

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and APPLE INC.,
Petitioner,

v.

RJ TECHNOLOGY LLC,
Patent Owner.

IPR2023-01183
Patent 7,749,641 B2

Record of Oral Hearing
Held: October 22, 2024

Before JON B. TORNQUIST, CHRISTOPHER M. KAISER and
BRIAN D. RANGE, *Administrative Patent Judges*.

IPR2023-01183
Patent 7,749,641 B2

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P R O C E E D I N G S

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JUDGE TORNQUIST: Good afternoon. We're here for an oral hearing in IPR2023-1183, Samsung Electronics and Apple Inc. versus RJ Technology, LLC. I'm Judge Tornquist, and with me are Judges Kaiser and Range. Who do we have from Petitioner?

MR. COLIN: Jeffrey Colin from Greenberg Traurig on behalf of Petitioner Samsung, and with me is lead counsel Andrew Sommer, also from Greenberg Traurig, and John Choi from Samsung is on as well.

JUDGE TORNQUIST: Okay, welcome. And Patent Owner.

MR. YANG: Good afternoon, Your Honors. Mitch Yang on behalf of Patent Owner, RJ Technology. I have with me George Stamatopoulos and Robert Zhou, who will be presenting.

JUDGE TORNQUIST: Okay. Per our oral hearing order, each party will have 60 minutes of argument time here today. We also note that Patent Owner is putting up a LEAP practitioner, so there'll be an extra 15 minutes for that LEAP practitioner to argue here today.

Petitioner, bearing the ultimate burden of proof, will go first, and you can reserve time for rebuttal. Then we'll hear from Patent Owner, who may also reserve a short period of time for rebuttal. Then we'll hear the rebuttal and sur-rebuttal arguments. We have the parties' demonstratives, but please, as you are giving your arguments, identify clearly for the record what page you are on so that record is maintained and is clear.

Okay. With that, Petitioner, when you're ready.

MR. COLIN: All right. Thank you.

JUDGE TORNQUIST: And please just let us know how much

1 time you'd like to reserve.

2 MR. COLIN: I'd like to reserve two hours. Sorry, 20 minutes, I'm
3 sorry for rebuttal.

4 JUDGE TORNQUIST: That was 20 minutes?

5 MR. COLIN: Twenty minutes, yes. I was trying to share my
6 screen and say that at the same time, and that did not work.

7 JUDGE TORNQUIST: No problem. Okay. When you're ready.

8 MR. COLIN: All right, so you can see my exhibits?

9 JUDGE TORNQUIST: Yes.

10 MR. COLIN: Okay. Good afternoon, Your Honors, Jeff Colin
11 from Greenberg Traurig on behalf of Petitioner Samsung.

12 I'm going to talk briefly today about the '641 patent and the prior
13 art. Then I'm going to talk about claim construction, specifically two issues,
14 where RJ Tech is trying to read additional limitations into the constructions
15 they argued for and won at the District Court. Then I'm going to walk
16 through the grounds where Samsung shows under RJ Tech's own
17 constructions, the claims are anticipated and obvious.

18 So, turn to slide 4. The patent is generally directed to rechargeable
19 lithium-ion batteries, and it identifies the problem in the prior art as the full
20 capacity of the battery materials weren't utilized. And that's because the
21 charge cut-off voltage was limited to 4.2 volts. And instead, increasing the
22 charge cut-off voltage was known to increase the capacity, but it also
23 reduced cycle life. And it says specifically it causes the deposition of
24 excessive lithium ions on the surface of the negative electrode, which we
25 also will call the anode today, as metallic lithium. And that's what's referred
26 to as dendrites. So, the patent's solution to this was we could increase

1 capacity by increasing the charge cut-off voltage above 4.2 and by properly
2 adjusting the ratio of positive electrode material to negative electrode
3 material.

