pathway that traverses the active
24 particles and nanotubes, and then eventually to the electrode current
25 collector.

1 JUDGE OBERMANN: I want to make sure I understand. I -- I'm
2 reading this carefully. So Ohata makes the masterbatch that includes the is it
3 PV --

4 DR. JIN IN: PVDF.

5 JUDGE OBERMANN: PVDF. And your position is that when it
6 gets to the point where it's going to sort of mate that with the electrode
7 material, the electrode material contains this solvent, basically, that's going
8 to solve -- dissolve at least a portion of that masterbatch so that the carbon
9 nanotube is available at that point?

10 DR. JIN IN: Yeah. Yeah. I -- we would argue all of it. Because
11 the electrode structure that you're trying to get is a porous conductive
12 structure where you have active particles and nanotubes forming the --

13 JUDGE OBERMANN: Is the electrode material mixture that I'm
14 looking at in paragraph 32, is that mixed into Ohata's masterbatch or is the
15 masterbatch something that is sort of made to contact that electrode
16 material?

17 DR. JIN IN: Oh, no. The masterbatch is a, you know, sort of
18 intermediary product. And so the resin, the combination of resin and the
19 nanotube itself, I mean, that, you know, doesn't do anything. You've got to
20 keep processing it until you get to the final desired form.

21 JUDGE OBERMANN: And how is that done? Is the electrode
22 material mixed into the masterbatch?

23 DR. JIN IN: Everything is mixed together.

24 JUDGE OBERMANN: Okay. That's what I wanted to know.

25 DR. JIN IN: Okay.

1 JUDGE OBERMANN: So you're taking this starting this point,
2 Ohata, that has the resin and the carbon nanotubes. And then you're mixing
3 into it, like a cake batter, this electrode material that's also a paste and
4 contains a solvent.

5 Is that your position?

6 DR. JIN IN: Well, the solvent would eventually all fly away. And
7 so at the very end, that the electrode paste that you have, you would take
8 -- sort of apply it onto a current collector. And once all the solution goes
9 away, you would have a dry, you know, conductive electrode that has
10 nanotubes and active materials.

11 JUDGE OBERMANN: But is your position that at that point,
12 there's the -- that any coated carbon nanotubes are now exposed?

13 DR. JIN IN: Yes, Your Honor.

14 JUDGE OBERMANN: And how does that happen? Where does
15 the PVDF --

16 DR. JIN IN: Sure. So maybe Slide 31.

17 So one of the things we -- we've really tried to clarify is that and
18 PVDF is easily dissolved in NMP. That is a very well-known fact. That's
19 basic chemistry. You know, and so the fact that we're adding this powerful
20 PVDF dissolving solution into a masterbatch that contains PVDF, I think
21 there may be some dispute on how much of that, you know, dissolution takes
22 place. But, you know, there -- there's no dispute that NMP is very good at
23 dissolving PVDF.

24 JUDGE OBERMANN: And what's the evidence that when all this
25 occurs, you still have these oxidized sites that were available for attachment?

1 This is chemistry. Does anything happen to those oxidized sites or are they
2 still in the pristine form they would have been, for example in Kavan, where
3 you're directly mixing an electrode material with this oxidized nanotube that
4 has a site available for attachment.

5 Where's the evidence that when you embed it in a resin, and even
6 if we accept that it gets dissolved by the pyrrolidone, what's the evidence
7 that that oxidized site is still available for attachment and attachment, in fact,
8 occurs? Because that's your burden to prove here.

9 DR. JIN IN: So again, I don't think there -- there's anything that
10 -- any phenomenon that we know of by which that oxidized spot would
11 somehow go away. But even --

12 JUDGE OBERMANN: Where is it in your papers? Where is it in
13 your papers that shows us? Because now, under your theory, we're dealing
14 with something that has been exposed, first to a resin and then to what you
15 call a, you know, a fairly powerful solvent to take that resin off.

16 Do you have anything in the record that demonstrates that that
17 oxidized site is available and that attachment actually does occur?

18 DR. JIN IN: So regard -- the more specific question regarding
19 whether the oxidized species remain after undergoing Ohata process, I'll
20 have to get back to you on that on rebuttal. But that said, I think the more
21 important point here is that we're starting with Ohata where the -- POSITA,
22 looking at Ohata, and looking at its desire to create a highly conductive
23 electrode that contains nanotubes and active particles, it -- it's sort of
24 nonsensical to suggest that Ohata never meant those two things to come in
25 contact with each other.

1 JUDGE OBERMANN: That sounds like hindsight to me, because
2 I think we're going to hear from your friend that that's not actually how
3 Ohata works.

4 DR. JIN IN: I think the record would prove otherwise, Your
5 Honor.

6 JUDGE OBERMANN: Okay. I'll see what your opposing
7 Counsel say.

8 DR. JIN IN: All right. Yeah. And go to Slide 32, as well.

9 Again, we have -- there's multiple, you know, evidence and
10 testimony from our expert explaining how, in practice, NMP and PVDF
11 react. And again, there -- there's no reason whatsoever for POSITA in Ohata
12 keep -- maintain the PVDF there. Because PVDF here was a, you know,
13 intermediary --

14 JUDGE OBERMANN: Let me try to get to this another way.

15 DR. JIN IN: Yep.

16 JUDGE OBERMANN: If we just look at Ohata by itself. And
17 what is happening in Ohata after you mix in -- do you mix a paste into
18 Ohata, just by itself, that contains the -- what did it contain, carbon black or
19 -- you had to take the actual moiety from Kavan as well, the titanium oxide
20 or the olivine (PHONETIC) material --

21 DR. JIN IN: Well, we're just taking the oxidized -- the teachings
22 of Kavan that says, if you have oxidized species attached to your nanotubes,
23 that gives you various benefits, including better attachment, better
24 dispersibility.

25 JUDGE OBERMANN: I understand.

1 DR. JIN IN: Okay.

2 JUDGE OBERMANN: I'm trying just to look at Ohata. And I
3 want you to remind me. Ohata, what is the moiety in Ohata that in your
4 combination is replaced by Kavan, titanium oxide, or the phosphate olivine?

5 DR. JIN IN: Well, those are the active, lithium-ion active
6 materials, Your Honor.

7 JUDGE OBERMANN: Yes.

8 DR. JIN IN: And so --

9 JUDGE OBERMANN: What, in Ohata alone -- is there a
10 substance of -- or is there a moiety in Ohata alone that your argument is
11 -- would be replaced by that in Kavan?

12 DR. JIN IN: It -- essentially, it would be the nanotubes. So it
13 would be unoxidized nanotubes would be replaced with oxidized nanotubes.

14 JUDGE OBERMANN: I see. Okay. So -- but that's not
15 happening in the combination. You're keeping the nanotubes in there?

16 DR. JIN IN: But we are applying the oxidation process from
17 Kavan into Ohata's nanotube. Because that gives you various benefits, as
18 Kavan clearly states.

19 JUDGE OBERMANN: So -- okay. So the active -- the electrode
20 in Ohata by itself is the carbon nanotube?

21 DR. JIN IN: Could you say it one more time, Your Honor?

22 JUDGE OBERMANN: I -- I'm trying to get a handle on this
23 combination and the reasons why someone would have done it. And if they
24 did it, whether you end up with the attachment that's required. And I'm
25 trying to get a handle on, you know, why someone would have seen Ohata,

1 taken Ohata and said, okay.

2 I'm trying to get a handle on how Ohata works by itself. And I
3 understand that your view is someone would have looked at Kavan and said,
4 okay, we're going to oxidize the carbon nanotubes. And then we'll go to
5 attach, either to titanium oxide if we wanted what is an anode, and -- or the
6 olivine if we want to make it be a cathode.

7 But what is Ohata really doing without those things added. How is
8 that operating?

9 DR. JIN IN: Yeah. So Ohata already has various types of lithium-
10 ion active materials that it is considering. And our position is that even
11 -- and as I said earlier, even though -- even if Ohata does not get into the
12 specific details of how the nanotubes and its active materials are, you know,
13 stuck together, they have to be stuck together to form a working electrode.
14 And so the only thing that Kavan adds is that, hey, by the way, if you look at
15 Kavan, it says, this attachment can be made even stronger if you use
16 oxidized nanotubes.

17 JUDGE OBERMANN: I just heard you refer to the carbon
18 nanotube as separate from the active material. And I think what I really
19 want to know is what is that active material in Ohata alone?

20 DR. JIN IN: And I think you mentioned things like the lithium
21 cobalt oxide. And there are various different types of materials that work in
22 a lithium-ion battery.

23 JUDGE OBERMANN: When do they get added into Ohata's
24 process?

25 DR. JIN IN: In the masterbatch process.

1 JUDGE OBERMANN: Okay. So just thrown in together?

2 DR. JIN IN: Yeah.

3 JUDGE OBERMANN: Okay. But you're not removing any of
4 that. You're just adding -- once you oxidize those carbon nanotubes you're
5 saying it would have been obvious to just add --

6 DR. JIN IN: We're essentially keeping Ohata's process the same.

7 JUDGE OBERMANN: Ohata's process the same. The only thing
8 you're doing, and correct me if I'm wrong, you're pre-oxidizing these carbon
9 nanotubes and then you're throwing in some of Kavan active?

10 DR. JIN IN: Oxidized nanotubes.

11 JUDGE OBERMANN: Oxidized nanotubes go in first. Or you
12 oxidize them before you put in the masterbatch?

13 DR. JIN IN: Yeah.

14 JUDGE OBERMANN: And then you add Kavan's catheter or
15 anode active?

16 DR. JIN IN: Correct. There's always a variety of options that one
17 can choose in terms of the active material chemistry. But the ones that are
18 specifically mentioned in Kavan says they are, you know, specific -- more
19 particularly attractive. So that would be, you know, one example active
20 material that Ohata could use instead of lithium cobalt oxide, for instance.

21 But you're right, Your Honor. Essentially, that's what we were
22 -- we are proposing with that combination.

23 JUDGE OBERMANN: Thank you very much.

24 DR. JIN IN: So I'm running low on time. So with that, let me go
25 ahead and hand things off to Gretchen. And I think she might perhaps ask a

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1 little bit more time from our rebuttal, if that's okay, Your Honor.

2 JUDGE OBERMANN: If you need more time, I'm happy to either
3 take it from your rebuttal or if you'd like ten extra minutes, I can add ten
4 extra minutes to your time.

5 MS. DEVRIES: That would be perfect. We appreciate that, Your
6 Honor. Thank you. Ten extra minutes would be lovely. Thank you. All
7 right.

8 Well, thanks H.J.

9 My name is Gretchen DeVries and I will be talking you very
10 briefly through the last two remaining combinations here. The Cheng-Gan
11 combination and the Lee-Wepasnick combination. And I'll start on Slide
12 106. We're going to start with the Cheng-Gan combination. That one was
13 advanced only with respect to one of the patents in the proceedings, the '924
14 patent. That's IPR2024-01011. And you'll see on this slide that we've
15 identified three key disputed issues for this ground. And we're going to
16 address to only two of them.

17 First issue, 4A, which is the petition showing that the nanotubes in
18 the Cheng-Gan combination of oxidation levels in the claimed range. And
19 then the second issue, 4C, which is the discreteness of the Cheng-Gan
20 nanotubes. I'll skip over the motivations to combine. But I'll refer Your
21 Honors to Slides 128 to 136 for an overview, if you're interested. And of
22 course, we're happy to answer questions if there are any.

23 So I'll start with a quick overview of the combination on Slide 108.
24 So Cheng describes a method that's somewhat similar to Ohata's method in
25 that it mixes up a lot of components to produce, ultimately, a composite

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1 electrode material. And Cheng's composite electrode material contains
2 carbon nanotubes and lithium-ion active material, which Cheng calls LFP.
3 And these components are uniformly dispersed in a binder with the objective
4 of achieving good electrical conductivity characteristics for the electrode
5 among other things. And Cheng's process turns out to be of -- at issue when
6 we look at the oxidation levels of the nanotubes.

7 So I'll just say briefly that Cheng makes this composite material by
8 mixing all of these things together. Specifically, it mixes nanotubes and a
9 precursor to that LFP active material mixes them together in a binder. And
10 then it heat treats the material through a process called calcination. And that
11 this process both disperses the nanotubes in the binder, and it also converts
12 the precursor materials into the final LFP material. So Slide 109, please.
13 These are excerpts from Gan, which is our secondary reference. And we've
14 relied on Gan for one thing, which is a teaching that oxidized nanotubes
15 have a variety of advantages in the context of these polymer based
16 composites.

17 And so on Slide 112, the way that Cheng and Gan come together is
18 that we keep Cheng's general composition. We keep Cheng's general
19 process, and we take the oxidation levels based on Gan's teachings. And
20 specifically, as you can see in the excerpt from Gan at right, Gan explains
21 that there's a particular range of oxidation levels. 2.5 to 10 percent, which
22 are optimal to access these various advantages of oxidized nanotubes. So
23 just to be clear, the composite electrode material in the Cheng-Gan
24 composition includes two things, nanotubes and LFP particles that are in a
25 binder. And that's consistent with the makeup of Cheng's material. And

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1 then the nanotubes in that final composite electrode material are oxidized to
2 a level of 2.5 to 10 percent. So there's no dispute that Gan discloses
3 nanotubes having these 2.5 to 10 percent oxidation levels. The issue is with
4 respect to how Gan can be integrated with Cheng.

5 And so let's go to Slide 113, please.

6 And specifically, I'll just talk you briefly through Patent Owner's
7 prime issue here with respect to the oxidation levels, which is the calcination
8 step of Cheng's process. Calcination is a particular variety of heat treatment.
9 And Patent Owner's argument, which is produced in part here, is essentially
10 that calcination in Cheng happens at temperatures that are so high that
11 essentially all of the oxidation that was on the surface of the Cheng-Gan
12 nanotubes is removed. So essentially, any oxidation that might have been
13 there in the beginning is no longer there by the end. So there are two
14 incorrect assumptions that underpin this position. And I'll talk you briefly
15 through two of these. The first one is that it -- this simply misrepresents the
16 nature of the Cheng-Gan combination. And secondly, it assumes something
17 more than what Cheng actually teaches. It assumes that calcination in the
18 combination necessarily has to be performed at a temperature that's high
19 enough to burn off all of the oxidation. And neither of these is true.

20 I'm going to skip around in the slides just a little bit in the interest
21 of time. So let's go down to Slide 127, please.

22 So Slide 127 addresses the fundamental problem with Patent
23 Owner's arguments that calcination removes oxidation from nanotubes. And
24 again, that problem is that Patent Owner's assuming that the 2.5 to 10
25 percent oxidation levels are present in the nanotube starting material, and

1 then are removed through the high temperature calcination steps. But that's
2 just not the ground that the petition proposed. You can see the petition at the
3 top left. And the petition clearly says that the Cheng-Gan combination has
4 the nanotubes in its final composite electrode material, that is the material
5 that's after calcination, exhibiting oxidation levels of about 2.5 to 10 percent.
6 And that's the highlighted and red underlined sentence there. Cheng's
7 composites had carbon nanotubes that are functionalized to that level. So
8 Patent Owner's arguments that calcination removes oxidation from
9 nanotubes is just not pertinent here because it's not aligned with the ground
10 events in the petition. The petition has said that those are the final oxidation
11 levels, not the starting oxidation levels.

12 You can jump back up to Slide 125. I'll just address the other
13 issue, which is the other flawed assumption in Patent Owner's position that
14 the calculation in the Cheng-Gan combination has to happen at temperatures
15 that would remove the oxidation species from the nanotubes. And so here,
16 even if the 2.5 to 10 percent were applied prior to calcination, we have our
17 experts explaining that calcination is a process that a POSITA would have
18 been able to tweak in order to satisfy particular needs. You can also see his
19 direct testimony on Slide 126. And so the statement that the calculation
20 temperature is temperature is 650 to 800 degrees C in Cheng is presented as
21 examples in Cheng. At the -- at right --

22 Sorry, back on Slide 125.

23 At right in the abstract, you see Cheng in the kind of, the middle of
24 that long abstract there, describing a generic calcination without specifying
25 particular temperatures. And so based on this context that is a process that

1 involves calcination of oxidized nanotubes, we can look to our expert's
2 testimony that to -- who has explained that a POSITA would have selected
3 particular calcination parameters taking into account factors like the raw
4 materials and the desired results. So this means that Patent Owner is
5 incorrect also in its assumption that certain temperatures must necessarily be
6 applied during calcination of the Cheng-Gan nanotubes.

7 Now, if we can go back to Slide 114, please?

8 The last issue that I'm going to address just very briefly is that
9 there are numerous corroboration references at issue with respect to the
10 effect of calcination. And again, these references really only come into play
11 if the Patent Owner's assumption that that 2.5 to 10 percent oxidation level is
12 applied to the starting nanotubes, not the final nanotubes. I'm sorry. But I'm
13 just going to say very briefly that Patent Owner has presented several
14 references that the petition has shown are not relevant to the specific
15 chemistry in the Cheng-Gan combination. And you can see some additional
16 detail on those in Slides 114 to 20 -- 120. And Petitioner, by contrast, has
17 advanced several references that demonstrate that the environment in
18 calculation matters. And that in the particular environment of Cheng-Gan,
19 where we have oxidized nanotube in the presence of LFP precursors,
20 calcination does not necessarily remove significant amounts of oxidation
21 species from the nanotubes. So these slides, 114 to 120, which you can
22 prove in more detail if you'd like, generally demonstrate that Petitioner has
23 shown that the oxidation would be able to remain on the nanotubes even if
24 the Patent Owner were correct that the 2.5 to 10 percent were the starting,
25 rather than the ending, oxidation level.

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1 So unless there are questions, let me just turn very quickly to the
2 Lee-Wepasnick ground. And I'll talk you through that for a few minutes.

3 JUDGE OBERMANN: I don't think we have questions.

4 MS. DEVRIES: All right. Thank you.

5 So let's go to Slide 86, please.

6 The Lee-Wepasnick ground is also at issue with only one of these
7 patents. That's the '909 patent, which is IPR2024-01006. And I'd like to
8 focus mostly on the question of the discreteness of these nanotubes. And
9 then to conclude, I'll just say a few sentences about how the nanotubes and
10 Lee-Wepasnick satisfy the claimed range of aspect ratios.

11 Let's go down to Slide 86, please.

12 And I'd just like to clarify that the details of the dispute on Lee-
13 Wepasnick and the discreteness of those nanotubes are different from what
14 we were discussing for Ohata-Kavan and what we didn't discuss, but it turns
15 out is very similar for the Cheng-Gan combination. That in both Ohata-
16 Kavan and in Cheng-Gan, there's a continuous conductive network of
17 nanotubes that the petition has shown are discrete. In Lee-Wepasnick, the
18 issue is more that the structure of the Lee material and how a POSITA
19 would have understood those nanotubes to be discrete.

20 Well, let's go to Slide 87 and discuss the structure of that material.

21 So the figure at left is Figure 1 of Lee. And this shows the
22 structure of Lee's material. The combination, the Lee-Wepasnick
23 combination, uses this structure as its starting point. And it incorporates
24 oxidized nanotubes based on the teachings of Wepasnick. And the question
25 of the discreteness of these nanotubes is really around what exactly this

1 structure means, so I'd like to take some time to talk through the structure of
2 Lee's material.

3 This is an -- essentially a two-tiered structure. The first tier is
4 primary nanoparticles. They're number 5, and one of them is highlighted in
5 green here. And the primary nanoparticles have two components: The first
6 component is a non-carbonaceous material, which are particles of the
7 lithium-ion active material, and those are the small gray circles in this figure.
8 And then the other component is the nanofibers, which are nanotubes, and
9 those are the black squiggly lines. And as a first step in this first tier, the
10 small active material particles and the nanotubes are bound together to form
11 the primary nanoparticles. And then there's a second tier of leaf structure, in
12 which these primary nanoparticles are agglomerated into larger
13 superstructures, which Lee calls secondary particles, and the entirety of this
14 schematic figure here is just one of these secondary particles.

15 If you go to Slide 88, please.

16 It's this very structure that the petition has shown makes the Lee-
17 Wepasnick nanotubes discrete. And I want to be very clear about this
18 because I think that the issue is with Lee's use of the word agglomeration. In
19 Lee, the nanotubes are bound to active material particles before any
20 agglomeration occurs. So when there is agglomeration -- and Lee does use
21 that word, agglomeration, but when there's agglomeration, it's agglomeration
22 of primary particles into that large secondary -- those large secondary
23 particles. It's not agglomeration of nanotubes. There simply isn't a way for
24 the nanotubes to agglomerate with one another, given that they're already
25 attached to the active material particles. And then there's one more thing

1 that contributes to the discreteness of the nanotubes, which is that they're
2 oxidized. And Dr. Zhu has explained on Slide 89 how the oxidation of the
3 nanotubes helps to promote discreteness.

4 Let's go to Slide 91, please.

5 And Patent Owner's arguments against the discreteness of
6 nanotubes in this structure, I think, just betray a basic misunderstanding of
7 the structure. At the top left, you can see the main thrust of Patent Owner's
8 arguments here, and the main concern really is semantic. Patent Owner
9 takes issue with Lee's use of the word agglomeration, and that's why it was
10 so important to understand the structure of Lee's material. Lee is not talking
11 about agglomeration of nanotubes. It's talking about agglomeration of
12 particles that already contain nanotubes that are fixed in place. They're
13 already bound to those initial small gray particles.

14 So there's this general conceptual misunderstanding, and then there
15 are three arguments that Patent Owner advances specifically why the Lee-
16 Wepasnick tubes are not discrete. I'm just going to touch very briefly on
17 each of these.

18 You can jump to Slide 93, please.

19 At left here, this is a microscope image from Lee. This is Lee's
20 Figure 6, and Patent Owner has argued that this image is hard evidence that
21 Lee's nanotubes are not discrete. And Patent Owner's main point about this
22 image is that no individual nanotubes are visible, and so therefore, they
23 conclude that no individual nanotubes are present. But this claim simply
24 isn't compelling, and the reason for that is the resolution of the image. What
25 we use is a small kind of nanotubes called single-walled nanotubes, which

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1 have a diameter of small as 1 nanometer. If you look at the scale bar at the
2 lower right of the image, it's really hard to see. 500 nanometers, and it's a
3 fifth or so the width of the image.

4 So a 1-nanometer feature on a figure of this size -- of an image of
5 this size is just not going to be visible, and even Patent Owner has admitted
6 this to be the case. You can see that in the lower right of the POR expert on
7 -- excerpt on this slide. So the absence of discrete nanotubes from this
8 image doesn't mean they're not there, which is what Patent Owners tried to
9 argue. It just means they're not visible at this scale. So the question is:
10 What has Patent Owner accomplished by showing this image? And the
11 answer is not much. There's just nothing that we can glean from this image
12 to prove or disprove Patent Owner's claim contradicting the structure of
13 Lee's material.

14 Slide 95, please.

15 Patent Owner's second substantive argument against the
16 discreteness of the Lee-Wepasnick nanotubes relates to the aspect ratio of
17 the nanotubes.

18 JUDGE OBERMANN: You are over the ten minutes.

19 MS. DEVRIES: Thank you. Let me just have one more minute
20 and I'll -- I'm almost done. Thank you.

21 And very briefly, Patent Owners argue that, because the Lee-
22 Wepasnick nanotubes are -- have a very high aspect ratio of, they say, at
23 least 5,000, essentially, they're saying they're too long to be able to be
24 discrete.

25 And if we look at Slide 96.

1 The main problem with this argument is that this only looks at part
2 of the aspect ratio range disclosed by Lee. The excerpt from the petition
3 there on the top right shows that Lee discloses nanotubes in the range of 10
4 to 10,000. So even if it's the case that nanotubes of an aspect ratio greater
5 than 5,000 are not discrete, which we don't believe Patent Owner has shown,
6 that still disregards the lower end of this range. And in fact, the claim itself
7 -- the claim is -- of these three challenged patents give us an indication that
8 nanotubes of shorter aspect ratios are capable of being discrete in the
9 recitation of an aspect ratio of 10 to 500 for those discrete nanotubes.

10 And then finally, just very briefly on Slide 97, Patent Owner also
11 makes an argument that there's a thermal treatment in Lee that causes
12 agglomeration of nanotubes. And as we've already seen, the agglomeration
13 that occurs in Lee is not of nanotubes. It's of those nanoparticles that
14 contain active material particles and nanotubes. So when Lee has a process
15 that it discloses agglomeration -- evaporation of solvent resulting in
16 agglomeration, again, that's not agglomeration of nanotubes. It's
17 agglomeration of these first-tier nanoparticle structures.

18 JUDGE KALAN: I have a question about the process herein from
19 you and also in Ohata. Once the nanotubes are oxidized or treated in
20 whatever manner they're treated, do they remain discrete throughout
21 subsequent processing steps?

22 MS. DEVRIES: Yes. We believe they do. And the reason for that
23 is actually at the lower right of Slide 98, in paragraph 63 from Lee, which
24 says that the primary nanoparticles are strongly bound together so that the
25 -- I'm sorry. Right before that highlighting. The non-carbonaceous material

1 binds with the hollow carbon nanofibers. That's at the top of that paragraph
2 63. Sorry. And that means that the nanotubes are strongly bound to those
3 -- to the active material particles to form those primary particles. There's no
4 indication in Lee that that's binding between nanotubes and active material
5 particles is disrupted as part of the agglomeration. So because the nanotubes
6 are discrete at the start of the process, we believe that they remain discrete
7 throughout the entirety of the agglomeration process.

8 JUDGE KALAN: Okay. Is the same thing happening in Ohata
9 then?

10 MS. DEVRIES: Ohata discloses a very different process, actually,
11 because Lee is focused on this first step of binding nanotubes to
12 nanoparticles and then agglomerating those first-tier structures into
13 superstructures, whereas Ohata first disperses nanotubes in a resin, and the
14 combination is oxidized nanotubes that are dispersed in a resin, and then it
15 mixes in the active material particles and a solvent to clear the resin and
16 allow the oxidized nanotubes to bind to the particles. So I think that it -- it's
17 difficult to draw any analogy between the discreteness of the Lee particles
18 and the discreteness of the Ohata -- I'm sorry. Of the nanotubes and the
19 discreteness of the Ohata nanotubes because the processing steps happen in a
20 different order and in different contexts.

21 JUDGE KALAN: Thank you for explaining.

22 MS. DEVRIES: All right. So in the interest of time, I'm going to
23 skip over the part on aspect ratio, but I'd like to just close the first part of our
24 presentation with just one final comment that hearkens back to the very
25 beginning, since I know this has been a very long presentation. And I'd like

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1 to say that, even if Your Honors choose to adopt Patent Owner's
2 construction of discrete, the grounds that we presented here, and particularly
3 the Ohata-Kavan grounds, render the claims unpatentable because Ohata
4 discloses carbon nanotubes that are separate and not attached to one another.

5 And for you to adopt Patent Owner's construction is a tall order.
6 First, you'd have to look past that '909 patent confirmation that we discussed,
7 that discrete carbon nanotubes are capable of being separated and, therefore,
8 have not yet necessarily been separated. And second, in the interest of
9 maintaining a consistent construction across all proceedings, you would
10 have to change that '282 patent's teachings that discrete equivalent -- that
11 discrete nanotubes are equivalent to exfoliated nanotubes to a different
12 equivalent that discrete nanotubes equal fully exfoliated nanotubes, and
13 that's a change without justification on this record.

14 MR. ZINDA: Your Honor, just one objection. She's making
15 arguments about the '282 patent in a different proceeding, with a different
16 specification. Just object to all of these arguments about the '282 family.

17 JUDGE OBERMANN: Your objections are recorded on the
18 record.

19 And please try to confine your comments to the case in -- at hand.

20 MS. DEVRIES: Yes. Understood. We just are hoping to
21 maintain a consistent construction, but we certainly understand that. All
22 right. I have nothing further, so if Your Honors have no questions --

23 JUDGE OBERMANN: Thank you very much.

24 MS. DEVRIES: -- we reserve the rest of our time. Thank you.

25 JUDGE OBERMANN: Okay. Mr. Zinda, I essentially gave them

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1 105 minutes, so you have 105 minutes, should you need it. Would you like
2 to reserve any of that time for surrebuttal?

3 MR. ZINDA: Yes, Your Honor. Fifteen minutes would be
4 sufficient.

5 JUDGE OBERMANN: Fifteen minutes? Okay. Then you have
6 90 minutes on the clock.

7 MR. ZINDA: Sorry, Your Honor. I'm just looking for the plug
8 outlet.

9 JUDGE OBERMANN: Take your time. And I won't start the
10 clock until you begin to speak.

11 MR. ZINDA: Oh, oh. Okay. Thank you, Your Honor. Thank
12 you, Your Honor. My name is Stephen Zinda. I'm lead Counsel for Patent
13 Owner, Molecular Rebar Design. There are a lot of issues to address, and I
14 probably won't get to all of them. And it's obvious to me that there are
15 certain issues that the board is, I think, more concerned with than others, and
16 so I'll try to focus attention to the matters that the board has indicated it's got
17 more interest in.

18 But before I do, I think it's important to talk about context, right,
19 the context of the invention. Something that you didn't hear them talk about
20 at all was why does this invention even exist. What were the inventors
21 trying to accomplish? They spent their entire presentation focusing on one
22 sentence that they say is -- they're not alleging is definitional, but all the
23 other evidence seems to suggest that they actually are, even though neither
24 expert has taken that position.

25 And so what I'd like to do is just briefly go over the overview of

1 the technology. And we did speak yesterday about the '282 patent. It
2 involved batteries and it involved separators and electrodes. This patent is
3 also focused on lithium-ion batteries, but the discovery the imagers had with
4 respect to this family of patents is -- provides a different benefit than the
5 '282 patent. And --

6 JUDGE OBERMANN: We're on Slide 3 now?

7 MR. ZINDA: Oh, sorry, Your Honor. Yes, Slide 3.

8 And so this is just a general overview of an electrode. And one
9 thing that has been discussed extensively is that there's typically an active
10 material, there's a binder, there's a current collector, and often there's a
11 conductive additive that is included in the composition to help increase the
12 conductivity of the binder. Now, one way that conductive binder was made
13 in the prior art was you would include carbon black as part of the binder
14 material, whether it's PVDF, which is a generally non-conductive binder, but
15 if you put carbon black in it, you can render it electrically conductive.

16 And so what I'm showing here is just a -- this is a schematic
17 illustration from MRD-2008, which is a -- which is a prior patent referred to
18 as Liu, I believe, in our briefing. And it just shows at a very high level that
19 you've got a PVDF that you mix with carbon black and NMP, and you end
20 up with this -- what is referred to as conductive glue. And if you look at the
21 Figure 6 at the bottom there, you will see that this conductive glue is being
22 used to essentially glue the active material particles together, glue them to
23 the collector to maintain mechanical stability but also provide conductivity
24 so that you can have electron travel through the composition.

25 Now, carbon black, useful, still used to this day. The problem with

1 carbon black is it's a little more brittle if you sonicate it. And Ohata actually
2 talks about this, is when you mix it, it can tend to break apart the particles,
3 and then you don't have the same level of conductivity that you would
4 otherwise want to improve your conductive -- to make the binder more
5 conductive. So that's where carbon nanotubes come into play.

6 And so what I'm looking at in Slide 5 is on the left. This is what
7 we refer to -- is a raw bundle of carbon nanotubes, and this is, you know,
8 generally an accurate depiction of how they are created, the form that they
9 come in when they're created. I believe maybe yesterday we used the -- I
10 used the phrase hair. Maybe a better analogy would be cotton ball, that it's
11 sort of like a cotton ball structure. And the benefit of carbon nanotubes is
12 they provide mechanical structural stability. They're very strong in that they
13 do not tend to break apart when you sonicate them and mix them like carbon
14 black does. The -- and they're also very highly conductive, highly
15 conductive electronically, but they also have ion conductivity as well.

16 And so on the right, it's just a more zoomed in depiction so you can
17 just sort of see how highly entangled the carbon nanotubes are. So while
18 they are an improvement over carbon black in a lot of ways, the problem
19 with carbon nanotubes is they're hard to disperse. You end up with clumps
20 of them, and actually, if you have clumps of them, sometimes that's actually
21 -- that can actually lead to increased resistance because they're all
22 agglomerated together and they're not giving -- you're actually having
23 contact resistance. So the goal at the time was to improve conductivity by
24 having a -- what some of the references call a percolated CNT network, so
25 an interconnected network of carbon nanotubes to improve conductivity.

1 You don't want them to be agglomerated. You don't want them to be
2 stacked on top of each other. You would prefer them to be spread out but
3 interconnected.

4 And the Gan reference is actually -- obviously, it's in the Cheng-
5 Gan combination, but it's one of the few references in this proceeding that
6 actually has a -- I think a good illustration to kind of show you what they're
7 trying to accomplish.

8 JUDGE OBERMANN: What slide are we on, please?

9 MR. ZINDA: I'm sorry, Your Honor. Slide 6.

10 JUDGE OBERMANN: Thank you. Okay.

11 MR. ZINDA: And I'll try to remember to reference the slide as I
12 go through. I know it's a terrible habit. And what I will note about Gan
13 Figure 5 is these are not oxidized or functionalized nanotubes. This is the
14 only depiction that Gan has of its network. It does describe how you can
15 functionalize the nanotubes to help with dispersion. So I just want to make
16 sure -- we're not trying to represent that this is functionalized. This is just a
17 CNT network that Gan depicts in its figures. Now, the background of the
18 patent talks about how -- and this is Slide 7, and on the left column, where in
19 -- highlighted in yellow, it says, The carbon nanotubes previously employed
20 are not considered to be essentially discrete, i.e., individual uniformly
21 dispersed tubes.

22 And going down to the green portion, the background expressly
23 describes the benefit of having discrete carbon nanotubes, and that is as the
24 active material expands and contracts. And so as the active material absorbs
25 lithium-ions, it expands, and then it releases and it contracts. And this

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1 expansion and contraction can actually cause the active material crack over
2 time, and that leads to higher internal resistance in your active material,
3 which leads to decreased performance, decreased electrical conductivity.
4 And so the patent, just clear as day, tells us at the very beginning that the
5 goal of the invention is to improve conductivity due to this cracking effect.

6 And if you go to the right column, it specifically says, Your Honor,
7 The present invention overcomes the difficulties of low electrical
8 conduction, particularly due to expansion and contraction of the material
9 during charging and discharging of the battery.

10 JUDGE OBERMANN: And to be clear, which case is the '483
11 patent from?

12 MR. ZINDA: Yes, Your Honor. The -- I'm not -- the '483 patent
13 is from the proceeding ending in 1013, I believe.

14 And I want to be clear, and maybe it'll help if I explain this a little
15 bit: The arguments I'm making right now are consistent in all three
16 responses. The evidence we cite is the same across all three -- I just cited to
17 the '483 because I thought it was easier just to have one cite. The same
18 information is in all of the other responses.

19 JUDGE OBERMANN: Okay. Okay.

20 MR. ZINDA: I -- with the caveat that they are slightly condensed
21 versions of the exact same arguments because of word count limitations, but
22 all of the evidence is cited in the -- from the '483 is cited in the other two
23 proceedings.

24 Now, this is LG -- LG's own patent application from 2018. And
25 the reason I'm showing this to you here is it describes and shows exactly

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1 what the inventors of the '483, '909, and '924 patent we're talking about in
2 the background there, and exactly what they were talking about when they
3 said they wanted to improve conductivity by preventing this cracking from
4 occurring. And if the cracking does occur, you -- at least you have these
5 little electrically conductive rebars that form bridges across the cracks so
6 that you reduce the loss of conductivity that occurs due to the cracking.

7 And so this is Slide 8, and we actually have a figure from the LG
8 Patent that shows that you have the nanotubes on the surface of the active
9 material. And then there's actually a quoted portion beneath that, where it
10 specifically talks about how they can crack during charging and discharging
11 and how the -- and how the nanotubes can help prevent that from happening.

12 JUDGE OBERMANN: Wouldn't they do that even if they were,
13 you know, touching or a little bit tangled with each other?

14 MR. ZINDA: They could, Your Honor, but the issue with if you
15 have -- imagine that you have a web wrapped around your active material.
16 What does that do to the active material's ability to expand? You -- you're
17 limiting the ability of the active material to expand, and that's actually also
18 has a negative effect, too. So it's true that you could get that effect. And
19 also remember, when they're networked together between active material,
20 they're not laying -- they're not necessarily laying flat on the active -- the
21 surface of the active material. They're -- they might be touching it, but
22 they're networked to other CNTs in between when you have a non-discrete
23 network of CNTs.

24 JUDGE OBERMANN: Okay. I read the briefs and I understand
25 the benefits that the inventors feel they found, and I'm sympathetic to that,

1 but what do we do with a claim that has a claim term that expressly defines
2 in the spec differently than how you appear to be construing it here?

3 MR. ZINDA: Yes, Your Honor. And so first, I want to -- the first
4 thing I'll note is we don't agree that it's expressly defined in -- you know,
5 honestly, neither expert has testified that it's --

6 JUDGE OBERMANN: Well, look, I don't care what the expert is
7 saying right now. I -- I'm focused like a laser beam on the specification, and
8 I'm also well aware of the cases that talk about definitional language. I see
9 definitional language in this spec, and once we have that, nothing any expert
10 says is going to undo it. So what do we do with that?

11 MR. ZINDA: Well, Your Honor, if the board concludes that it's
12 definitional, obviously, I think under Federal Circuit precedent, they -- the
13 board should adopt the construction that they believe is definitional. I
14 personally do not believe it is definitional. I think you have to look at the
15 patent spec in context, and that --

16 JUDGE OBERMANN: Well --

17 MR. ZINDA: -- there is a sentence -- oh, sorry, Your Honor.

18 JUDGE OBERMANN: Please focus on what your view is on how
19 we can either add to or why it's not definitional and then we stop there.

20 MR. ZINDA: Yes, Your Honor. And I -- I'm more than happy to
21 do that. And I want to be clear that I think discrete in this proceeding, it's an
22 important term, and the construction is important, but there are other issues
23 in this pertaining -- that are very important that would result in patents
24 coming out without any invalid claims. So I will focus on this briefly and I
25 will directly answer your question. I think I can probably skip a lot of my

1 slides on discrete then.