4 And this concept is shown on slide 5, which is basically as you
5 increase the charge voltage, you pull more lithium out of the cathode and
6 into the anode. So, in order to balance that and avoid dendrites, you have to
7 increase the amount of the anode. And there's two independent claims of the
8 '641 patent, and they're directed to these two main issues, the charge cut-off
9 voltage, and the capacity ratio. And again, charge cut-off voltage, you have
10 to simply charge a battery above 4.2 volts, but less than 5.8. And then
11 there's a ratio of positive electrode material to negative electrode material.
12 It's from 1:1.0, which would be a balance cell, to 1:2.5. So, you have two
13 and a half times as much anode as cathode. And then it's calculated with the
14 charge cut-off voltage limited to 4.2 volts.

15 So, the Uemura patent, which we'll talk about today in the
16 publication, solves the same problems as the '641 patent. As you see on
17 slide 7 on the left, paragraph 33, it teaches a capacity balance ratio B to A,
18 source of the negative electrode, total negative electrode material to the total
19 capacity of the positive electrode material, is preferably fixed at a range of 1
20 to 1.5. And it says that for the same reason the '641 patent does, if the ratio
21 is below 1, you have the same dendrite issues. And if you look at paragraph
22 81 of Uemura, it talks about charge and discharge of batteries created by
23 Uemura was repeatedly performed at a constant current of 0.5 milliamps per
24 centimeter square and a voltage ranging from 4.3 volts to 2.0 volts. So, he
25 says we charge a constant current up to 4.3 volts and down at a constant
26 current down to 2.0 volts, and he does that hundreds of times.

1 Another patent we're going to talk about today is Abe or another
2 publication. And again, this is directed to the same problem as the '641
3 patent. And it says specifically in paragraph 9, when the charging current is
4 increased, needle-like lithium may be precipitated on the surface of the
5 negative electrode. So again, you may get dendrites. And again, Abe and
6 Uemura are directed to lithium-ion batteries for electric vehicles. So, there's
7 high charge, high current, and they use lithium manganese oxide in this
8 example of Abe.

9 And so how do you solve this problem of avoiding dendrites? In
10 paragraph 18, Abe says you adjust the capacity ratio. And wherein the
11 design of the negative electrode is a non-aqueous electrolyte-based
12 secondary battery having a design capacity greater than that of the positive.
13 So, you have more anode than cathode to avoid that issue. And then in the
14 next teaching on that, it says a specific range of between 1 and less than or
15 equal to 1.6 for the design capacity. Again, you have more anode than
16 cathode. And for these secondary batteries of Abe, he also says, for
17 example, for lithium manganese oxide, you could charge this up between 4.2
18 to 4.3 volts. And he says for lithium cobalt oxide and lithium nickel oxide,
19 they're less stable. That's known in the art. So, they're charged to 4.1 to 4.2,
20 preferably 4.1.

21 The last main reference that will rely on today is Guyomard. Like
22 Abe, like Uemura, this is directed to lithium manganese oxide cells. And he
23 says, is known in the prior art, you could charge these up, but it will begin to
24 oxidize at about 4.5 volts at room temperature, as low about 4.3 volts at
25 temperatures in the range of 55 degrees Celsius. So that's, again, very
26 similar to what we just saw in Abe, charges between 4.2 to 4.3. But also

1 similar to the problem identified in the patent, he says, because of this
2 lowered cut-out voltage, the available capacity of the cell is about at 55
3 degrees C. There's only about 75 percent of that at room temperature.

4 So, Guyomard has a bit of a different solution to this. It says let's
5 optimize electrolyte for lithium manganese oxide cells. And when we did
6 that, we were able to charge it up -- and sorry, I'm on slide 11, and this is on
7 the righthand side of it now. We were able to charge it at cut-off voltages of
8 4.9 volts and 4.5 volts, respectively, at 25C and 55C. And it describes it
9 specifically as a high-charging voltage. And it says even with this high-
10 charging voltage, we're able to get more capacity, but also show the
11 remarkable fact that the cell capacity is after 500 cycles was only about 10
12 percent less than after 5 cycles. And it's notable because after the Patent
13 Office reviewed Guyomard during prosecution of the child application of the
14 '641 patent, the Patent Office found that RJ Tech's statements that it was not
15 known to charge batteries above 4.2 volts in the prior art was simply not
16 true. And despite that finding in the prosecution history of the child
17 application, RJ Tech still makes those arguments about no battery materials
18 being charged above 4.2 volts in the prior art.

19 So, turning to claim construction, and I'm on slide 15, the petition
20 relied upon Patent Owner's own statements concerning the intrinsic evidence
21 and claim constructions from the Apple litigation, that's in the Central
22 District of California. And based on that, Samsung showed that Uemura and
23 Abe anticipated and rendered obvious the patent claims. With respect to the
24 charge cut-off voltage, RJ Tech persuaded the court that a charge cut-off
25 voltage is a designed maximum charging voltage based on the intrinsic
26 evidence. And the court issued the construction the maximum voltage to

1 which the battery is configured to be charged. Here, RJ Tech tells the Board
2 it should read two additional limitations into the court's construction. So,
3 now I'm at page 23 of the POR. And it says, accordingly, the Board should
4 construe charge cut-off voltage as the maximum voltage to which the battery
5 is configured to be charged. So, that's the court's construction. But then it
6 says, distinguished from, so it reads in two negative limitations, saying the
7 externally applied voltage to which a battery may be charged. So, it says it's
8 not a charging voltage. And then two, voltages pertaining to a half-cell
9 configuration.

10 So, turning to slide 16, as you can see on the lefthand slide, RJ
11 Tech repeatedly told the court, the term is used throughout the specification.
12 In each case, it refers to the charging voltage maximum. That's what they
13 said based on the specification. And they said in the next excerpt, the
14 examiner understood the term the same way, using charge cut-off voltage
15 without reference to a particular charging algorithm. So, it doesn't matter
16 how you charge it. And in many cases, synonymous with charging voltage.
17 And again, they say that extrinsic sources confirm that the 4.2 limit was a
18 maximum charging voltage.

19 So, that's what they told the court based on the intrinsic record.
20 Here, they tell the court that it's a measured value. You actually have to
21 have an electrochemical measurement to do it. And if you look at on the
22 right, we cite to Dr. Yao's deposition testimony, their expert, and he said he
23 cited no intrinsic evidence in his construction -- his opinions on claim
24 construction. All they rely on for saying it's not a maximum charging
25 voltage, its actual measured value, his experts say so. If you look at his
26 declaration, there's simply no support there. Notably, RJ Tech didn't address

1 any of his previous statements concerning the intrinsic evidence in any of
2 the papers. So, if we hear that today, that's an improper new argument.

3 And the question now becomes, well, why exactly does this
4 matter? So, if you look at Uemura, and we looked at this a couple of
5 minutes ago, paragraph 81, this is on slide 30, Uemura says, the charge-
6 discharge was repeatedly performed at a constant current of 0.5 milliamp per
7 centimeter square and voltage ranging from 4.3 volts to 2.0 volts. Based on
8 this sentence, RJ Tech is arguing that Uemura discloses what they call an
9 applied voltage or a charging voltage and not a charge cut-off voltage. But
10 that's not what they told the District Court about constant current charging or
11 about what the claims mean.

12 So, for example, if we turn to slide 40, this is an excerpt from Dr.
13 Yao's declaration to the California court. And if you look at paragraph 33,
14 which is on the right, Dr. Yao, starting at line 17 again says charge cut-off
15 voltage can be implemented by other charging algorithms. So, he's telling
16 the court it doesn't matter how you charge it. And he says, for example, in
17 many laboratory settings, and this is me adding into it, which could be
18 Uemura's lab, batteries are charged at a constant current. Uemura says 0.5
19 milliamp per centimeter squared without a constant voltage change. Again,
20 there's no constant voltage in Uemura, it's constant current. Once the battery
21 reaches a predetermined voltage, i.e., the charge cut-off voltage, which in
22 Uemura is 4.3 volts, the charging stops. That's what they told the court.
23 And they said you could charge at a constant voltage, you could charge it at
24 pulse charging. And then lines 23 says in each of these cases, there's a
25 charge cut-off voltage, which is the maximum voltage to which the battery is
26 configured to be charged. Again, he doesn't say it has to be measured. He