2 And just to answer your question directly, my view is, if you read
3 the spec as a whole and if you go to Slide 12, for example, the way that
4 discrete carbon nanotubes are described in other areas of the specification is
5 not just capability of being separated. And an example in the yellow here is
6 it doesn't -- it says, essentially discrete carbon nanotubes, i.e., individual
7 uniformly dispersed tubes. It's not that they're capable of being made
8 individual or uniformly dispersed. It's that they are. It --

9 JUDGE OBERMANN: I know, but the definition says they have
10 to be capable -- I don't know. I'm having a hard time.

11 MR. ZINDA: I understand, Your Honor. I understand, Your
12 Honor. And our position is, and I'll just -- I'll -- I guess I'll just wrap it up
13 really quickly because I don't want to waste a lot of time on an issue that
14 -- like this. So what I'll say is the patent specifically talks about in -- this is
15 Slide 13. I'm calling for line 6 to 24. Specifically says, during the process
16 of making discrete carbon nanotubes. To me, that, by itself, indicates that
17 there has -- something has to be done to become discrete. It is not merely
18 the capability. And we disagree with them that -- I mean, any nanotube is
19 capable of being separated out if you -- according to -- even to their own
20 expert, if you follow the appropriate procedure. And that's why we view
21 that as an overly broad reading of what discrete means. The patent
22 repeatedly describes it as something that -- a process you have to follow to
23 get to discrete.

24 JUDGE OBERMANN: Okay. Now I'm starting to see it. I mean,
25 if we read this entire spec, it sort of comes clear that the claim is referring to

1 nanotubes that are discrete. And you've got a lot of discussion in your spec
2 about how you get to discrete, but then you have a definition that really is
3 pretty express and point-blank says that a discrete carbon nanotube is one
4 capable of being separated into individual tubes. So I -- it's hard.

5 MR. ZINDA: I understand, Your Honor. And I -- my only -- my
6 final pitch on this one, if you will, would be that a person of ordinary skill in
7 art -- in the art reading the spec would understand that, under that -- if you
8 were to define it that way, it essentially renders the term discrete
9 meaningless, but if you read the entire context of the patent, it's very clear
10 that's not what the inventors intended.

11 JUDGE OBERMANN: Okay. I like that. I don't think it's in the
12 brief, but I think the Federal Circuit has said that, at a hearing, the board is
13 able to, you know, indicate that it might take a position on claim
14 construction and give the other side an opportunity to respond to it. And I
15 would like to give the other side an opportunity to respond to what mister
16 -- I'm sorry. Mr. Zinda just said because that, to me, frankly, is kind of
17 compelling that. I just want to put you on notice that the board may take a
18 position on that in our final.

19 MR. ZINDA: And Your Honor, to -- just to finish this point -- and
20 I -- to be clear, I think we did -- I -- we may not argue in those exact words,
21 but we spent a lot of time arguing in our sur-reply that it is simply not
22 plausible to interpret discrete to mean capable of.

23 JUDGE OBERMANN: Yes, sir.

24 MR. ZINDA: And we went through that extensively. So I mean, I
25 -- we didn't use the exact language that I just -- I had just explained here, but

1 it's --

2 JUDGE OBERMANN: It's been in your sur-reply, correct?

3 MR. ZINDA: It is in our sur-reply. It -- and it --

4 JUDGE OBERMANN: And --

5 MR. ZINDA: I'm sorry.

6 JUDGE OBERMANN: -- we may want to give -- I'm not saying
7 we're going to do this, but be prepared that we may want to give the other
8 side an opportunity to brief this in a sur-reply if it becomes an issue in our
9 final.

10 MR. ZINDA: Yes, Your Honor. Totally understand that.

11 And the last thing I'll point to on this issue is example 3, where it
12 actually walks through a very specific process for creating discrete carbon
13 nanotubes. And you'll note that it doesn't start with discrete carbon
14 nanotubes. It starts with just multi-wall carbon nanotubes oxidized to about
15 8 weight percent. The final product of that entire process is you have
16 discrete carbon nanotubes. Again, it's not just capability. It's -- there's a
17 process for getting two discrete carbon nanotubes, and that's the point I'm
18 trying to make with the -- with this issue. So I'm going to -- I mean, I was
19 going to go through my whole -- the heckling on the issue of discrete. I
20 didn't know if you wanted me to go on and do that now that we've discussed
21 that concern that you had a little earlier, Your Honor?

22 JUDGE OBERMANN: I don't -- do I handle it? I don't want to
23 cut you short if you think there's something important to add.

24 MR. ZINDA: Yeah. I just one point. And I know you -- Your
25 Honor, you mentioned a moment ago that maybe expert testimony -- you

1 know, expert testimony certainly does not supersede or substitute for what is
2 in the specification, but again, I just want to -- I want to note and reiterate,
3 going to Slide 15, that neither party's expert has ever read that phrase as
4 being definitional. Nobody has argued there's an express definition in the
5 spec. And also, they've argued plain, ordinary meaning, so obviously, if
6 they're going to say that the plain, ordinary meaning is that specific phrase,
7 well, that's not actually plain, ordinary meaning. That's a definition. And
8 they've told the board repeatedly today that's not what they want to do.

9 And this is actually from Dr. Zhu's declaration in the '483. And
10 again, you all -- Your Honor, you all might recognize this because this was
11 the same slide we used in the proceeding yesterday, same evidence. It's in
12 the record, but again, I think this is the most telling example of their expert
13 clearly taking the position of what discrete means in his mind, and he's --

14 JUDGE OBERMANN: Now, wait a minute. What -- where did
15 the expert take this position, because they made a pretty good argument that
16 this guy was just saying, yeah, to -- are you relying on that?

17 MR. ZINDA: Oh, that's part of it, but not here, Your Honor. This
18 is actually clearer than that. And I'll also say it's interesting that their
19 defense to what their expert said is, sometimes our expert says yes to things
20 he didn't mean yes to. I think that's --

21 JUDGE OBERMANN: He's acknowledging the question, but if
22 you read his answer, it is pretty clear that he's disagreeing in that one
23 example, even though he says, yeah. So what else do you have besides that?

24 MR. ZINDA: Yes, Your Honor. So right here, this is from his
25 declaration. And in his declaration, this is where he's explaining why he

1 believes Ohata teaches discrete carbon nanotubes. And he says, And
2 looking again to Ohata's illustrative example provided below, it can be seen
3 that most of the nanotubes are depicted as being discrete, non-agglomerated,
4 exfoliated. Most. So he's admitting that not -- in -- under his interpretation,
5 under his view, not all of the nanotubes shown there are discrete.

6 Okay. Well, if that's true, that's not consistent with the position
7 they're taking now about capable of, right, because all of those are clearly
8 capable of being separated if you do a little bit of sonication. You have the
9 ones that are crisscrossing, that are not --

10 JUDGE OBERMANN: Are these in the resin at this point, in
11 Ohata?

12 MR. ZINDA: They -- yeah. I mean, Ohata's Figure 1 is incredibly
13 cartoonish. It is supposed to be a depiction of the nanotubes in the resin, I
14 suppose, after they've been mixed to entangle them -- try to entangle them.

15 JUDGE OBERMANN: And you can't do anything else to them at
16 this point, right? They are what they are. You're not going to be able to
17 further separate them when they're stuck in the resin, are you?

18 MR. ZINDA: I don't know about that, Your Honor. I do know
19 that, after the -- they're mixed in the resin and we -- our position is they're
20 fully coated -- and we have a lot of evidence to show that that I'll get to. But
21 once you mix them with the resin, you mix them with NMP, which is a
22 -- which is a dispersion medium, and it does, in fact, dissolve. It doesn't
23 fully dissolve, but it's used to spread the PVDF domains throughout the
24 composition so they can act as a conductive glue. I don't know if the form
25 of the nanotube structure is going to change much during that process. I

1 don't exactly know the answer to that, so.

2 JUDGE OBERMANN: That's okay.

3 MR. ZINDA: And so I'm going to skip this. And here's another
4 point, Your Honor, is I asked doctor -- Dr. Zhu -- this is Slide 17. I said,
5 What is the definition of discrete carbon nanotubes in your own words?
6 Well, I don't think we really need to have a definition for this discrete. So
7 they had a chance to tell us what the definition they think applies from the
8 spec. They've never raised that issue. They actually didn't -- the first time
9 I've seen them even point to that definitional issue is in their slide deck for
10 this hearing. So I think that's a -- that's an argument they came up with at
11 the last minute. There's never been an assertion by Petitioner that there's a
12 definitional language in the spec.

13 JUDGE OBERMANN: I know, but we have one. And I mean,
14 that's the one issue that I think the board has to get right, regardless of what
15 the parties argue. And if I see a definition in the spec and it's got
16 definitional language, there's very little that can be done with that.

17 MR. ZINDA: Understood, Your Honor. And I think our -- I stand
18 by our position earlier that I think, if you read the spec as a whole, and the
19 knowledge of a POSITA would understand that that can't be what the
20 inventors meant, so.

21 JUDGE OBERMANN: Okay.

22 MR. ZINDA: So let me just -- I'm going to get going and skip
23 ahead. One thing I want to point out is they did allege that we took an
24 inconsistent position. And so this is actually Petitioner's Slide 14, and they
25 argue that we took an inconsistent position on the meaning of discrete in our

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1 infringement contentions. And they reproduced two SEM images out of
2 many SEM images that were taken, and they all allege, well, this shows that
3 they're not arguing discrete is inconsistent with the way they're proposing
4 them in the IPR proceedings.

5 We'll go to the next slide, which is MRD Slide 22, and what you
6 will see is that we identified the CNTs that were fully separate and isolated.
7 And that's actually -- these are original highlightings from the contentions.
8 These are not added for the IPR. This is how they were accused in the
9 litigation. And these are just a few. There's a lot of figures where we have
10 -- specifically where there are specific isolated CNTs that have been
11 identified. And so their reliance on those two SEM images is quite
12 remarkable because both experts and Petitioner itself have acknowledged
13 that, when you have an SEM image and you have a -- you have depth to it,
14 right? So you have CNTs behind other CNTs and they're all -- there's a lot
15 of depth to this. It's a 3D environment and you're taking a 2D SED -- SEM
16 image. You can't fully -- you can't tell if they're touching because of the
17 separation in the depth of -- due the depth perception.

18 When you look at the higher magnification SEMs like the ones we
19 just looked at, you can clearly see that there are CNT's not touching. They're
20 not. And there were no CNTs that were touching that were identified by the
21 Patent Owner. And so I think that's just sort of a sleight of hand, because
22 they actually rely on that principle, the common -- they call it the common
23 sense principle that, when you look in an SEM image, the depth perception
24 is skewed. They rely on that in the other IPR proceeding, and so it's just
25 ironic to me that now they're trying to use that against us to say that we took

1 inconsistent positions.

2 And finally, Your Honor, on the issue of discrete, the '483 claims
3 recite discrete, non-agglomerated, and exfoliated, and at least in one of their
4 petitions, they take the position -- I believe it's the '924. They flat out come
5 out and say that Dr. Zhu said they all mean the same thing. They all mean --

6 JUDGE OBERMANN: Which slide are we on?

7 MR. ZINDA: Slide 26, Your Honor. MRD Slide 26.

8 They took the position that discrete, non-agglomerated, and
9 exfoliated mean the same thing. Well, that's not consistent with Federal
10 Circuit law. Federal Circuit law is that, if you have two different claim
11 terms in a claim, they're presumed to have different means. So to equate
12 those all to mean the same thing is just -- that's not consistent with the way
13 the claims use it, and in fact, it's not consistent with the fact that those words
14 do have different meanings.

15 JUDGE KALAN: But are they mutually exclusive or is there
16 some overlap? What would --

17 MR. ZINDA: Yes, Your Honor. I would say that they're -- they
18 -- they're not mutually exclusive. A discrete carbon nanotube, for example,
19 would be non-agglomerated and it would be exfoliated. It has to be. It has
20 to be exfoliated to become discrete and it has to be non-agglomerated to
21 be discrete. So there is some overlap between those terms, but that -- the
22 point is they don't have the exact same meaning. And you know, during
23 the deposition, Dr. Zhu consistently tried to, like, conflate them all as if they
24 meant the exact same thing. I mean, look, if they have evidence of that, they
25 should have presented it in the record, because I -- other than his bare

1 testimony, there's nothing in the record that shows these three terms are
2 treated the same by people with skill in the art.

3 Now, with that, Your Honor, if the board has no other questions on
4 discrete, and I'll give you all a moment, I would like to move on to the next
5 kind of central issue.

6 JUDGE OBERMANN: I'm good with that.

7 MR. ZINDA: Thank you, Your Honor. So the Ohata-Kavan
8 grounds permeate and overlap with all three IPR petitions. And I'm on Slide
9 28. And so what I've done is I just highlighted those grounds in red to kind
10 of show, you know, how they cover a lot of ground in all three of these
11 petitions. And the arguments we made in our -- all three of our responses
12 and sur-replies are pretty much identical across the board on these, unless
13 there's, like, a dependent claim difference. Pretty much identical across the
14 board, the same evidence, and so there's not really any risk that we're going
15 to -- we're going to mix evidence from one proceeding with another that
16 shouldn't be.

17 So what I'll first do, Your Honor, is I'd like to talk about Ohata at a
18 high level. This is Slide 30. And the -- Ohata actually tells us expressly the
19 problem that it is trying to address. It talks about how it's not -- in the prior
20 art, they would mix a conductive material such as carbon black with a
21 binder to help uniformly disperse the carbon black within the binder, and
22 then they would put that binder in an electrode, right? They would use it to
23 attach to the active material and attach the active material to other active
24 material particles and to the current collector. The problem with that is that
25 carbon black is just a little bit more fragile. It's -- it tends to break apart and

1 then when you have -- instead of having these linked-together chains of
2 carbon black, they kind of scatter everywhere and you just don't get the same
3 level of conductivity that you really are looking for. And on the right, it
4 -- this is a -- the right figure there, Figure 6, is not from Ohata. It's from the
5 Liu reference. But we believe it is very consistent with what Ohata is
6 describing. And we would -- just wanted to have a visual illustration of,
7 kind of, what the problem Ohata is saying that he's trying to overcome.

8 And so what does Ohata recognize? Well, he says, well look,
9 carbon black. Highly conductive. A -- very strong. Doesn't tend to break
10 apart. I can use that instead of carbon black. But he also recognizes that a
11 problem with carbon nanotubes is they're difficult to disperse. And so he
12 basically says, well, okay. Rather than me mixing everything together once,
13 I'm going to mix the carbon nanotubes with the resin first, because the resin
14 can actually help disentangle them. And then I'm going to mix the
15 conductive resin with the active material and disperse it within that. So --

16 JUDGE OBERMANN: And what's the active material? Carbon
17 black?

18 MR. ZINDA: The conductive agent -- a conductive agent or they
19 also call it conductive additive, that is the carbon black. The active material
20 in Ohata could be a variety of things. It -- they talk about all -- I think
21 lithium, cobalt, salt is one of them.

22 JUDGE OBERMANN: All right. Okay.

23 MR. ZINDA: Just various active -- I would honestly say, I don't
24 think the active material in Ohata really matters. And even in their
25 combination, they're taking the active material from Kavan and plugging it

1 into Ohata. So in -- but what we've responded to is, we responded to that
2 combination of that active material from Kavan.

3 And Figure 1 of Ohata, this is Slide 31 -- oh. I -- I'm sorry. I
4 should've told this -- told you this a minute ago. Going to Slide 31, this is
5 where he -- where Ohata talks about -- in paragraph 4 he talks about how
6 you can have, superior conductivity with a small amount of conductive
7 material, yet with high capacity. This is all about using carbon nanotubes
8 instead of carbon black. And the first step in his process is this masterbatch
9 process.

10 JUDGE OBERMANN: So when they -- when -- in paragraph 4
11 where he says, a small amount of conductive material, he's talking about
12 those nanotubes?

13 MR. ZINDA: Correct, Your Honor. He's talking about the
14 masterbatch process and I'll get to that in a minute. More specifics is, five
15 parts carbon nanotubes up to 20 parts nanotubes mixed with at minimum, 80
16 percent resin. That -- and that's how you -- that's how the masterbatch is
17 created. Then that composition is then mixed with the active material in the
18 NMP solution to disperse it. And then you have the glue globules gluing
19 everything together.

20 JUDGE OBERMANN: And what's the glue globules?

21 MR. ZINDA: That is the PVDF.

22 JUDGE OBERMANN: So that is not going away without being
23 dissolved? You're going to get there.

24 MR. ZINDA: Yeah. I will get there and I will tell you, Dr. Zhu's
25 -- I mean, it doesn't disappear. And I think that's a -- the kind of a lingering

1 misconception in the briefing -- their briefing is, it doesn't magically vanish.
2 This is not like the ACME cartoons where the coyote drops into acid and
3 there's just bones left over, right? That's not how it works. The resin stays
4 in the composition.

5 The only purpose of the NMP -- and I agree, the NMP does go
6 away, but the only purpose of the NMP is to break the resin apart so that you
7 can disperse it throughout the electrode, so that you have glue contact points
8 throughout. I mean, that's the only reason the NMP is there.

9 JUDGE OBERMANN: So you're basically thinning it with this?

10 MR. ZINDA: Excuse me?

11 JUDGE OBERMANN: You're basically thinning the paste?

12 MR. ZINDA: I would say -- I think that's a fair way to say it, is
13 thin it. But -- and one of our arguments is, you can't -- their position that
14 you fully dissolve it doesn't make any sense because if you fully dissolve the
15 PVDF, what is going to hold stuff together? Like if you have just individual
16 little molecular -- molecules of PVDF all over the place, they're not big
17 enough to actually hold anything together.

18 JUDGE OBERMANN: And did you have some evidence that this
19 PVDF is going to bind to those oxidized sites pretty strongly?

20 MR. ZINDA: We do. We have evidence that it bonds -- that
21 PVDF bonds to -- PVDF bonds strongly to normal CNTs and even more
22 strongly to CNTs that have been oxidized.

23 JUDGE OBERMANN: Okay. Thank you.

24 MR. ZINDA: And -- but I want to make a point. That is not even
25 if the board was to find that wasn't true, I think we still win.

1 JUDGE OBERMANN: Why?

2 MR. ZINDA: Because they would still be coated. They don't have
3 to be bonded to be coated in resin. That's -- that -- that's a reason -- that's a
4 reason, an argument, that we made to dissuade the argument that you could
5 just easily melt the PVDF off. But we still believe that it would be coated. I
6 mean, you don't have to have -- if I take Elmer glue and put something in it,
7 like, it's a gooey, viscous, glue substance. It's going to coat it, whether it's a
8 stronger coating because of a bond is, kind of, a different issue, right? So I
9 want to just go to slide --

10 JUDGE OBERMANN: But being bonded would prevent that site
11 from being available for -- to the lithium bonds?

12 MR. ZINDA: Correct, Your Honor.

13 JUDGE OBERMANN: Okay.

14 MR. ZINDA: And I -- on Slide 32, I -- this is not in dispute, but
15 this is just a slide I put together to show that in every single example in
16 Ohata, the weight percentages of CNT to the PVDF binder, all fall within
17 that range at the beginning of the path. So there's not an example where
18 there's 60 percent CNT to 40 percent binder. No. It's always that 20
19 percent, at most, CNT to 80 percent, at minimum, PVDF.