1 doesn't say there's electrochemical measurements. You're not going to find
2 any intrinsic evidence in the record supporting those statements because it's
3 frankly not there. They said, however you charge it, the maximum
4 voltage --

5 JUDGE TORNQUIST: Mr. Colin, this is Judge Tornquist. Can I
6 ask you a question?

7 MR. COLIN: Of course.

8 JUDGE TORNQUIST: Do we have to resolve this particular
9 question? I think in your papers, you said you believe it's disclosed either
10 way.

11 MR. COLIN: That's correct, Your Honor. So, and we'll get to this
12 in a minute, but Mr. Juzkow says, based on his understanding, the charge --
13 the bad -- Uemura says charge at a constant current of 4.3 volts. Under his
14 understanding, that's what he discloses. So, you charge it up to 4.3, you
15 charge it down to 2.0. He did that hundreds of times to get the cycling data.
16 So, and Mr. Juzkow says in the petition and his declaration -- I'm sorry, one
17 second. So, this is, for example, on slide 31, he says the 4.3 volts value is
18 the charge cut-off voltage because it reflects the maximum voltage to which
19 Uemura's batteries are charged to. So, it's our position that it discloses
20 charged to, particularly under how RJ Tech say constant current goes to the
21 charge cut-off voltage. So, it's disclosed that way. But they also say it's an
22 applied voltage, which we disagree with, but they say the applied voltage is
23 4.3, and under what they told the court, that fits it as well. So, we think
24 either way we win. It doesn't need to be construed. So, we agree with you
25 there.

26 JUDGE TORNQUIST: Okay.

1 MR. COLIN: So, turning back now to slide 17, and I think this is
2 directed to the same issue, really. This again, on the left is what RJ Tech
3 told the court. They say constant current, the battery is charged at a constant
4 current until it reaches the charge cut-off voltage. Again, they don't say
5 anything about constant current and an applied voltage. That's frankly
6 incorrect. But notably down here at line 3, it says in each case there's a
7 maximum voltage to which the battery is configured to be charged. So,
8 they're saying it doesn't matter how you charge it, that's the charged cut-off
9 voltage. And it gives several names to say it could be the potential limit, the
10 upper voltage limit, the upper charged limit, which is clearly what the
11 Uemura is, you charge it up to 4.3 volts. In each case, it's the designed
12 maximum charging limit. So again, that's saying you look at what the
13 reference says, it says charge it up to 4.3. That's above 2 is our position,
14 that's enough -- not enough. And because under their own construction, they
15 have that, they come up with this new opinion, which as you see on the right
16 here is Dr. Yao. You actually have to measure the battery voltage to have
17 the charged cut-off voltage. And again, there's no intrinsic evidence. That's
18 just experts say so which should be rejected.

19 Again, if you actually do look at the intrinsic evidence, which --

20 JUDGE RANGE: This is Judge Range. If you could go back a
21 slide.

22 MR. COLIN: Of course.

23 JUDGE RANGE: Yeah. So, when they say it's a maximum, it's a
24 maximum voltage to which the battery is configured to be charged, I'm
25 wondering what that means. I get the impression that maybe there's
26 something going on that makes it so you just stop charging when you get to

1 whatever arbitrary number you pick and that's what they have in mind. Or is
2 it like the battery will physically break or physically cannot hold more
3 voltage than what that maximum is?

4 MR. COLIN: So, I think there's a couple of aspects to that. And
5 so, Uemura specifically says it's directed towards electric vehicle batteries.
6 So, if you look at paragraph 103, he's saying I'm looking for a high capacity
7 batteries for doing this. So, the charged voltage that he's applying, that's
8 going to be the maximum. So, 4.3, he says, I'm trying to get high capacity.
9 He's not going to say, well, the maximum voltage is 4.3, or sorry, 4.8 or
10 something like that, but I'm not going to charge it. He's trying to get high
11 capacity, so he's going for as much as possible. So, we think that's one
12 aspect of it.

13 The second aspect of it is there is an issue about overcharging, and
14 this is another place where their construction that it's a measured voltage
15 falls flat because they repeatedly told the California court, and I think they
16 have some statements in the record here in their petition, about
17 overcharging, and essentially that raises the question. If they're saying, well,
18 you have to measure it, I mean, if you measure it during overcharging, is that
19 enough? I mean, frankly, they just don't have support for their position, so it
20 leaves that an open question. Whereas if it's just looking at what the
21 reference says, this is the maximum, I'm charging up to 4.3, that seems to be
22 consistent with what they told the court repeatedly that you do with constant
23 current and with how it doesn't matter which charging algorithm you use.

24 JUDGE TORNQUIST: Counsel, this is Judge Tornquist. Just to
25 follow up on that, would you agree that the charge cut-off voltage for a
26 battery is actually controlled by a circuit or the charger, and that's the system

1 that sets the limit?

2 MR. COLIN: So, that's a great question, Your Honor. If you look
3 at the intrinsic record, which is what RJ Tech did with the court when they
4 gave the construction, if you look on I'm on slide 18, and on the lefthand
5 excerpt, I think this is from column 9, 49 to 55, this specification specifically
6 says the charging device controls the charge cut-off voltage of the single
7 lithium-ion cell within a range from.

8 So again, that's something that I agree with you. It's set by a
9 charging device under their construction or with like a battery management
10 system. We do have a slide from their infringement contentions, for what
11 it's worth, where RJ Tech agrees that there's circuitry within the device and
12 software that controls, again, exactly how much the battery is charged. And
13 they call it, you know, this is what controls the charging voltage. So, I think
14 the intrinsic record, and again, if you look at I think the excerpts from 4, 27
15 to 37 on the right, it says the single lithium-ion cell having the adjusted
16 ratios were tested by charging at a charge cut-off voltage.

17 So again, the specification seems to be indicating that this is
18 something that's controlled by a charging device. It could be controlled by a
19 battery management system. And I think more support for that is also in
20 slide 19, which if you look at examples 14 and 15 in the table, there's no
21 processing change. So, these are the same starting point with the battery.
22 And if you look at the description on the right, it says there are different
23 charge voltages. So again, it's equating charge voltage with charge cut-off
24 voltage, but it says you charge example 14 to 4.2, you charge example 15 to
25 4.3. So, it's something that's controlled again by the device, by the battery
26 management system. But in either case, it's the maximum which that battery

1 is configured to be charged for 14 is 4.2. So, that wouldn't be within the
2 claim range for 15 is 4.3. So, under that teaching, it would be within the
3 claimed range.

4 JUDGE TORNQUIST: Okay. So, one follow-up question to that
5 is, I believe it came in in their sur-reply that they argued that the reason
6 example 14 and 15 are different is because they had different formation
7 systems. What's your response to that?

8 MR. COLIN: So, that's mere attorney argument. There's no expert
9 testimony because their expert didn't opine on anything having to do with
10 examples 14 and 15 or any other intrinsic evidence with respect to this. And
11 it's also just -- my understanding of their argument just didn't even make
12 sense. It's the same battery. You know, obviously, if you charge it, you
13 have the same battery to 4.2 to 4.3 to 4.4. You're going to get higher
14 capacity out of that, but that's not going to change the fact, I mean, that's
15 something that's controlled by the charging device. And as the patent says,
16 once you do that to a certain extent, you have to worry about the electrolyte
17 being a problem. You have to worry about this and there's -- and if you look
18 at the patent, there's actually like compound A, compound B, compound C,
19 that once you get the higher voltages, they say you have to add this in and
20 change it. Otherwise, it's all going to break down. So, you do have to
21 modify it once you get the higher voltages. But again, I mean, what you're
22 pointing to is mere attorney argument. And it's just not correct. And it's late
23 because they don't rely on any intrinsic evidence in the POR.