20 JUDGE OBERMANN: And they haven't suggested a modification
21 that would change that at all?

22 MR. ZINDA: Correct, Your Honor. And in fact, in most of these
23 combinations, they haven't -- they initially did not propose modifications
24 and now I will get to it. There are ones where they are completely changing
25 their theories and I will point that out when I get to it. But for this one, they

1 have not changed their theory on that.

2 JUDGE OBERMANN: That's very helpful, because I know that
3 the Federal Circuit doesn't look kindly on changing the thrust of the
4 challenge in a reply brief.

5 MR. ZINDA: Yes, Your Honor. And we think that that's
6 happened at least once. So I will get to that in a moment. And now I'm
7 going to go to Slide 33. This is Ohata talking about the dispersion medium.
8 So just to back up a little bit, remember, we've already made the
9 masterbatch. The masterbatch has the CNTs in it and now we're going to
10 take this masterbatch composition and we're going to take this dispersion
11 medium and mix it together with the masterbatch and the active material.
12 And that disperses the PVDF binder in the CNTs in that overall active
13 material composite. Go ahead.

14 JUDGE OBERMANN: The substance that they claim dissolves
15 the PV -- what is it? PV --

16 MR. ZINDA: PVDF, Your Honor.

17 JUDGE OBERMANN: -- DF, is that from Kavan or is that in
18 Ohata?

19 MR. ZINDA: That is in Ohata. And the point I want to make here
20 is, Ohata refers to NMP, which is the -- that is the substance they refer to as,
21 you know, completely dissolving the PVDF. Ohata repeatedly refers to that
22 as a dispersion medium. He has one sentence where he says, it easily
23 dissolves the PVDF. And we don't disagree with that. We agree that it does
24 easily dissolve it, but it doesn't fully dissolve it. It doesn't dissolve it into
25 little molecules that would be so small they wouldn't actually be able to

1 function as the glue that we've already shown you from the prior art. It's got
2 to be viscous. It's got to be big enough to hold things together. And so the
3 only reason I highlighted this passage here was just to show that, even at the
4 higher level, Ohata talks about the NMP as a dispersion medium. There's
5 one sentence where he says it easily dissolves the NMP -- the PVDF.

6 And so now, turning to Kavan, Kavan has a fundamentally
7 different process. And the reason that Kavan's process is fundamentally
8 different is, Kavan actually mixes his nanotubes in water, and then he adds
9 the active material in, right? So you have naked, functionalized nanotubes
10 in Kavan that are mixed with active material. The reason he does that is
11 because it allows the active material to anchor you could say it the other way
12 around, it allows the oxidized nanotubes to anchor to the active material.
13 That's why he -- and he even refers to it, and I'll get to it in a moment, he
14 refers to those nanotubes as naked. Ohata never says his nanotubes are
15 naked. And the reason is, they're in PVDF.

16 So -- and I'll note that Kavan does rely on PVDF, 5 percent by
17 weight. So he's using that as a binder, but he does not embed the nanotubes
18 in the PVDF before mixing with the active material. And so the order of
19 mixing is very important. It's actually remarkable that Dr. Zhu testified that
20 the order of mixing does not matter at all. He said you could start with A, B,
21 C, D or D, B, C, A. And I just think -- I don't even think you need to be a
22 scientist to know -- if you've ever baked a cake you know that's not true.
23 The order of mixing is important. And there's a -- the reason Ohata mixes in
24 the order he does, he tells us in his spec. He says, I want to disperse the
25 nanotubes more easily by mixing with the resin first. And then Kavan just

1 doesn't do that. Kavan says, I'm just going to anchor and I get some
2 dispersion from the oxidation so maybe I don't need to do that step of Ohata,
3 right? So there -- it's an important distinction.

4 In Slide 36, I'm just highlighting the part where -- and I believe
5 Petitioner did this as well, where Kavan actually talks about the anchoring of
6 the nanotubes towards the titanium dioxide, which is one of the active
7 materials they're plugging in to Ohata. And then also, he talks about naked
8 nanotubes are easily recognized. And they're naked because they're not
9 covered. Now, a really important issue in -- across all of these proceedings
10 with respect to Ohata-Kavan is this issue of attachment. Is that whether
11 -- and our position is simple. And let me first start with the way they
12 proposed their combination, because I know there were a lot of questions of
13 their Counsel about how they were combining things and I just want to make
14 sure we're clear about how they are combining Ohata and Kavan.

15 So on Slide 38, I just highlighted where they specifically say, The
16 Ohata-Kavan combination uses -- composition uses the teachings of Ohata
17 as a starting point. And then they go on to explain exactly what that means.
18 And so what they're doing is, they're taking the nanotubes of Ohata as is,
19 oxidizing them, per the teachings of Kavan, and then they're using those
20 oxidized nanotubes in the masterbatch of Ohata. Which again, we contend
21 completely coats them in resin. And so that's a very important point for this
22 part of the arguments, because the key dispositive issue on Ohata-Kavan,
23 separate and aside from discrete, it has nothing to do with discrete, is
24 whether the oxidized CNT -- oxidized CNTs of Ohata-Kavan -- of the Ohata
25 electrode paste would be fully coated with resin. If the answer is yes,

1 Petitioner does not dispute that it cannot prevail on the Ohata-Kavan
2 grounds.

3 And Your Honor, you asked -- Judge Obermann, you asked the
4 Counselor -- Counsel, did you have any other theories? If it is fully coated,
5 do you have any other theories? And they don't. And I -- he honestly
6 answered, they do not have any other theories to address that issue. If --

7 JUDGE OBERMANN: I'm sorry, what issue?

8 MR. ZINDA: The issue of whether or not if the CNTs, the
9 oxidized CNTs, of Ohata-Kavan are fully coated in resin, as we as Patent
10 Owner contend, they don't have any counterpoint to that.

11 JUDGE OBERMANN: No. I heard that.

12 MR. ZINDA: I just wanted to make -- I agreed -- and I agreed that
13 they were 100 percent above board on that issue. I just wanted to point it
14 out. It's a dispositive issue in argue on Ohata-Kavan. And so what I've done
15 is -- they had a lot of arguments and they had a lot of clips from their
16 arguments and their briefs. What they didn't really have a lot of were actual
17 pieces of evidence in their presentation. And so what I would like to do, just
18 briefly, is walk the board through the evidence we presented that
19 demonstrates, I think very clearly and very visibly, that when you mix CNTs
20 with a large volume of resin, you coat them. And that the resin is
21 -- completely coats the CNTs.

22 And starting first with MRD-2013. And this is Slide 40. Sorry,
23 Your Honor. On the bottom right there, that's a figure of heat-activated
24 PVDF. And I think -- I don't know if anybody has ever owned a lava lamp?
25 I know they were popular in the '90s, but that's kind of what it looks like, a

1 lava lamp. And that's because it's these globules of PVDF floating around.
2 That's what it looks like.

3 And when you take it, going to the next slide, Slide 41 -- what you
4 can see here is there's four figures. There's A, B, C, and D. Now A is just
5 PVDF. And what you see in A is, the PVDF again, it presents itself as
6 globules or domains of material. It is not -- it is not, like, individual little
7 particles that are uniformly dispersed throughout. And that's by design.

8 On the right, B, we have functionalized carbon nanotubes. And as
9 you can see, they're highly entangled because you look at -- it to me, as
10 though they're raw, bundled carbon nanotubes.

11 JUDGE OBERMANN: When you say functionalized, they've
12 been oxidized?

13 MR. ZINDA: Correct, Your Honor. And just to be clear, the prior
14 art uses the word functionalized and oxidized, kind of, interchangeably.

15 And then Figure C is 2 percent functionalized CNTs in 98 percent
16 PVDF. And I -- granted, these are not the -- and we're not saying this is the
17 exact composition of Ohata. We are just using this to show you how
18 embedded and encoated those -- the CNTs would be when you're talking
19 about a large volume of resin. And at 2 percent -- and then on the right
20 there, it's just a zoomed up image, you can see that the CNTs are fully
21 entrained within that PVDF. There are no CNTs that are sticking out. That
22 -- and that's just the nature of when you embed them in a viscous substance
23 like that. And even the text of this reference says, and this is the very
24 bottom of Slide 41, microspheres of polymer have been formed throughout
25 the composites and carbon nanotubes are homogeneously dispersed within

1 the polymer 3D scaffold. That is the polymer matrix that forms the domains.

2 Going to 2011, MRD-2011, page 3. This is on Slide 42. I like this
3 exhibit a lot, because it actually shows you different concentrations of CNTs
4 in PVDF. And you can actually see that, as you go from Figure B, which is
5 3 percent CNTs -- I'll call them fat fingers, right? They look like fat fingers
6 because you've heavily coated each CNT, because you've got less CNTs in
7 there. You go to 5 percent. Still coated, but not as coated. Then you go to 9
8 percent. Still coated, not as coated, but you can still see that there's coating
9 on all of the CNTs. There are no naked CNTs in this image.

10 MRD-2012, which is on Slide 123. Again, it -- you can see that
11 PVDF is a -- the best way I can describe it, it's a very viscous substance.
12 And it's got to be heated because you need to melt it down to make it to
13 where you can actually flow it a little bit, to get -- to mix it up. And so that
14 -- this image is 3 percent by weight, the CNTs and PVDF matrix.

15 Now, in addition to just the mere -- the fact that when you mix a
16 lot of PVDF with CNTs, you're going to have -- they're going to be coated,
17 we've also presented evidence that when you mix CNTs with PVDF, there's
18 actually a strong interaction between the two. MRD-2009 talks about how
19 the PVDF molecular chains would coat onto CNT surface due to the strong
20 interaction between PVDF and CNTs. And I'll note that even in MRD-2009,
21 that -- it has NMP in it. So even with the NMP in it, it still strongly coats
22 onto the surface of the CNTs.

23 And MRD-2009, I do not believe -- it does not follow the
24 -- Ohata's unique process where it mixes all the CNTs with the masterbatch
25 -- to make the masterbatch first. I think it's more of just throw everything

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1 together at once. So it's actually -- you know, Ohata is actually a little bit
2 more extreme because it starts with so much PVDF and just CNTs and no,
3 NMP.

4 JUDGE OBERMANN: What is the NMP again?

5 MR. ZINDA: Sure, Your Honor. I feel bad. I can't remember the
6 -- what the actual word, because I've used NMP so much. NMP is the
7 solvent that Ohata uses to disperse the masterbatch throughout the -- it's part
8 of the electrode material paste.

9 JUDGE OBERMANN: So you're saying -- so that's the solvent,
10 so?

11 MR. ZINDA: Correct. You can call it a solvent and there's
12 different types of solvents. There's organic solvents. There's all different
13 kinds.

14 JUDGE OBERMANN: And so you're showing us this to show
15 that, even if you were to throw the nanotubes and the resin and the solvent
16 together, you'd still have a fully coated CNT; is that correct?

17 MR. ZINDA: Correct, Your Honor. And I have -- we have -- I
18 have a few more slides that actually are very specific to that issue, because I
19 think we've got overwhelming evidence that they're coated in the
20 masterbatch process and they're not magically uncoated at the end. We have
21 a lot of visual evidence for that, that they have no evidence to rebut it with,
22 except Dr. Zhu's testimony. And I'll get to that in a little bit.

23 Another exhibit, LGES-2014. This is one of their exhibits that
24 talks about how CNTs are completely covered with matrix. That matrix is a
25 resin matrix because it's been mixed with resin. And resin generally is, I

1 mean, I think in all cases -- I'm not aware of any resin that's not, like, a
2 viscous substance. I mean, it's supposed to be because it's being used as a
3 glue type material.

4 And so we also have the testimony -- this is Slide 44. We have the
5 testimony of Dr. Chung who explained that when you oxidize CNTs, you
6 actually get an even stronger bond with PVDF because of the dipole
7 interaction between the highly polar fluorine-carbon covalent bonds of the
8 PVDF molecules and the presence of functional groups. And I believe
9 we've cited references that show that when she testified to it.

10 And Dr. Zhu at the bottom here, while he did not testify that there
11 was a strong bond, he did at least concede that when you mix resin with
12 carbon nanotubes, he said, I agree that resin covers significant amount of the
13 surface of the carbon nanotube. So even he has to acknowledge that it
14 covers the surface. Now, he wouldn't say the whole surface and I don't
15 know how it couldn't cover the whole surface when you're talking about
16 ratios like those in the Ohata-Kavan masterbatch. But he -- even he
17 conceded that it's a lot of coverage.

18 And now going back to this whole issue, I believe all the slides that
19 I just went over, kind of, prove the point that, when you mix PVDF with
20 CNTs, they're completely coated. Now, what happens in the next step?
21 When you go to the next step of Ohata-Kavan where you actually create the
22 electrode material mixture paste, that is where Ohata takes the masterbatch,
23 which has the CNTs embedded in PVDF, and he mixes with active material
24 and NMP, right? And that -- the purpose of that is to disperse the PVDF
25 throughout -- or we'll call it the masterbatch. Disperse the masterbatch

1 throughout the composition so that you have these conductive glue-like
2 particles throughout that hold things together. And he calls it a dispersion
3 medium throughout his specification.

4 And to answer your question, Your Honor, earlier, NMP is N-
5 Methyl-2-Pyrrolidone. And it's a tough -- it's a tough one to remember for
6 people who aren't chemists, like me.

7 So Your Honor, if we go to the next slide, which is Slide 46, the
8 -- their -- you know, one of the key pieces of evidence they rely on is this
9 one sentence from Ohata that says, The masterbatch was easily -- was easily
10 dissolved. And they cling onto that as if it means you completely dissolve
11 the PVDF to where -- like, the CNTs have no PVDF enrollment,
12 everything's naked and it's just little particles of PVDF throughout the
13 composition that are uniformly mixed. That's simply not true. I'm going to
14 show you some slides that show what happens when you put NMP in a
15 mixture. But I wanted to point out here that, if look at Ohata as a whole, it
16 consistently calls it a dispersion medium. It is true that NMP dissolves
17 PVDF, that's why you use it to help disperse PVDF, but it doesn't fully
18 dissolve it.

19 And in fact, if we look at -- this is actually a bigger Figure 6 from
20 the Liu reference that we've talked about earlier, it mixes carbon black with
21 PVDF-NMP Solution. This is Slide Number 4. I'm sorry. I had to -- I
22 jumped back pretty far because I wanted to use this slide again. So Slide
23 Number 4, which is the Figure 6 from the Liu reference, which is MRD-
24 2008. And --

25 JUDGE OBERMANN: And why is this a tie-in to what we just

1 talked about?

2 MR. ZINDA: Yes, Your Honor, because if you look, it mixes
3 PVDF, NMP, and carbon black. And look at the figures, they -- it is still a
4 viscous glue in between the active material. Even in this cartoon figure,
5 that's illustrated.

6 JUDGE OBERMANN: And so the active material are the
7 spheres?

8 MR. ZINDA: Correct, Your Honor.

9 JUDGE OBERMANN: That would be like your lithium?

10 MR. ZINDA: That would be like the titanium dioxide in their
11 Ohata-Kavan combination that they're relying on as the active material. And
12 part of the reason they do that is because Kavan likes the titanium dioxide
13 because it's better for anchoring, right? And so that's part of the reason they
14 picked it from the Kavan reference.

15 Now, another reference -- well, the same reference actually, MRD-
16 2008. And I hate to do this, but we're going to jump to Slide 47. Slide 47,
17 this is actually a quoted passage from MRD-2008. And it talks about, it flat-
18 out says, initially acetylene black, which is carbon black, by the way. It's
19 another word for carbon black. Is mixed with NMP and PVDF. And then if
20 you go to the very end, In this form, the binder has previously and
21 preferentially bonded to the carbon black. So PVDF even bonds to carbon
22 black particles. Even when you mix it with NMP, it bonds. It's not
23 surprising. It's supposed to be a glue.

24 Now, I think these might be the most important -- you know, I
25 guess I don't want to categorize importance of exhibits, but this one's pretty

1 important. This is Slide 48. This is actually -- these are CNTs that have
2 been mixed in PVDF and they have been -- and they're functionalized and
3 they've been introduced to NMP. And if you look at these, all of these
4 figures still show that the CNTs are coated. That fuzzy web-like substance
5 that's on those long, little strands that are throughout the SEMs, that's the
6 PVDF coating on the carbon nanotubes. And you can see that there are no,
7 quote, unquote, naked carbon nanotubes in this composition.

8 JUDGE OBERMANN: Where -- what -- when I'm looking at this,
9 can I see the carbon nanotubes?

10 MR. ZINDA: No, Your Honor. You can't actually see them
11 exposed because they're covered in the -- they're covered in the PVDF. If
12 you look at the -- you'll see, I'm trying to think of a good way to zoom in on
13 this and maybe show it, but you can see how they're like strands, sort of,
14 embedded in there. Let me see if I can zoom in. You see these right here,
15 like this strand here?

16 JUDGE OBERMANN: Counsel is referring to the upper right D
17 diagram?

18 MR. ZINDA: Yes, Your Honor. I think you can see it in the lower
19 left as well. I'm just focused on this one because maybe it's a little easier to
20 see. But you see how these little strands throughout, those are the carbon
21 nanotubes that are coated in resin. So they -- I mean, they're in there, but
22 they're not naked. They're not naked like Kavan describes them because
23 these are completely coated in resin. Let me zoom out.

24 And Your Honor, the same thing with -- this is MRD-2000. Same
25 exhibit but page 8. These are additional figures. And again, you can't see

1 the carbon nanotubes because they are entrained within that PVDF
2 molecules or they call them molecular chains, which is Slide 49.

3 And then going to Slide 50, which maybe this one's better. Maybe
4 it's a little easier to see in this one. MRD-2011 shows different volumes.
5 We've already talked about this evidence, but I think it's important because
6 this is post NMP. The NMP has already been introduced. Even 3 percent, 5
7 percent, 9 percent nanotubes, all of those you can still see the CNTs are
8 coated. They're more heavily coated in B because you have less nanotubes,
9 right? So there's more coating on each nanotube, but then as you increase in
10 concentration of nanotubes, the coating gets thinner, but it's still there. 5
11 percent, that's within allotted range. 9 percent, that's within the 5 to 10 -- the
12 20 percent of Ohata. So there's no evidence on the record that when you mix
13 NMP with a masterbatch as described by Ohata, you're going to eliminate
14 the coating.

15 JUDGE OBERMANN: And we know that the solvent has already
16 been added here?

17 MR. ZINDA: Yes, Your Honor. It is in the text -- it is in the text.
18 I did not produce the text here. I triple-checked that to make sure I wasn't
19 giving you all a slide that was misleading. And I -- I'm 100 percent sure this
20 is post NMP.

21 I'm going to skip this one and then going to MRD -- this is Slide
22 52. And if you all have any questions, please feel free to stop me. I know
23 I'm moving a little bit fast now, but there's a lot of evidence to cover here.
24 Slide 52, this is a CNT-PVDF-NMP composition and as you can see on the
25 left -- in the middle figure there, the SEM, again, it's -- you can see the

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1 CNTs have this kind of, webby coating all over them. There are no naked
2 CNTs. And this reference even says, In a CNT-PVDF-NMP suspension,
3 PVDF molecular chains would coat onto the CNT surface.