24 And frankly, one other point with that, which is interesting,
25 because I saw that in their slides. And I saw that they have an excerpt from
26 the Apple Markman hearing. And the context of that, that's Exhibit 1041

1 from pages 5 to 12, I think it's illustrative. Apple was arguing, after they got
2 the court's preliminary construction, that if they remove the configured to
3 language and just says the maximum voltage to which the battery is charged,
4 the intrinsic evidence that RJ Tech is now relying on is what Apple was
5 pointing to in support of its construction what the court rejected.

6 And counsel for RJ Tech actually stood up and said, the one
7 problem with that is if you just say what it's actually charged to, you know,
8 for example, I had to come to court today and I had to pull my phone out of
9 the charger before it was fully charged. That shouldn't take it outside the
10 claim. If that's a battery that could be charged up to 4.4 volts, the fact that I
11 just took it off shouldn't bring it out. But that's what they're essentially
12 arguing with Uemura, which we disagree with based on their own
13 statements. But they're saying, oh, yeah, he didn't actually charge it all the
14 way up to 4.3 volts. So, because there's no electrochemical measurement
15 showing it, it doesn't meet the limitation. We think, again, I mean, they
16 literally made that argument and they're contradicting it here.

17 And again, I mean, I've spent a lot of time on this, but what Dr.
18 Yao told the court in paragraph 18 on slide 20, it says the '641 patent
19 describes increasing the charging voltage applied to a battery. They stripped
20 that language in copying and pasting that same paragraph in his declaration
21 to the Board, changed charging voltage applied to a battery to charge cut-off
22 voltage. And as I said in their POR at 23, they're trying to say that charge
23 cut-off voltage does not cover the externally applied voltage to which a
24 battery may be charged, which frankly, again, is inconsistent with their own
25 previous statements.

26 So, unless there's any questions on that, the second kind of issue

1 that they're trying to read in, the negative limitation is referring to half-cell
2 versus full-cell. And we think that's unnecessary for claim construction, and
3 there's two reasons. The first reason is when you look at Claim 5 on the top
4 of slide 22, it says the lithium-ion cell or battery has a charge cut-off
5 voltage. So, by saying the secondary lithium-ion cell or battery, that's
6 clearly already a battery, you don't need to say it's full-cell. That would be
7 redundant.

8 And then the second reason why that construction is wrong is
9 because when the charge cut-off voltage is also reflected in the capacity ratio
10 limitation, and that has to do with electrode capacity as opposed to battery
11 capacity. So, you measure those in two different ways. Battery capacity,
12 you cycle between the anode and the cathode. Electrode capacity, you need
13 to have your anode versus lithium and your, well, this is a reference versus
14 your cathode versus lithium. Otherwise, if you're just cycling a battery, it'd
15 be 1:1 every time. So, you need to have a reference material. And Dr. Yao
16 agreed with me at his deposition.

17 So, if you look at slide 23, he said for the capacity ratio limitation,
18 when you're talking about electrode capacity, it's your opinion that that's
19 referring to a half-cell capacity relevance to a reference electrode. And he
20 said, correct. So frankly, their construction ignores that, there's no response
21 to that in their sur-reply. So, it shouldn't be adopted because one, it's
22 redundant, and two, their expert rejected that very position at deposition.

23 JUDGE TORNQUIST: Counsel, this is Judge Tornquist. Is it
24 possible that actually the first half of it, if you could go back to the claim, I
25 think it was your previous slide.