4 JUDGE OBERMANN: And this is from the reference itself?

5 MR. ZINDA: Correct, Your Honor. That's a quote.

6 JUDGE OBERMANN: From 2009?

7 MR. ZINDA: Correct, Your Honor.

8 JUDGE OBERMANN: Okay. What is 2009, by the way?

9 MR. ZINDA: I have to look up -- let me pull it up. We have a lot
10 of exhibits. Sorry for not knowing it off the top of my head. Let me pull it
11 up.

12 JUDGE OBERMANN: And you cited this in your response on
13 this?

14 MR. ZINDA: Correct, Your Honor, we've -- everything that we
15 are including has been cited. So it's an article entitled Binder -- Binder-
16 Assisted Dispersion of Agglomerated Carbon Nanotubes for Efficiency.
17 And to be frank, Your Honor, the only reason we cited this was to show
18 what it looks like, right? To show the effects of mixing PVDF, CNTs, and
19 NMP. It wasn't -- there might be some greater meaning to this reference that
20 just, we haven't analyzed it for that. I do know that it -- that that is an
21 accurate representation of what it says.

22 I'm going to skip these slides just for time. Now, so Your Honor,
23 you asked earlier, I think you asked the question to this effect about what
24 happens to the PVDF when you mix the NMP in it, right? And this is Dr.
25 Zhu's testimony. I asked him, this is Slide 53, That doesn't mean that the

1 PVDF is removed from the mixture, correct?

2 No, it's not.

3 I asked him -- and I asked him to clarify or asked for a little more
4 clarification, and he said again, so no, it would not be removed from the
5 mixture.

6 So the notion that there's some sort of, like, acid dissolution and
7 the PDF just disappears, is just not true. And in fact, you really don't want
8 that because if it disappears, where is your binder? Remember the PVDF is
9 the glue, right? The CNTs help with structural integrity and they help with
10 conductivity, but the binder is the actual glue. If you just had CNTs, I mean,
11 you're going to have an incredibly brittle product. It's going to, kind of, just
12 fall apart because you don't have anything holding everything together.

13 So their only evidence, this is --

14 JUDGE KALAN: Counsel, question: is the upshot of this
15 evidence that every site that would be -- on a CNT that would be capable of
16 accepting a crystal of lithium-ion active material is taken up by PVDF in this
17 process and not an accessible --

18 MR. ZINDA: Correct, Your Honor. It would be -- the CNTs
19 would just be coated in resin. And if it's coated in resin --

20 JUDGE KALAN: No matter --

21 MR. ZINDA: -- it can't -- go ahead. I'm sorry.

22 JUDGE KALAN: -- no matter how much NMP is flushed through
23 the system?

24 MR. ZINDA: I honestly don't know if -- I mean, I guess if you put
25 enough NMP and you let it sit there for long enough, I don't know if that

1 would completely remove it. I haven't seen any evidence of that.

2 JUDGE KALAN: Okay.

3 MR. ZINDA: I mean, that's all I can say, is -- and they had the
4 opportunity to bring -- and to be honest, they had an opportunity to bring any
5 evidence they wanted in their reply. Any evidence they wanted as
6 Petitioner, which is, you know, obviously feels a little unfair to the Patent
7 Owner, but they could have brought anything they wanted in. And you'll see
8 they didn't really provide much evidence other than Dr. Zhu's testimony.
9 And I think that itself, is quite telling as to -- I mean, why couldn't they just
10 go find a reference that shows what would happen? Why couldn't they just
11 do a simple experiment to show that it wouldn't be covered in resin? I -- you
12 know, I think those are questions that are good ones, so.

13 And to that point, I'm going to go to slide -- I'm jumping to Slide
14 32 of Petitioner's demonstrative exhibits. And I mean, this is the only
15 evidence they have. They have Dr. Zhu saying it was well-known -- It is
16 well known that PVDF is highly soluble in NMP. Okay. We don't disagree
17 that it's soluble in NMP. We just disagree that you would completely
18 dissolve it or remove the coating of CNTs from the CNTs.

19 He also says, for instance, PVDF is fully dissolvable in NMP at
20 concentrations greater than or equal to 10 percent by weight. We address
21 this in the papers. We didn't find anything in the references he cited that
22 actually support that. In fact, if you look, he cites to Ohata, which Ohata
23 doesn't say anything about the concentrations of -- or how much dissolution
24 the NMP accomplishes. It -- so I don't know how that could possibly
25 support what he's saying here. Again, they could've gotten any reference

1 they wanted if it existed. They could've gotten it. And they didn't. They
2 just relied on a paragraph from Dr. Zhu.

3 LGES 1062, I'm not going to get into it. We referenced it in our
4 brief. We couldn't find anything in that reference that supports that you get
5 full dissolution at 10 percent NMP. And certainly not full dissolution at 10
6 percent NMP in the specific composition of Ohata-Kavan.

7 JUDGE OBERMANN: I'm looking at this Slide 32 and
8 somewhere it says that you get full dissolution?

9 MR. ZINDA: Correct, Your Honor.

10 JUDGE OBERMANN: Where is that? Is it highlighted?

11 MR. ZINDA: It's -- he says, yes. For instance, this is paragraph
12 14, top left of Dr. Zhu's testimony. The declaration testimony. PVDF is
13 fully dissolvable in NMP concentrations greater than or equal to 10 percent
14 by weight. We think that's just unsubstantiated.

15 JUDGE OBERMANN: Okay.

16 MR. ZINDA: And we've shown you images of -- SEM images
17 where NMP has been used and there's still clearly coating.

18 JUDGE OBERMANN: Are they -- is the NMP used in your
19 showing at equal to 10 percent by weight?

20 MR. ZINDA: I don't recall if it was at 10 percent by weight, it
21 might actually have been much higher than that. I don't recall the number.
22 But the point is, is we've shown that it -- when you introduce NMP, it does
23 not dissolve the coating off of the resin. It does break the resin up. That's
24 what the -- that's the -- what it's supposed to do. That's what you use it for,
25 but it doesn't melt the coating off of the CNTs. That's our point.

1 JUDGE OBERMANN: Okay.

2 MR. ZINDA: And I just wanted to point out, like, really, this is
3 their kind of key evidence and I think it's rather weak. Now, they have other
4 evidence that say -- that they cited as well. This is, again, Dr. Zhu could've
5 brought any evidence in the world he wanted to brought -- bring in. Instead
6 he just casually says, PVDF may not be -- oh. This is Slide 54, Your Honor,
7 sorry. PVDF may not be completely dissolved and will lead to the
8 aggregated undissolved particles and NMP solution. This is a strict
9 condition that a PSITA would try to avoid.

10 So in other words, he's arguing a PSITA would've been -- would
11 not have wanted to have any domains of PVDF at all. They would've
12 wanted it to be fully dissolved. The problem with this testimony is, A, it
13 defies common sense, because how is your PVDF going to hold anything
14 together if it's fully dissolved? But B, he doesn't cite any evidence. He has
15 no evidence cited in this paragraph at all. It is just naked expert testimony
16 coming in to -- trying to undermine our positions.

17 JUDGE OBERMANN: I'm sorry. What slide is that?

18 MR. ZINDA: Yes, Your Honor. This is Slide 54 of MRD's
19 Demonstratives.

20 JUDGE OBERMANN: Okay. Of -- oh. Oh. You read the
21 demonstratives.

22 MR. ZINDA: Yes, Your Honor. Patent orders.

23 JUDGE OBERMANN: Thank you.

24 MR. ZINDA: And just to be clear, these are -- none of these are
25 new arguments. We have -- every time we've seen things in their brief

1 where we think their expert is saying things that are unsubstantiated, we've
2 pointed them out. And when we think they're incorporating arguments that's
3 improper, we've pointed it out. It's only a few instances, but that is in the
4 record already.

5 So Your Honor, again, I just -- paragraph 14, the highlighted
6 language is him essentially saying that a PSITA would've wanted to fully
7 dissolve the PVDF. But again, he cites no evidence to support it. There's
8 not a single exhibit cited in that paragraph.

9 JUDGE OBERMANN: And this is slide?

10 MR. ZINDA: 54 of MRD's demonstratives -- Patent Owner's.

11 JUDGE OBERMANN: I may have gotten to the wrong slide.
12 Thank you. Okay. Thank you.

13 MR. ZINDA: And again, we talked earlier -- and this is where
14 -- so I think Petitioner knows they got a problem. They got a problem
15 because they didn't account for Ohata's very unique masterbatch process,
16 where it, you know, coats these CNTs and just a lot of resin. And they don't
17 have any references that keeps that you would ever oxidize CNTs in that
18 particular environment. I think there's a good reason for that. And that's
19 part of the reason that we think they haven't carried the burden.

20 But their own -- their expert, Dr. Zhu, actually took the position
21 that the order of mixing doesn't matter. Like, the -- and I talked about this
22 earlier, but I just want to show in Slide 55, this is his testimony where he
23 says, it doesn't matter. You can do -- you can do the -- you can do the
24 masterbatch first, or you could do step C before D and this -- that's just not
25 plausible testimony.

1 JUDGE OBERMANN: So this really goes to the motivations to
2 do it, because you wouldn't oxidize it in Ohata?

3 MR. ZINDA: Right? And he's trying to downplay -- I mean, our
4 view is that Dr. Zhu is trying to downplay the significance of the order of
5 steps that Ohata follows. Ohata on one hand, PVDF with CNT as a
6 masterbatch. Kavan, naked CNTs with water, right, and active material.
7 Huge difference. Huge difference in results. And I think their Counsel
8 referred to this as simple chemistry. You know, frankly, I disagree. This is
9 not simple chemistry. This is very complex chemistry. The Petitioner has
10 made a lot of money selling lithium-ion batteries, that -- all of this very
11 complex chemistry. And this is just an example of what happens when you
12 try to, you know, throw two references together and not actually think
13 through what, you know, kind of, what that combination looks like.

14 And one of their other arguments. So you know, we already talked
15 about, we do -- they don't really have any evidence to refute our position
16 about the coating of the CNTs and how that would prevent the attachment.
17 So they have this other theory. The theory is that, well, if the CNTs are
18 coated in resin, they can't physically contact the active material and therefore
19 you wouldn't have any electrical conductivity. Well, that's just scientifically
20 not true.

21 We identified two scientific principles in our surreply. And again,
22 this was in response to that -- the argument they raised in their reply. So it
23 was an argument that we didn't even know they were going to make until
24 they actually made it. But the first is the principle of electron tunneling.
25 And we've cited references in the record that actually explicitly teach that

1 electrons can easily -- this is Slide 56, by the way, Your Honor, MRD-2010.
2 Electrons can easily travel from one tube to another tube without any
3 obstacle through tunneling, when the CNTs are touching each other or very
4 close in distance. They do not have to physically be touching for there to be
5 electrical conductivity. There's physical contact and there's electrical
6 contact, right? You can have things that are spaced apart, and I know in a
7 -- in the everyday world that we live in, I think most people think, well, you
8 got to have contact, right? But we're talking about the molecular level here.
9 And at the molecular level, there are scientific principles that aren't really
10 that well known to laypeople, and this is one of them. Electron tunneling.

11 And we have two references that specifically talk about electron
12 tunneling. MRD-2012 talks about tunnel of electrons as a conduction
13 mechanism in PVDF/CNT. And it's important. These references are both
14 PVDF/CNT composite materials. They are exactly what Ohata is doing.
15 They're PVDF/CNT mixed together. So that's an important thing. The other
16 thing is, Dr. Chung testified to this in her deposition. She talked about how
17 you do not have to have a direct physical contact. They can -- there could be
18 space between CNTs for there to be conductivity.

19 The other scientific principle that we talked about was called the
20 percolation threshold, which is really complex, but at a -- I'm going to try to
21 boil it down to a level that, you know, is easy for me to explain and
22 understand, is essentially, if you have enough volume of a conductive
23 material mixed with a non-conductive material, like PVDF, so CNT is mixed
24 with PVDF, at a certain concentration, that entire composite will be
25 -- become conductive. So even though PVDF itself is not conductive, the

1 entire composite does become conductive. That is very -- admittedly, very
2 counterintuitive, but it is supported by the science.

3 And we've cited several references. And I really like the way
4 -- this is Slide 57, MRD-2011. I really like the way this reference describes
5 it, because I think it's the easiest to understand, is essentially, once you reach
6 the percolation threshold, the dielectric properties of composites transform
7 from insulator-like to metal-like behavior. So now that PVDF that was non-
8 conductive before is suddenly conductive. Same with 2000 --

9 JUDGE OBERMANN: Is Kavan taking advantage of this concept
10 and -- or do we not know that? Like, is it discussed in your spec?

11 MR. ZINDA: It is not discussed in our patent. And honestly,
12 Your Honor, I don't think there's any reason for it to be because, remember,
13 in our patent we don't coat the CNTs in resin, like Ohata.

14 JUDGE OBERMANN: Right.

15 MR. ZINDA: So there's no reason -- I don't think there was a
16 reason for the inventor to describe this phenomenon. I -- we actually do
17 have -- I will get to it in a minute. There are -- is a prior art reference to
18 when we've already talked about the --

19 JUDGE OBERMANN: So why are you talking about this? Is this
20 to demonstrate that Ohata really does have CNTs that are not touching?

21 MR. ZINDA: It's to demonstrate that if you -- if the CNTs are
22 coated -- they've argued that if the CNTs are coated in resin, it wouldn't
23 work. There's no conductivity. And our counter to that is, that's wrong.
24 There's electron tunneling, and then there's this percolation threshold, both
25 of which -- and that's the -- by the way, that's the goal of Ohata. He -- he's

1 -- he wants a conductive binder. It's just like the Liu reference. Liu puts
2 carbon black in his PVDF, to make it a -- he calls it a conductive glue, right?
3 And that's exactly what Ohata's doing. So -- and then -- and we also have
4 Dr. Chung -- so we have two objective pieces of evidence that clearly
5 support the existence of percolation threshold, particularly in this exact
6 application of CNTs and PVDF. That's MRD-2011 and MRD-2014. But
7 then we also have Dr. Chung who testified to this in her deposition. And she
8 essentially testified, you have to view the master batch composite, the
9 CNT/PVDF composite, as if it's one material, because you have a CNT filler
10 material, and then the PVDF. And as you increase the amount of CNTs, the
11 overall composite material becomes more conductive.

12 And another important point is -- this is Slide 58. Our evidence
13 also shows that the -- you don't even need that many CNTs to get to the
14 percolation threshold. So MRD-2011, at 5 percent CNT to PVDF volume,
15 you have reached the percolation threshold, according to this reference.
16 Another reference, MRD-2012, at 3 percent, you reach the percolation
17 threshold. This is the Gan reference, which they combine with Cheng, talks
18 about 5 percent or less, and even 1 percent or less, can significantly -- what
19 is it? Significantly increase electrical conductivity.

20 So all of this shows is that at Ohata's minimum amount of CNTs, 5
21 percent, you are already at that percolation threshold level. You should
22 already have achieved increased conductivity of your binder, to do exactly
23 what Ohata's trying to do and what the other references we talked about have
24 done before, too.

25 Now, they repeatedly rely on Dr. Chung's testimony, and they try

1 to portray her as agreeing that you have to have physical contact. I'm
2 putting up on the -- Slide 59, she was explicitly answered -- asked that
3 question, and she answered it exactly as you would have expected her to
4 answer it based on what we've just discussed. She said no. And she
5 explained that it's because Ohata is trying to form a more conductive form of
6 binder. And so the CNTs do not have to stick out. The binder itself is
7 conductive.

8 Now, I cross-examined Dr. Zhu in the -- in these proceedings.
9 Slide 60, Dr. Zhu acknowledged electron tunneling, and he explained
10 electron tunneling consistent with the way I just explained it to the board.
11 And he also acknowledged the percolation threshold, that Slide 61 shows his
12 testimony, where he gives a very -- I think a very accurate description of
13 what the percolation threshold is.

14 Now, the only counter they have to our position on electron
15 tunneling and the percolation threshold is Dr. Zhu offered testimony on
16 redirect, in the second deposition of three, a full day after he was asked
17 about electron tunneling in an earlier deposition and percolation threshold.
18 He came back and he said, well, if we consider -- and this is Slide 62. If we
19 consider a lithium battery, this is typically a microscopic device, and I don't
20 think the tunneling effect actually plays any part in the role of these
21 microscopic devices. Well, he doesn't even explain why that's true. I -- he
22 never explains why it is he thinks that electron tunneling doesn't work in
23 lithium-ion batteries, and he certainly never says that he disagrees that the
24 percolation threshold is applicable. I don't believe they even got him to give
25 testimony on redirect about that.

1 So we have several references that teach electrode tunneling,
2 several references that teach the percolation threshold, and their only rebuttal
3 evidence is Dr. Zhu's redirect, maybe like two paragraphs of him explaining
4 this in a way that is not even -- it doesn't even explain the why. Okay,
5 they're tiny, microscopic devices. Why does that matter? All the references
6 I showed you all that have the electrode tunneling and the percolation
7 threshold, those are all microscopic -- you know, microscopic compositions,
8 too. They involve nanotubes. They involve PVDF molecular chains. So it's
9 just -- it just feels like it's testimony to undermine our position, but it doesn't
10 actually explain how it actually does.

11 Now, in the briefing, they had -- there were a lot of discussions
12 about electrical bridges and electrical connections and --

13 JUDGE OBERMANN: What -- I saw the electrical bridging, and
14 that's different from electrical -- from the tunneling.

15 MR. ZINDA: It is, Your Honor. The electrical bridges are
16 actually -- the nanotubes themselves can act as a bridge, and you can't have
17 tunneling across the --

18 JUDGE OBERMANN: And that's when they're touching?

19 MR. ZINDA: Excuse me, Your Honor?

20 JUDGE OBERMANN: Is that when they're touching?

21 MR. ZINDA: Electrical bridging --

22 JUDGE OBERMANN: Is the electrical bridging when the
23 nanotubes are touching?

24 MR. ZINDA: I don't think they have to touch. I think that's just
25 -- that just means that the nanotubes themselves act as an electrical bridge.

1 They don't have to be -- again, they could be like this, they could be like
2 this, and they could be touching the active material. They could be.

3 JUDGE OBERMANN: Okay.

4 MR. ZINDA: And that would all be electrical bridging.

5 JUDGE OBERMANN: But it's okay if they're not touching too?

6 MR. ZINDA: Correct. If -- presuming they're not too far apart,
7 right? There is a -- there is a distance at which -- obviously the further apart
8 two things are electrically, you know, the further apart, the resistance is
9 higher, so they can't be far apart. But if they're sufficiently close, you can
10 still have conductivity. If you have a layer of -- a thin layer of PVDF
11 separating your nanotube from your active material, that's -- in our view,
12 that's not going to affect the conductivity at all. And that's actually what
13 those percolation threshold references show.

14 Now, the only point I want to make about this whole electrical
15 versus physical thing is, we agree -- and this is Slide 63. We agree that there
16 must be electrical contact between the active material and the conductive
17 additive. We agree that there should be electrical contact. But electrical
18 contact is not the same as physical contact. You can have electrical contact
19 without there being physical contact between two things. I think one
20 example I give -- obviously, this is not a micro example, but if you think of a
21 power line, you have a -- you have a power line and you start to open a
22 breaker, you'll see an arc of electricity, right? So I mean, that's just a lay
23 example that shows, you don't have to have -- granted, those are incredibly
24 high currents, but in this molecular environment, they can be close together
25 and still have conductivity as well. And I used to work for the power

1 company, so I like that analogy.

2 Now, Dr. Zhu also testified that -- to rebut our position -- try to
3 rebut our position, he testified that the active material in the CNTs have to
4 touch, because -- physically touch, due to the relatively low intrinsic
5 electrical conductivity of the active material itself. And that's line 64 -- I
6 mean, Slide 64. I'm sorry, Your Honor. And the point I want to make about
7 this, first off, the percolation threshold and electron tunneling completely
8 undermines that position. I mean, the percolation threshold itself dictates
9 that, if the binder itself is conductive, that provides conductivity to whatever
10 it's touching. And that's the whole point of the percolation threshold, is to
11 have a glue that's not conductive become conductive.

12 But secondly, he testified in his deposition on cross that not all
13 active materials have low conductivity. In his declaration, he made it sound
14 like they all do, and he kind of assumed that's the case. But in his
15 deposition, he acknowledged that, no, there are some that have good
16 conductivity and some that don't.

17 JUDGE OBERMANN: Does this go into the opinion that Dr. Zhu
18 has that electrical contact as equivalent to physical contact?

19 MR. ZINDA: I would say -- I would say no, Your Honor.

20 JUDGE OBERMANN: What is this about? This testimony --

21 MR. ZINDA: This slide is just about -- one of their arguments is
22 that the active material is low conductivity, right? So that's these titanium
23 dioxide particles, low conductivity, right? And then you've got these
24 nanotubes, which are high conductivity. But because of the low
25 conductivity of the active material, they got to touch. That's their position.

1 And our position is that, first off, Dr. Zhu admitted that not all
2 active material have low conductivity. And secondly, even if they did,
3 we've already explained the percolation threshold and electron tunneling.

4 JUDGE OBERMANN: I think I'm confused, because he says in
5 paragraph 10 electrical contact, but he really means physical contact?

6 MR. ZINDA: Well, I'm sorry, maybe I should have put -- yeah, it's
7 confusing, because he uses the word electrical contact, but when you read
8 the briefing, he's clearly talking about physical.

9 JUDGE OBERMANN: Okay.

10 MR. ZINDA: I think it's very confusing, and we pointed that out,
11 that that's -- we don't disagree with him that you have to have electrical
12 conductivity. We agree with that. But if you're going to treat electrical
13 conductivity as if it means physical, that's where we say you're wrong.
14 That's -- we disagree with that. And I -- yeah, I understand, Your Honor.
15 That can be confusing.

16 And then one final point on this issue, Your Honor. And boy, I
17 really burned up all my time on this issue, but I think it's an important one.
18 So Slide 65, there's one question that they -- I know they don't have an
19 answer to, because they haven't answered yet. Claim 6 of the '909 patent
20 and Claim 8 of the '483 patent require, without clustering on a dimension
21 scale less than one micrometer. And there -- I don't think there's a dispute
22 that that means you have to have a certain -- a minimum amount of spacing
23 between your carbon nanotubes. Well, their position that you have to have
24 physical contact -- if you have to have physical contact between carbon
25 nanotubes, then why would Ohata-Kavan even try to achieve what Claim 6

1 and Claim 8 require? Why would it even try to achieve carbon nanotubes
2 that are spread apart by one -- more than one micrometer?

3 So my point is that the theories are not consistent at all. They say
4 you have to have physical contact, but then they say, oh, but for Claims 6
5 and 8, it would've been obvious that you would spread them out and not
6 have physical contact. That's just -- it doesn't -- those two theories don't jive
7 together. And the -- because I'm running low on time, I think I'm going to
8 jump ahead.

9 Were there any questions on the issue of attachment? I'm more
10 than happy to answer those before I move on.

11 JUDGE OBERMANN: I'm hesitant to open a can of worms, but
12 this idea that there has to -- that there -- that they can interact from a
13 distance. Does that have anything to do with the definition of discrete?

14 MR. ZINDA: I do not believe that it does, Your Honor. I think
15 that's an issue that is -- at least the disputes have all revolved -- that issue has
16 been about this attachment issue, as far as I can recall.

17 JUDGE OBERMANN: Okay. Thank you. So I don't think we
18 have anything else on that.

19 MR. ZINDA: Thank you, Your Honor. So I'm going to move
20 ahead. Just give me one moment to figure out where I want to go, because I
21 know I'm low on time.

22 I'm going to hop back real quick, this is Slide 70, to the term
23 discrete. And this is not claim construction. This is just the application of
24 -- their application of discrete carbon nanotubes to Ohata-Kavan. I just want
25 to make a quick -- a few quick points.

1 One, if the board agrees with our construction that the nanotubes
2 have to be separate, then they haven't -- they don't have any
3 counterarguments that they can win on. And in fact, if you look at their
4 reply brief, they didn't even argue that they could win under that
5 construction. They just argued that our construction was wrong. And I'm
6 actually -- got a -- the little excerpt I have here is from their reply brief, and
7 they go straight into just arguing we're wrong on claim construction. So
8 they've never argued -- or at least now they're saying they've never argued
9 that Ohata teaches -- Ohata-Kavan teaches separated-out nanotubes. That's
10 the first point.

11 The second point, and I believe Judge Kalan asked this earlier, or
12 alluded to this earlier with the question to Petitioner, was about the -- there's
13 a master batch process in Ohata, and Figure 1 -- this is Slide 71. Figure 1 of
14 Ohata shows -- Figure 1A -- I'm sorry, Figure 1B is what they're relying
15 almost exclusively on for their arguments about discrete. Whether it's our
16 definition or their definition, that's what they rely on primarily. And as we
17 pointed out in our reply -- in our Patent's response and in our surreply, the
18 problem with that is the master batch does not have the active material in it.
19 Remember, there is the master batch, and then there's the additional step of
20 mixing active material with NMP and the master batch to get the final
21 electrode composite of Ohata.

22 And so the Figure 1 that they keep relying on, Figure 1B, we don't
23 think they have sufficient evidence to show that that's how your actual final
24 composition would look. In fact, look at Gan. Gan is trying to achieve a
25 percolated network of CNTs. That is the same objective of Ohata. If Ohata

1 -- if I go back to Slide 71, if Ohata had nanotubes that weren't touching,
2 according to them, it just wouldn't work. And the reality is Ohata was trying
3 to create a percolated network of CNTs throughout its binder to increase
4 conductivity. That's its goal. So Figure 1B of Ohata is not showing you the
5 final composition. It's showing you an intermediate step. The final
6 composition, we believe, would look more like Gan, Figure 5, which is on
7 Slide 72, where your nanotubes are now all interconnected, because that's
8 the goal of Ohata.

9 JUDGE OBERMANN: So you're saying that -- and is this argued
10 somewhere in the briefing, that the organization of the nanotubes changes
11 during this process, to become non-discrete?

12 MR. ZINDA: Correct, Your Honor. Or maybe even a -- I guess a
13 more favorable way to say it for us is that they just haven't shown that it
14 maintains that composition. And honestly, it's kind of crazy to think that it
15 would, because you're doing additional mixing, right? You're doing
16 additional mixing with active material, so obviously your carbon nanotubes
17 are going to be rearranged. And the arrangement that Ohata is trying to
18 achieve is a network of carbon nanotubes, because he wants to increase
19 conductivity. That's our only point. And I think that's -- if you were to boil
20 down our argument on this in -- into one or two sentences, it would be that
21 they overly rely on Figure 1B of Ohata as evidence that the final
22 composition would be discrete. They kind of ignore that there's a second
23 step, that's additional mixing with active material, that would change how it
24 looks.

25 JUDGE OBERMANN: Okay. And so in other words, I'm looking

1 at Claim 1, and it's clear that you need discrete carbon nanotubes that have
2 the lithium-ion attached to the surface. And what's your evidence -- if you
3 have any. I understand you're the Patent Owner, and you don't need to put it
4 in. You're saying that they haven't demonstrated adequately that that final
5 product does in fact have a discrete --

6 MR. ZINDA: Correct.

7 JUDGE OBERMANN: -- arrangement? Do you have any
8 evidence that it doesn't?

9 MR. ZINDA: Your Honor, the evidence -- the -- I think -- I don't
10 remember if we had other evidence, but the one that I thought was worth
11 putting in our presentation is on 72 --

12 JUDGE OBERMANN: The Gan.

13 MR. ZINDA: -- and this is a Gan reference. And this is -- Gan is
14 -- and remember, they combined Gan with Cheng, so it's clearly a relevant
15 reference. But Gan is trying to achieve a percolated network. That's exactly
16 what Ohata's trying to do. And Gan actually talks about how, when you
17 oxidize the nanotubes, it draws the CNTs closer together. So what does that
18 mean? It means it broke -- it brings them into closer contact with one
19 another. So we functionalize the CNTs of Ohata-Kavan, they're going to be
20 closer together than they appear in Figure 1B. But then you have the
21 additional step where you mix the active material. So now you're
22 completely changing the composition up more, the organization of the CNTs
23 and where they are.

24 So I guess my point is, you can't just rely on Figure 1B, cartoon
25 representation, and say, oh, it's going to be these really perfectly separated-

1 out nanotubes. That's -- we don't think that's how it would actually work. It
2 would -- they would come together and form a network, because that's what
3 Ohata's trying to do.

4 So Your Honor, with the final ten minutes I have, I don't think I'm
5 going to get to Lee-Wepasnick or Cheng-Gan. We're more than happy to
6 rest on the papers. We feel very strongly about those arguments. But
7 obviously, this ground is -- permeates to all the proceedings. If the judges
8 have any questions about those references, I can try to answer them now.
9 And there's one other claim I want to get to.

10 JUDGE OBERMANN: I don't think we have questions.

11 MR. ZINDA: Thank you, Your Honor. So the -- there's one claim
12 -- this is Slide 73, Claim 6, Dependent Claim 6 of the '909 patent requires
13 uniformly dispersed -- discrete carbon nanotubes are uniformly dispersed
14 without clustering on a dimension scale less than one micrometer. That
15 same limitation appears in claim -- independent Claim 8 of the '483 patent.
16 So this is an issue that is specific to those two proceedings and those two
17 claims.

18 Now, you -- and this is Claim 6, and again, Claim 8 has the
19 virtually identical limitation. So I'm just putting Claim 6 up here. You think
20 about this claim as two parts. One part is uniformly dispersed. Have they
21 shown that? And then the other part is, without clustering on a dimension
22 scale less than one micrometer. So first off, I want to go to uniformly
23 dispersed. This is straight from their petition. And what you'll notice in the
24 first sentence of Slide 75, sorry, it -- what you'll notice is they quote Ohata,
25 and it says, Any conducted material is uniformly pre-dispersed in a binder.

1 That's a quote that they take from paragraph 2 of Ohata. They then rely on
2 that quote, and it permeates all the way through their arguments. All of their
3 arguments about uniform dispersion are tied back to paragraph 2 of Ohata,
4 and Ohata allegedly teaching uniform dispersion.

5 But if we go to the next slide, what we'll see is that paragraph 2 of
6 Ohata is not about carbon nanotubes. paragraph 2 of Ohata is talking about
7 how the prior art uniformly disperses carbon black in PVDF binder. In fact,
8 nowhere in Ohata does it ever say, teach, or suggest that the carbon
9 nanotubes are uniformly dispersed. And so essentially, what we have here is
10 a situation where they relied on paragraph 2 of Ohata for all of their
11 arguments. They misinterpreted it as if it was referring to carbon nanotubes,
12 when in fact it was referring to carbon black, which is fundamentally
13 different from a dispersion perspective. Remember, carbon black is, I
14 believe, easier to disperse, but it's weaker, more brittle, and breaks apart,
15 right? So easier to disperse. So Ohata's talking about how you can
16 uniformly pre-disperse carbon black and PVDF binder, but then Ohata talks
17 about how hard it is to disperse carbon nanotubes, right? And he never
18 describes the carbon nanotubes as being uniformly pre-dispersed.

19 And so our position here is simple, that they haven't carried their
20 burden, because they relied on the wrong paragraph of Ohata. Ohata says
21 carbon black can be uniformly pre-dispersed. It never says carbon
22 nanotubes are. And that's the -- that's their evidence.

23 Now, in their reply -- this is Slide 78. In their reply, Your Honors,
24 they have a -- they completely changed their theories. So this is from their
25 reply, and this is them responding to our position. And they say, As

1 explained in the petition a POSITA would have expected the nanotubes in
2 the hottest master batch to be uniformly pre-dispersed. That's not what they
3 said in the petition. They said Ohata says it's uniformly pre-dispersed, and
4 then they relied on that statement for all of their arguments. But it doesn't
5 actually say that. It says carbon black is uniformly pre-dispersed.

6 And that makes sense because carbon black is easier to disperse.
7 Carbon nanotubes are not. So that first green highlighted sentence is just not
8 in their petition, and they came back in their reply and tried to fudge up their
9 petition to make it seem as if they made an obvious argument that they never
10 made.

11 The second argument they make is that we overlook that a master
12 batch process is a conventional approach known to uniformly disperse an
13 additive in a matrix material. Okay. They cite to Ohata LGES paragraph 3.
14 That's the same -- that's the paragraph that talks about carbon black, too. It's
15 not talking about nanotubes. And secondly, the other exhibit they cite to is a
16 new exhibit they added in reply that was not cited in their petition. So it's
17 entirely new evidence. And that itself is indicative that they are trying to
18 change their theory midstream. And so all we ask here, Your Honor, is they
19 be bound to the theory they put in the petition. They said Ohata teaches
20 uniform dispersion of carbon nanotubes. We proved it doesn't. They should
21 lose on that issue.

22 And finally, they have this argument where they say, oh, well,
23 Petitioner -- Patent Owner's infringement contention showed that they're
24 applying uniform -- or uniformly dispersed in a way that's inconsistent with
25 what we're doing in these proceedings. That's not true. Here, our Slide 79,

1 numerous SEM images we have. They picked one SEM image where the
2 nanotubes look kind of close together, and they didn't look at any of the
3 other ones where we show that the nanotubes are dispersed throughout the
4 composition. And of course, if you take an SEM image of 1/1000th of a
5 composition, you're going to be able to find parts where it doesn't look like
6 they're spaced apart very well. So, you know, we think that's just a
7 mischaracterization of our infringement contentions.

8 So that's uniformly dispersed, Your Honor. I'm on Slide 80. The
9 other issue with this Claim 6 and Claim 8, Claim 6 of the '909 patent and
10 Claim 8 of the '483 patent, is this without clustering on a dimension scale
11 less than one micrometer. And I cannot emphasize this enough. This is
12 different from uniformly dispersed. This -- without clustering limitation,
13 they haven't disputed it, our expert testified to it, and theirs did, too. This
14 has to do with how far apart the CNTs are spaced. And our -- what -- our
15 argument is that this requires that the CNTs be spaced apart by -- the
16 discrete CNTs be spaced apart by at least one micrometer. Why is that?
17 Because that's how you -- that's how this claim is delineating what is and is
18 not clustered. If you're more than one micrometer apart, you're not clustered
19 with another CNT. So as far as we're aware -- go ahead, Your Honor.

20 JUDGE OBERMANN: So for Claim 6, is there any dispute that
21 these have to be completely isolated?

22 MR. ZINDA: I -- they have not argued that our interpretation of
23 this claim is wrong. And in fact, they -- I think if you read their petition,
24 they sort of -- they do this thing where they don't want to tell you what
25 anything means, and so they give you all these alternative constructions.

1 They gave -- so one of the constructions they gave for this, which was
2 implicit, is they argued, well, this could mean that the clusters can't be more
3 than one micrometer in size. And then the alternative one that they gave
4 was, well, that they're spaced apart by more than one micrometer. Our
5 expert testified that they would understand it to mean spaced apart by more
6 than one micrometer. That's what without clustering means under this claim
7 limitation. Their expert agreed that the limitation has to do with -- that it has
8 -- requires significant distance between the CNTs. I personally don't see
9 how it couldn't require separation, because if we're talking about the space
10 between two CNTs -- I mean, if they're touching, the space is zero. So I
11 think that -- hopefully that answers your question.

12 JUDGE OBERMANN: So at least for Claim 6, we are talking
13 about discrete individuals separated --

14 MR. ZINDA: Correct. Correct, Your Honor. And we've argued
15 in our briefing on claim construction. It that this claim itself is evidence that
16 our construction is reasonable, right? Because we have -- now you have a
17 claim that doesn't just require discrete, it requires that they have to be spaced
18 apart by a certain degree, a certain level of discreteness, if you will.

19 JUDGE OBERMANN: But that would require us to read into
20 Claim 1, which is a much broader claim that --

21 MR. ZINDA: Agreed.

22 JUDGE OBERMANN: -- that clustering is not allowed.

23 MR. ZINDA: I agree with Your Honor, but I think, from my view
24 at least, it at least strongly suggests that the inventors -- the discrete was
25 envisioned to require some degree of separation. I'm not saying that the

1 limitation should be read in. I just think that it's a natural limitation to come
2 from the broader claim under our interpretation.

3 JUDGE OBERMANN: Well, I don't know about that, because
4 they knew how to say without clustering in Claim 6, and they didn't say it in
5 Claim 1.

6 MR. ZINDA: Correct, Your Honor. But this claim is not just
7 without clustering, it's without clustering on a dimension, so it's just very
8 specific degree of cluster. I see your point, though. I -- it's well taken, Your
9 Honor. I think we've beaten discrete like a dead horse.

10 I -- I'm going to -- I'm going to try to finish. I have two and a half
11 minutes left. I'm going to try to get through this. So this issue, Your Honor,
12 we also think is a very straightforward issue. And honestly, I think this is
13 maybe the weakest position they have, and they've done -- frankly, I don't
14 think they've really directly responded to our key argument on it. So we
15 talked about how this -- without clustering, on a dimension scale of less than
16 one -- less than -- about 1 micrometer, that's from '483 -- Claim 8 of the '483
17 patent and Claim 6 of the '909.

18 Now, Slide 81 is -- you can see how they're interpreting it. They
19 say, for instance, the nanotubes having the length of 100 micrometers, the
20 space between nanotubes is depicted as greater than one micrometer. They
21 are interpreting it the way we are. Space greater than one micrometer. Go
22 down to Dr. Zhu's testimony, and he specifically -- I asked him specifically
23 about this term. What is your understanding of the meaning of that phrase?
24 So they have to have -- they have to have significant distance between each
25 other.

1 So I think we're all on the same page that this claim involves
2 spacing. So how did they prove it? How did they -- how did they somehow
3 prove, based on Ohata's cartoon figures, no actual SEM images, how did
4 they try to prove that it meets this limitation? Going --

5 JUDGE OBERMANN: And we're going to ask -- and I can give
6 you another couple minutes --

7 MR. ZINDA: Sure.

8 JUDGE OBERMANN: -- but we were on claim -- we were on 81.
9 Oh, is this -- I'm confused.

10 MR. ZINDA: Sure, Your Honor. This is the without clustering
11 limitation, and I'm showing portions of their arguments --

12 JUDGE OBERMANN: Yeah. In 81, oh, I -- okay. I'm sorry. I
13 interrupted. I see it's right on that page. Okay. Go ahead.

14 MR. ZINDA: So as you will see in 81, this -- they apply it the way
15 we interpret it, and we all seem to be in agreement on that. They didn't rebut
16 it in our -- or say that we were wrong in their reply. So --

17 JUDGE OBERMANN: And even witness -- even their witness
18 -- this is their witness on the bottom?

19 MR. ZINDA: Correct, Your Honor. Dr. Zhu. I have trouble
20 saying that. So on page 82, Your Honor, their entire theory on that they
21 claim that they carried their burden on this very specific limitation. And let's
22 make no mistake. It is a very specific limitation. It doesn't just require
23 separation. It requires that you're separated by more than one micrometer.
24 Their entire theory is premised on Figure 1B of Ohata. And on the right
25 -- Slide 82, on the bottom -- on the right side, they actually put a scale bar on

1 there. They put a scale bar on there, because they're using -- they're trying to
2 use Figure 1B of Ohata and argue that the scale is accurate, and that using
3 that scale, you can -- that proves that the final composition of Ohata-Kavan's
4 master batch would have the spacing required by this claim. And if you look
5 at their arguments on the left, they're all about scale. They say, although no
6 scale is provided, a POSITA would've been able to estimate the scale, right?

7 And then they -- and then they mentioned -- they refer back to the
8 figure. The spacing between the nanotubes is depicted as greater than one
9 micrometer. Again, all of these arguments are teed off of and rely on Figure
10 1B having some sort of discernible scale. The problem with that is the
11 Federal Circuit's put the kibosh on it. You cannot rely on a -- the scale of a
12 figure if there's nothing to suggest that that figure was intended to have
13 scale. And in fact, I think it's even more severe here, because they're relying
14 on a cartoon. I mean, that's a cartoon I could have hand drawn in five
15 minutes. It's clearly not a real world representation. It's not intended to be
16 an SEM image. It's --

17 JUDGE OBERMANN: -- I don't want to make arguments for you,
18 but it's also not the final product that has the lithium-ion --

19 MR. ZINDA: Correct, Your Honor. And I was -- that was going
20 to be my final point. You beat me to it. That's true. It is not the final
21 product. So even if they -- even if they are separated by the alleged one
22 micrometer in that image, they're not -- that -- there's no evidence that would
23 be the case when they're mixed together more with the active material.
24 Again, and I don't think they dispute this, Ohata's trying to form a network
25 of CNTs. He wants to have highly conductive glue. So -- and we've cited

1 the case law, and I think the thing that I just want the board to be aware of is,
2 they actually didn't dispute any of these arguments, about scale in terms of,
3 like, that they're not allowed to do it. And they also didn't argue that a
4 POSITA would actually look at Figure 1B and think it's supposed to be
5 drawn to scale. They just kind of abandoned their argument altogether and
6 just ignore our counterarguments. But the one thing that they did do -- I'm
7 going to keep going. These are their slides. I'm going to skip ahead real
8 quick.

9 I'm a little over -- I'm fine eating into my rebuttal time just for a
10 couple of minutes, Your Honor. So one thing they did to try to counter us
11 -- you know, they -- this is Slide 84 -- is they rely on this Epstein case. It's
12 In re: Epstein 32 F.3D 1559, it's a 1994 Federal Circuit case. And they
13 argue, well, Epstein says that the spec of a patent is not very explicit or clear
14 about what a limitation means. That the Petitioner's allowed to just not have
15 to show that in the prior art. They can just kind of assume it's there because
16 it wasn't shown in the patent. But that's not what Epstein says. In Epstein,
17 the prior art taught the limitation. The Patent Owner argued it wasn't
18 enabled. And the Federal Circuit said, wait a second. You're saying it's not
19 enabled, but the disclosure in the prior art is just as good as the one in your
20 path. So you lose on that argument. We are not arguing enablement. We
21 are arguing, they haven't shown the limitation of the prior art.

22 And we were -- I mean, we spent a lot of our brief explaining why
23 they were wrong about Epstein, and then they just went back and doubled
24 down on it in their reply. And I think, you know, I think there's really no
25 valid basis for them to rely on this case for what they're relying on it for.

1 And in our surreply, we also pointed out, we were involved -- I personally
2 was involved in a proceeding against Google where they did exactly what
3 the district's doing here. They tried to rely on this Epstein case to say, oh,
4 Your Honor, we don't actually have to show the limitation of the prior art.
5 You can just assume it's there because we complained that the spec is too
6 vague, right? The patent spec is too vague. The board said, no. The board
7 said, no, you still have to show it in the prior art. It's not enablement. We're
8 not fighting about enablement.

9 And then lastly, Your Honor, I think this is probably -- there's
10 going to be two more slides. Slide 86, another attempt by Petitioner. So
11 we've completely blown up their estimated scale arguments, and shown that
12 they can't possibly carry their burden on that without clustering limitation.
13 So what do they do? They come back in their reply, and they characterize
14 their petition as making arguments that the petition actually didn't make.
15 There's two that they argue that they made that you will find nowhere in the
16 petition. First, if we go to Slide 86, I highlighted one of them yellow. They
17 say the first Patent Owner fails to address the petition's explanation that a
18 POSITA would've found this to be obvious, given the size range of Ohata's
19 nanotubes and Ohata's explicit disclosure that the nanotubes are dispersed.
20 That is just not true. They never made an argument that was separate from
21 the figure. The Figure 1B of Ohata is -- it was fundamental to every
22 argument they made in the petition. And all we're asking is they be stuck
23 with that argument. If the board disagrees with us about the scale fine, but
24 we don't think it's appropriate for them to come back and cite to their own
25 petition and then say they made an argument that they didn't actually make.

1 The second argument that they made is basically an offshoot of
2 that first one. Patent owner fails to contend with the role of Ohata's master
3 batch process in enabling dispersion of nanotubes, which again, given the
4 size, range of Ohata's nanotubes would've rendered the obvious the claimed
5 scale of dispersion. They never argued that, based on anything other than
6 the figures. And by the way, Your Honor, they can't possibly show the
7 generalized teaching of dispersion cannot possibly be sufficient to show this
8 very specific claim limitation is met by the prior art. It's just -- we just think
9 that's insufficient as a matter of fact, and it just -- there's no evidence to
10 support it.

11 And with that, Your Honor, to your point, Judge Obermann, that
12 you made a little earlier, our final probably maybe most important point on
13 this is that they're focused on Figure 1B, which is the master batch. They
14 are not talking about the final composition of Ohata, which I don't think they
15 can dispute would look fundamentally different. Certainly the nanotubes are
16 not going to be spaced apart the way they're depicted in Figure 1B after
17 they've been mixed with NMP and the active material.

18 And so with that, Your Honor, I -- I've gone five minutes over.
19 One last slide. This is Slide 88. This is their product. If they wanted to
20 prove that our claims were invalid, they could have experimented to get
21 SEM images like this, or they could have found prior art that actually had
22 SEM images. They tried to take a shortcut and they tried to rely on Ohata's
23 cartoon and, unfortunately, that's just insufficient as a matter of law. And so
24 with that, Your Honor, if you all have any questions, I'm more than happy to
25 answer them. I'm a little over time.

1 JUDGE OBERMANN: No, I think we're okay. I think it makes
2 sense to take a little break here, if everyone's okay with that. What -- would
3 15 minutes or is that too -- 15 minutes? Okay. It is 1:55, let's come back at
4 2:10.

5 (Whereupon, the above-entitled matter went off the record at 1:55
6 p.m. and resumed at 2:10 p.m.)

7 JUDGE OBERMANN: Okay. By my count, Petitioner, you have
8 30 minutes as your rebuttal. I'm going to give you 35 because the Patent
9 Owner did go over and I would like to give them a full 15 minutes if that's
10 okay with you?

11 MR. RENNER: It's fine.

12 JUDGE OBERMANN: Great, so 35 minutes. And I'll start the
13 clock when you're ready to proceed.

14 MR. RENNER: Okay. May it please the Board. Karl Renner
15 again on behalf of the Petitioner. Regarding the construction of discrete, I
16 thought we'd start with that before I ask my colleague to come up and talk
17 about some of the prior art, especially the Ohata grounds. But given the
18 exchange with MRD's Counsel, I thought we'd start with the return to
19 discrete. And at the outset, to the extent Your Honors emerge with questions
20 or concerns over Petitioner's positions regarding this issue, or if you're
21 disinclined to follow the express disclosure that we believe dictates by the
22 patent applicant in the specification, we would appreciate, and I think you'd
23 mentioned it, the possibility to brief and to address the arguments that were
24 raised and the Patent Owner is certifying.

25 But that said, we don't think that MRD's arguments actually are

1 going to require that and we'll talk about a few of the reasons why, and I'll
2 hopefully clarify some things here to help get there. We are sympathetic to
3 your views, frankly. The Federal Circuit case law, I think you're not
4 inaccurate to how it concerns -- the concerns it raises over diverging from
5 language of the type that's found here when it's offered by the patent
6 applicants and their specifications. And with that, I thought we might return
7 to what I've got shown here at Slide 8 of our presentation materials. We'll
8 go back to that language briefly and talk a little bit about it, and then some
9 testimony that bears on it that we maybe touched on in front of the
10 presentation.

11 Here, to focus on the legal question to, kind of, get really more
12 particular on the legal question that Your Honor raises, we do indeed see in
13 this passage, some interesting language. And that language, it comes in the
14 form of, Term X as used herein refers to Y. That's the form you see, kind
15 of, again and again from the applicant in that front end of the specification,
16 the detailed description of it. This is a pattern that they've used and it's not
17 only in respect to this term and these terms that are shown here, but at the
18 outset, they do use this to address maybe how to read the specifications that
19 they've given us. And I'm just not aware of cases that give a lot of license,
20 frankly, to interpret or to apply claims without heeding this kind of directive
21 when it is present as by the applicant. I think Your Honor made that point
22 and I -- we, kind of, were caucusing on that offline and we just aren't aware
23 of that kind of case law.

24 Now, when getting into the substance of the applicant's directive,
25 because we still have to look at what it actually says, we see that they -- the

1 discrete carbon nanotube used herein, it says, refers to are capable of being
2 separate. We've talked a bit about this, but suggestions by MRD's Counsel
3 that an applicant's directive would be rendered meaningless -- would render
4 meaningless to the term are, we believe, wrong and unsupported. They're
5 wrong because MRD contends that processing must be performed to resolve
6 the discrete carbon nanotubes, but MRD's contention doesn't support their
7 conclusion. Consistent record testimony and evidence demonstrates that
8 POSITA would have considered with this -- within this specification that
9 discrete and exfoliated are related alternatives. And I mentioned this in my
10 opening and we'll see probative expert testimony from both experts that
11 agree, we believe, on this point. I mentioned -- and we'll look at this in a
12 moment. For the remote judges, we'll be turning, in a minute, to LGES 1054
13 if it's helpful to have that. I think it would be helpful to have that in front of
14 us all.

15 As we're getting there, I'll just say that from Chung, you may recall
16 me directing attention to page 23 and -- page 22 and 23 of that LGES 1054
17 transcript, where we found Dr. Chung, that's MRD's expert to just orient,
18 acknowledging that no perceived difference exists between the usage of
19 -- by this Applicant of the term discrete and the usage of the phrase discrete
20 and non-agglomerated and exfoliated.

21 JUDGE OBERMANN: What exhibit is that? I'm sorry.

22 MR. RENNER: It should be LGES 1054, Your Honor.

23 JUDGE OBERMANN: Thank you.

24 MR. RENNER: And they went on -- Dr. Chung went on -- and I'll
25 read the relevant transcript in a minute when we have it all in front of us to

1 point out that CNTs are discrete, that if they're discrete, then CNTs are also
2 non-agglomerated and exfoliated. That's the nature of the testimony. So
3 when we look at that, if I could direct you on page 23 here in front of us,
4 lines 4 through 9, and I'll give you the question and the answer.

5 It says -- it says, so. and there was an attempt to ask this question
6 just before, that's why you start off the -- here. But it says, the questioner,
7 So I'm basically trying to ask if there's a difference between the meanings of
8 these two terms, the first term discrete carbon nanotubes, and the second
9 term is discrete non-agglomerated and exfoliated carbon nanotubes.

10 And she says, Unequivocally, no difference. We look a little
11 further down. You see the next meaningful question at 16. And here -- we
12 clarified a little bit here and on page 24, and we'll review that as well.

13 So based on your statement just now, is it fair to say that if you
14 have discrete carbon nanotubes that you necessarily have discrete non-
15 agglomerated and exfoliated carbon nanotubes?

16 Yes.

17 If I go to slide -- page 24, please.

18 And on page 24, it's lines 24 to 28 that we think -- 24 to 28; is that
19 right? It is -- let's see. Sorry. It is lines 14 to 18. My apologies. Remarks
20 14 to 18. If you have discrete -- no, it's the other direction. If you have
21 discrete, non-agglomerated, and exfoliated carbon nanotubes, you also have
22 discrete. The answer, yes. So you can see very clearly and over and over
23 again, we ask just to make sure we're getting it right, that these terms are
24 thought by their expert to be terms that are referencing the same thing. And
25 the same is true for Dr. Zhu, and I'll just give you the cite that his testimony

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1 on the same. It's MRD-2024, 11 to 13 and 15.

2 Now, in essence, what we see, when we look a little kind of deeper
3 or maybe more conversational about it, is these carbon nanotube fibers that
4 they're discrete until they've been exfoliated. Okay. So you asked, I think, a
5 question like, you kind of moved from an agglomerated setting to
6 somewhere, and somehow you get to exfoliated and discrete, right? What's
7 -- how do you make sense of that? Well, our attempt to make sense of that
8 is the patent applicant's specification for us. Our attempt to do that is to say
9 a pre-exfoliated, non-agglomerated mass.

10 Well, when you have that, you have carbon nanotubes that are
11 capable at that phase of being separated. You should after all, you could
12 apply exfoliation to them. So they're not yet non-agglomerated, exfoliated,
13 or discrete, but through exfoliation, carbon nanotube fibers, they become
14 capable of being separated. So they become non-agglomerated, exfoliated,
15 and discrete. And we see again, Dr. Zhu embrace this, and I think we just
16 saw Dr. Chung embrace it as well.

17 I wanted to address this slide as well, but do you have a question
18 that you --

19 JUDGE OBERMANN: No.

20 MR. RENNER: Okay.

21 JUDGE OBERMANN: Just Slide 15.

22 MR. RENNER: Slide 15 of Patent Owner, MRD's slide deck is
23 where we are, and you saw some attention being given to this. So I wanted
24 to return a little attention of our own.

25 Now with respect to the passage that you see here on Slide 15,

1 MRD looks to the testimony from Dr. Zhu from his original declaration, but
2 a careful read reveals that this is unveiling on this point. By focusing on his
3 use of most Patent Owner attempts to establish some sort of admission by
4 Zhu, that some non-discrete -- non-discrete carbon nanotubes are in this
5 image. And -- but appropriately contextualize, when you look at where this
6 is given, it's with respect to the Ohata reference, we can see that this
7 testimony is directed to the process to get Figure 1B, how it aims to get an
8 unraveled and straightened set of carbon nanotube fibers that are illustrated
9 by the figure.

10 And with that in mind, the qualifier most, it's really just an
11 acknowledgement of what our real world constraints. We know that
12 processing like this is just simply never going to be 100 percent. It's never
13 going to be 100 percent of the intended consequence. And as a consequence
14 of that, we know that he could have said all, but that really probably would
15 be an inaccuracy. So you see him hedging here. He's not testifying as to the
16 meaning of the term of the claim, he's testifying in -- as to the -- what's in
17 Ohata. And so it's out of context, but additionally, it's just a careful
18 testimony.

19 JUDGE OBERMANN: It's just not a testimony?

20 MR. RENNER: Careful testimony, Your Honor. I think he's just
21 being a careful expert. Now, there was no questions, I should mention this,
22 there's no questions of moment here. There's nothing being produced here
23 by opponent saying that somehow they asked him about this to clarify, to
24 make sure that this comment made with respect to Ohata was in fact
25 informing of the meaning of the claim term. Nothing like that. This is

1 original testimony. They could have asked him about it. They certainly had
2 opportunities and did not -- chose not to, but now surface this in support of
3 certain prior arguments.

4 Finally, a word on the recitation by the '483 of the phrase, non-
5 agglomerated, exfoliated, and discrete. Now, I kind of just hit this, but I'll
6 -- I just wanted to make sure we're being expressed here.

7 In MRD's argument that the record lacks clarity and evidence, they
8 said, I believe, speaking to how this language was reviewed when grouped
9 together. I -- I'd return attention to the earlier review testimony that you just
10 reviewed from Dr. Chung, which speaks to, we believe, directly at this point.
11 She said again that there's no difference between these terms and discrete.
12 And she confirms that it's fair to say that when you have one, you have the
13 other. Again, that was LGES 1054, pages 23 and 24.

14 Your Honors, I'm happy to take any questions you have about this,
15 but that's all I have on it. And I would invite my colleague to speak more on
16 Ohata if you don't have any.

17 JUDGE OBERMANN: Is it fair to say that dictionary definition of
18 the definition, the spec definition in this particular case isn't quite conclusive
19 on the whole meaning of discrete?

20 MR. RENNER: Oh, well, to the extent that every definition
21 leaves, you know, some details unaddressed, I'd say there could be that, but I
22 think it's pretty clear, and then capable of. That means that it is not
23 demanding that there's necessarily separating. So I think it's very conclusive
24 as to that particular issue.

25 JUDGE OBERMANN: Is that what you think it means?

1 MR. RENNER: Yes, Your Honor.

2 JUDGE OBERMANN: Okay. So it wouldn't contemplate a total
3 mass like we had in Kavan?

4 MR. RENNER: A total mass we have in Kavan?

5 JUDGE OBERMANN: It has to have some exfoliation.

6 MR. RENNER: My apologies. I'm more -- I probably have my
7 -- I'd probably ask my colleague to speak to that who studied more of the
8 prior art disclosure as it relates to Kavan --

9 JUDGE OBERMANN: Okay.

10 MR. RENNER: -- in light of what I've said.

11 JUDGE OBERMANN: Thank you.

12 MR. RENNER: Of course. Any other questions?

13 JUDGE OBERMANN: No.

14 MR. RENNER: Okay. Well, thank you very much, Your -- oh,
15 sorry.

16 JUDGE KALAN: I do have a question. Is it fair to say that
17 perhaps the definition in the spec is not to be disregarded per our governing
18 case law, that it's just a starting point that needs to be enhanced or elaborated
19 on? And if that's the case, I guess we would have to ask the parties to
20 explain what is lacking there. We want to elaborate on it.

21 MR. RENNER: Thank you, Your Honor. We -- we'd certainly be
22 happy to provide whatever be useful to Your Honors, but our view is that it's
23 sufficiently and perfectly elaborate enough to address the issue at hand.
24 They would like the claim to be read to demand separateness and to preclude
25 attachment. And we think that when the specification tells us that, that term

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1 refers to merely capably being separated, it is not -- it is not leaving open the
2 possibility for the construction that they're leaning on, so.

3 JUDGE OBERMANN: That makes sense. So in other words, you
4 would -- we don't need to go further in this case that to say that, that
5 definition makes claims that there can be some attachment?

6 MR. RENNER: Correct, Your Honor.

7 JUDGE OBERMANN: Okay. Thank you.

8 MR. RENNER: Yeah. Judge Kalan, did you have more before I
9 yield to my colleague?

10 JUDGE KALAN: Not at this time. Thank you.

11 MR. RENNER: Of course. Thank you for your attention.
12 Appreciate that.

13 MR. ZINDA: Thank you, Karl. Thank you, Your Honors. There
14 were several sort of points that were made by opposing Counsel. I try to
15 take notes of most of them. I may miss some, but I believe our papers that
16 we filed have good responses to sort of things that were raised today by
17 opposing Counsel.

18 Before I sort of try to address some of them here, there was an
19 earlier discussion about sort of basic chemistry and what is basic chemistry?
20 I did want to remind the panel here that we do have a pretty sophisticated
21 level of ordinary skill that we're applying in these proceedings. And, you
22 know, as you -- as you've heard here today, this area, this technology is not a
23 -- it's not a simple one. It -- it's one that, you know, has some very specific
24 terminologies and concepts and require, you know, a lot of times
25 explanations from experts who know what these procedures would

1 understand.

2 And, you know, for instance, our-- the -- Dr. Zhu's declaration in
3 paragraph 11, you know, talks about at least a master's degree in material
4 science, chemistry, chemical engineering, at least three years of experience
5 in anatomy materials, electric chemistry, batteries and so forth. So it -- it's a
6 somewhat difficult field.

7 JUDGE OBERMANN: Is it an unpredictable art?

8 MR. ZINDA: I don't -- I don't think so, Your Honor, but I think it
9 specific knowledge related relative to batteries is something that is very
10 helpful in understanding the prior art and the claims. And that's something
11 that Dr. Zhu really tried hard to provide here throughout his testimony.

12 Earlier, there was some mention of how the SEM images in the
13 infringement contentions that we pointed to show that there were touching
14 and even attached nanotubes. I think opposing Counsel said that, you know,
15 we couldn't tell from the SEMs that whether they were touching or not. Our
16 expert, Dr. Zhu, did provide some relevant testimony on that, Your Honor,
17 and it's MRD-2043, page 16, line 23, to page 18, line 10. Basically there, he
18 went on to explain how in SEM image -- taking SEM images, you are really
19 taking one slice at a time. So if you're seeing something on an SEM image
20 that is perfectly in focus, as are the images of nanotubes that are touching
21 that it was pointed to, his opinion was that those are really touching, because
22 that's sort of a one dimension in which all of these nanotubes are located.
23 And he provided a testimony.

24 And the second part, and this has -- it is relevant to, I think, a
25 question, Judge Obermann, that you're asking about Ohata and Kavan, and it

1 relates to the use of oxidized nanotubes in Ohata's system. And I think our
2 -- my colleague, Dr. DeVries, earlier, very concisely, I think summarized the
3 process that happened in Ohata to get to its electrode. So I'll skip that for
4 now. But going back to the question of the oxidized nanotubes, I think the
5 question -- one of the questions that you asked was, you know, do we show
6 somewhere that those types of oxidized nanotubes as in Kavan, you know,
7 could be used in Ohata's process? And I think we -- the answer is that, yes,
8 we explained that pretty thoroughly in our petition and declaration. So I did
9 want to point you to -- so referring to the '909 patent proceedings, but we
10 have the same testimony and information in the others as well.

11 Petition at page 11, it refers to Dr. Zhu's first declaration at
12 paragraph 51, 52 and so forth. And starting with paragraph 52 there, Dr.
13 Zhu explains, you know, one of the reasons why he thinks this use of Ohata
14 carbon oxidized, carbon nanotubes would be successful within Ohata. And
15 he says, and one of the reasons is because Kavan is slurry, that it makes
16 -- it's generally similar to -- in composition to Ohata's electrode material
17 paste. And then he kind of goes on to explain why he thinks that is the case.
18 But I think perhaps more persuasive is actually his earlier paragraph,
19 paragraph 51. There he explains why, what he first states his view, which is
20 that the use of oxidized carbon nanotubes in compositions for lithium-ion
21 batteries, what was conventional. And then he proceeds to explain using
22 specific citations to references why he thinks that is the case.

23 You know, of course, the first example, there is Kavan itself
24 where, you know, Kavan has oxidized nanotubes. It also has PVDF. It also
25 has the NMP solvent. So that suggests to him that given the use of all these

1 materials that we've been talking with respect to Ohata, even that Kavan is
2 using it as well in making its battery, is that shows using carbon nanotubes.
3 You know, he thinks that points, or that would indicate to POSITA that, that
4 would indeed be possible and that you wouldn't somehow, you know,
5 irreversibly damage these oxalate nanotubes, because again, same materials
6 being involved here.

7 The other reference that he actually mentions here, and it's an
8 exhibit here, is the SHEEM reference, S-H-E-E-M, and I believe that is
9 Exhibit 1032. And he cites to column 3, various lines of column 3. And
10 sort of an important part there is that, again, SHEEM also is a lithium-ion
11 battery that includes active materials, that includes oxalate carbon
12 nanotubes. And not only that, it also uses NMP as a solution for dissolving,
13 and it also uses PVDF as a binder.

14 So all of that combined, we believe points to, you know, the notion
15 that POSITA, looking at Ohata, looking at Kavan, would have a very high or
16 reasonable expectation of success that the oxidations of the nanotubes as
17 explained in Ohata or in Kavan would also work in Ohata as well. And as I
18 explained earlier, there were many benefits, of course, that would arise from
19 that. And our petition, I think, had, like, five different benefits based on
20 Kavan's teaching itself.

21 So related to that, I saw a slide a bit earlier from -- I think Slide 4,
22 of Patent Owner slides where it shows sort of, you know, active materials
23 with what is, I think, a -- some sort of glue that I think they were equating to
24 the resin material of Ohata. I think, I think this is very misleading, Your
25 Honors. I mean, here it says very clearly that is a conductive glue, and it's

1 not -- there's no dispute in these proceedings from our expert, from their
2 expert that the PVDF resin that is used in Ohata is an insulating material, so.

3 JUDGE OBERMANN: Do you dispute that it becomes conductive
4 what you've done with percolation threshold?

5 MR. ZINDA: Well, Your Honor, so I was going to talk about that
6 a little bit later, but to get to that, first of all, percolation threshold, it -- I
7 mean, it's something that was thrown out really at the last minute. And I
8 was listening to the explanation given by opposing Counsel about that, they
9 were talking about, you add some conductive filler materials to increase the
10 overall conductivity of this larger material. But there, again, what is being
11 added is conductive materials. So there has to be some conductive path that
12 is provided to get conduction. And if you have nanotubes that are fully
13 encapsulated by insulating material, that it -- it's not going to contribute to
14 any sort of improved conductivity in the -- in that material.

15 And then if I -- we could go to our slides, starting around Slide 43
16 -- actually, I might fault you. Before that, if we could, yes, 43. Thank you.
17 And going back to even without the very specific pieces of evidence that Dr.
18 Zhu provided to explain why he thinks the electrode, the battery electrode in
19 Ohata requires electrically conductive nanotubes. He -- on the left side of
20 Slide 43, he goes into explain how, if you have, again, which is what I was
21 saying earlier is that if you have CNTs that are fully embedded, fully
22 encapsulated in a non-conductive material, that electrically isolates the
23 active materials from the nanotubes, and there necessarily has to be a, you
24 know, very reliable conductive path between those two materials.

25 And actually, Patent Owner expert, Dr. Chung, does not dispute

1 that. I mean, how cushy. If we go to the next slide, Slide 44, this is from the
2 deposition of Dr. Chung. And here, I mean, before we even got to the prior
3 art and where, I think some -- should become somewhat defensive, here we
4 were just talking about how batteries work in general, how do batteries
5 work. And here she was giving a very, I think, honest and technically
6 correct answer, which is starting at the top, it says, we asked, does this
7 conductive additive, which by the way, something as a carbon additive is a
8 conductive additive, that she acknowledged. So for this conductive additive
9 to be, is it required that it be in physical contact with the active material?
10 And then she actually went on to explain that, yes, the conductive additive,
11 i.e., the carbon nanotube, needs to be in physical contact with the active
12 material so that the charges can come out or go in of this active material
13 particle.

14 And that's the same, really basic concept for concept of batteries
15 and electric chemistry that I was referring to earlier. And that Dr. Zhu was,
16 of course, relying on in his view of Ohata and how Ohata must work to
17 create the electrically conductive electrode material by the addition of these
18 electrically conducted carbon nanotubes.

19 Next slide, in Slide 45, just to sort of put an end to this, you know,
20 section here, Dr. Zhu was on to explain that, you know, if you were to
21 somehow encapsulate, fully encapsulate all of the nanotubes in Ohata, that it
22 would really lead to a non-functional device, non-functional battery. And
23 that is for the precise reasons that Dr. Chung just explained in the previous
24 slide.

25 Before I move on to the next topic, any questions on that, Your

1 Honors?

2 JUDGE OBERMANN: No.

3 MR. ZINDA: Okay. The next thing I want to briefly discuss,
4 earlier, Patent Owner went through a lot of SEM images, talked about a lot
5 of different references where, you know, allegedly they had carbon
6 nanotubes that were fully encapsulated in some sort of insulating resin
7 material.

8 And, you know, I mean, that's really a red herring there, Your
9 Honors, because we -- we've never argued that it is physically impossible to
10 create nanotubes that are fully embedded in PVDF or other types of resin.
11 Of course you can. And I think on the flip side of that, I think even
12 opposing Counsel acknowledge that if you run the NMP solution long
13 enough, that you would eventually get rid of most of that PVDF there as
14 well. So that -- that's not what's in -- sort of in dispute here. And I think it's
15 really telling that if you look at all of those different examples that were
16 pointed out, there -- there's not a single one of them where fully coded non-
17 insulating carbon nanotubes were being used in a battery context to make
18 better battery electrics. And that is the precise context in which Ohata add
19 nanotubes.

20 So we're not disputing that you can make nanotubes fully
21 embedded so that they're not touching, they're not conducting. It -- it's just
22 completely irrelevant to what Ohata is trying to achieve based on all of its
23 specific objectives and processing conditions and things like that, that it
24 accurately explains.

25 The last point I wanted to make for now is, if we go to Slide 46,

1 you heard some arguments here about tunneling. So again, this is -- it -- it's
2 not something that Dr. Chung, Petitioner's expert ever opined. It is possible
3 in the battery context. And if you actually look at some of the references
4 that are cited, all that those are saying is that, you know, theoretically, if you
5 have two nanotubes that are basically in the atomic length separated, you
6 know, apart from each other, that there can be electrical interactions between
7 those two points, i.e., tunneling. Now, and the notion that somehow this
8 electron tunneling concept can allow the active particles in Ohata, which are
9 these micron-sized particles, by the way, to sort of make the leap and make
10 an electrical connection to a fully insulated carbon nanotube, that's just pure
11 fantasy, Your Honors.

12 There's no reference that supports that, you know, by any stretch of
13 the imagination. And our expert, Dr. Zhu, of course, explained why he does
14 not believe that will take place in the battery electrode context. And he
15 actually did provide some reasons. For instance, the distance scale is very
16 important. For tunnel length to even occur theoretically, the two points, the
17 gap has to be incredibly small. And Dr. Zhu explained that the distance
18 scales involved in this these, you know, microscale battery electrodes, it is
19 just not what tunneling is intended to cover.

20 And so based on that, I think that sort of -- and I think that came
21 out in the last minute, because otherwise, the -- based on -- patent was
22 argument that the nanotubes in Ohata are somehow fully encapsulated.
23 Which, again, we strongly disagree with. You know, I think perhaps they
24 are starting to agree that there has to be electric conductivity. So maybe this
25 is something they came up with at the last minute. But, again, Your Honors,

1 there -- there's no scientific basis that, that is something that can happen in a
2 battery electrode.

3 Yes, by the way that testimony from Dr. Zhu was from his
4 deposition transcript, MRD-2043 at page 14, line 17, to page 15, line 4,
5 among others. So and if -- actually, I'm not sure if Your Honors had any
6 questions about the Lee and Cheng grounds, but if you do, I think Dr.
7 DeVries would be happy to address that.

8 If there are no further questions, then we will yield the remaining
9 time. Thank you.

10 JUDGE OBERMANN: Thank you so much, Counsel.

11 MR. ZINDA: May I approach, Your Honor?

12 JUDGE OBERMANN: Yes, you may. Thank you.

13 MR. ZINDA: Thank you.

14 JUDGE OBERMANN: And I'll give you your full 15 minutes.

15 MR. ZINDA: I appreciate that, Your Honor.

16 JUDGE OBERMANN: If you need it.

17 MR. ZINDA: Just one moment, Your Honor, get situated.

18 All right. I'm ready, Your Honor.

19 Stephen Zinda, again, lead Counsel for Patent Owner, Molecular
20 Rebar. Your Honors, I'll try to be brief. Final last -- you know, last words, I
21 will try to be brief, though. The first issue I want to address is, there was
22 some reference to Dr. Chung's testimony during her deposition where the
23 other side kept representing that she had agreed that discrete, non-
24 agglomerated, and exfoliated all have the same meaning. That's not what
25 she said. I'm going to pull up the testimony so we can take our time and

1 read it very carefully.

2 But she was asked, is there a difference between discrete carbon
3 nanotubes and discrete non-agglomerated and exfoliated carbon nanotubes?
4 She ultimately --

5 JUDGE KALAN: Can you tell us what we're looking at please, for
6 the record?

7 MR. ZINDA: Oh, yes. Yes, Your Honor. So this is in LGES
8 1054. This is the deposition transcript of Dr. Chung. I apologize.

9 And on page 22, starting at line 23, and going down, we'll read
10 from there, I'm trying to get rid of this -- trying to get rid of that. In your
11 view, Dr. Chung, is there a difference between discrete carbon nanotubes
12 and discrete non-agglomerated and exfoliated carbon nanotubes?

13 And if you scroll down, she said, No difference.

14 Well, that's because a discrete carbon nanotube is necessarily
15 exfoliated, it's necessarily non-agglomerated. There is no difference. As we
16 discussed before, discrete, non-agglomerated, exfoliated all have different
17 meanings and they do overlap. An exfoliated -- a discrete carbon nanotube
18 is both exfoliated and non-agglomerated. So they kept pointing to her
19 testimony, and she kept explaining to them, yeah, it's discrete, so it has to be
20 those things already.

21 I just want to make sure the record is clear, she was not agreeing
22 they have the same meaning. And in fact, if we go down to the other -- one
23 of the other quotes that was cited on page 24 of the same exhibit, LGES
24 1054, if you have -- and I read the question very carefully, but we'll start at
25 line 14, down to 17 on page 24, If you have discrete non -- non-

1 agglomerated and exfoliated carbon nanotubes, do you also necessarily have
2 discrete carbon nanotubes?

3 Well, of course you do.

4 They asked her, if you have a discrete carbon nanotube, do you
5 necessarily have a discrete carbon nanotube?

6 Her answer was, yes.

7 It's not a got-you moment for her. It was a straightforward answer
8 to a poorly asked question. And so I just want to set the record straight,
9 because the impression I got from their Counsel up here was that she was
10 agreeing with them that those three terms are interchangeable. And again,
11 that position is not consistent with their new position that you should be
12 adopting the express language from the start. They're taking a -- now they
13 are taking a -- there is a definition claim construction. That is their new
14 position. That was not in their petition. It was not in their reply. It is
15 something that they raised for the first time at this hearing. And they're not
16 even really admitting it. They don't want to tell you they're proposing a
17 definitional construction, but that's what they're trying to do.

18 Now, I want to go to MRD -- sorry. MRD Demonstrative Exhibit,
19 Slide 15. Just give me a moment to get there, Your Honor.

20 All right. So their Counsel got up here and tried to explain away
21 Dr. Zhu's sworn declaration testimony where, as you see here, he says, it can
22 be seen that most of the nanotubes. Not all of them, most. There's no
23 logical way to interpret that other than he does not consider them all to be
24 discrete. I don't know how else you can interpret that. They got up here and
25 tried to explain that he was trying to give safe expert testimony. Well, if

1 that's going to be their position, I just hope that the board considers the
2 credibility of all his other testimony. Because if he's going to get up here
3 and say he didn't really mean what he wrote in his declaration, that's
4 something that should be considered for all of the positions they relied on his
5 testimony for.

6 JUDGE OBERMANN: But if some of them are discrete, isn't that
7 enough to be in Claim 1?

8 MR. ZINDA: I don't disagree with that, Your Honor. It certainly
9 is. The issue I have is that he's clearly not identifying all of them as discrete.
10 He says most of them are discrete, right? And that's not the position they're
11 taking now, though. The position they're taking now is that all of them
12 would be discrete. So there's a clear inconsistency in the way that term is
13 being treated, from their petition to their reply, and now at this hearing. And
14 I just want to -- I mean, it's just, to me, it's a remarkable position to say, well,
15 he didn't really mean what he said. He was just being a careful witness.

16 Okay. Well, where else was he being careful in these proceedings?
17 I -- I'm -- I've never actually heard somebody characterize their witness'
18 testimony that way. Now, I think, Your Honor, that may be all that I have
19 on the issue of discrete.

20 On the Ohata-Kavan issue, the only thing I would like to say is,
21 Petitioner's Counsel got up here and talked to you about electron tunneling,
22 said that Dr. Zhu said it didn't apply in battery context. Just want to remind
23 the board again that Dr. Zhu provided no evidence to support that testimony.
24 And his testimony is like a few -- I guess, like, three paragraphs of a redirect
25 testimony that occurred a full day after his first depo, where he actually

1 testified on electron tunneling. So that's the first thing I want to mention.

2 The second thing I want to mention is, Dr. Zhu never testified that
3 the percolation threshold is not applicable. And they haven't even argued
4 that it's not applicable. So even if the board says, oh, okay, electron
5 tunneling doesn't apply. Despite there being no evidence to actually support
6 that, the percolation threshold evidence still substantiates our position. And
7 so I just feel like we have a lot of evidence, and on the other side, I don't
8 really think there's much evidence at all, other than Dr. Zhu's testimony.

9 And so with that, Your Honors, I'm more than happy to answer any
10 questions you may have.

11 JUDGE OBERMANN: I don't think we have any.

12 MR. ZINDA: Thank you, Your Honors.

13 JUDGE OBERMANN: Well, thank you. Thank you very much.
14 Counsel, I greatly appreciate your presentations today. Again, they were
15 very helpful. I'm so thankful that you're so willing to entertain our
16 questions. I know that we ask a lot, but you both served your clients very
17 well today, and we'll do our best to reach the right result. Final decisions
18 will issue in due course, and the proceeding is adjourned. Have a good
19 afternoon. Please hang around for the court reporter.

20 MR. ZINDA: Thank you, Your Honor.

21 JUDGE OBERMANN: Thank you.

22 (Whereupon, the above-entitled matter went off the record at 3:02
23 p.m.)

IPR2024-01006 (Patent 8,808,909 B2)
IPR2024-01011 (Patent 8,968,924 B2)
IPR2024-01013 (Patent 10,153,483 B2)

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