26 MR. COLIN: Yeah.

1 JUDGE TORNQUIST: Is it possible that the first time it's used,
2 that is talking about a battery. So, it's a full-cell.

3 MR. COLIN: We agree with that, Your Honor.

4 JUDGE TORNQUIST: But the second time it's used might very
5 well be a half-cell or should at least include a half-cell.

6 MR. COLIN: The first one?

7 JUDGE TORNQUIST: No, the second.

8 MR. COLIN: The second one has to be a half-cell, it can't be a
9 full-cell battery.

10 JUDGE TORNQUIST: Okay.

11 MR. COLIN: Because otherwise, again, if you have a full-cell
12 battery, you can't tell the electrode capacity because what's going from the
13 anode is going to the cathode and back. What you do with electrode
14 capacity, which Dr. Yao admitted at deposition, you have to charge your
15 relevant to lithium. So, a common reference electrode. So, you get your
16 capacity of, you know, cathode relevant to lithium, and then you get your
17 capacity of graphite relevant to lithium. And then you adjust the ratio in this
18 limitation by adjusting the amounts. So, the first construction has to do with
19 the actual specific capacity.

20 JUDGE TORNQUIST: (CROSSTALK) is there a full-cell up top.
21 The first one could be a full-cell.

22 MR. COLIN: Correct.

23 JUDGE TORNQUIST: And the second one a half-cell.

24 MR. COLIN: Correct.

25 JUDGE TORNQUIST: Okay. And you'd be okay with that
26 construction?

1 MR. COLIN: Yes.

2 JUDGE TORNQUIST: Okay.

3 MR. COLIN: Yeah, the full one, there's no dispute. It says it's a
4 secondary lithium-ion battery or cell.

5 JUDGE TORNQUIST: Okay.

6 MR. COLIN: But when you talk about electrode capacity, it's
7 different, which is what the second part of it is.

8 So, then turning to the second main issue on claim construction,
9 and again, these claim construction, I know I'm spending a lot of time on it.
10 It really flows down through the entire analysis because these are the two
11 claim limitations at issue. So, the fact that RJ Tech is running away from
12 their previous constructions and taking on new constructions not supported
13 by the intrinsic evidence renders their arguments just faulty.

14 So, turning to capacity ratio limitation, RJ Tech persuaded the
15 court that the specification expressly defined theoretic capacity to mean
16 capacity. We see that on slide 25 in the left. And this is from their brief to
17 the Apple court and says, unless there be any doubt, the patent specification
18 expressly defines theoretical capacity to mean the capacity of 4.2 volts.
19 They cite the patent at column 4, lines 5 to 9. And they say, this rules out
20 Apple's construction and is dispositive. So, this is what they told the court
21 theoretic capacity means.

22 Here, and you see on the right, the court agreed with that. This is
23 from the court's claim construction decision and says the '641 patent defines
24 theoretical capacities. And it's again, it's the capacities and it cites to the
25 patent at the same cite and the same cite from the California -- from their RJ
26 Tech's brief. So, the court agreed with them. And then it issued its

1 construction which is shown below on the slide, which again, it doesn't say
2 theoretic capacity because RJ Tech said it's not theoretic capacity, it means
3 the capacity. So, if you see the court's construction it just says capacity of
4 the cathode divided by capacity of the anode when the charge cut-off voltage
5 is 4.2 volts.

6 JUDGE TORNQUIST: Okay. So, what does the specific capacity
7 mean?

8 MR. COLIN: Specific capacity means it's a capacity per mass
9 unit. So, specific capacity, for example, would be milliamp hours per gram.
10 If you're just saying total capacity, it's just milliamp hours. So, for example,
11 if you're looking at Uemura, it says total capacity because they already
12 multiplied out the specific capacity times the weight. So, then you get total
13 capacity. If it's divided by the weight, it's specific.

14 JUDGE TORNQUIST: Okay. So, do you -- did you do enough in
15 your petition to show specific capacities were shown in Uemura and Abe?

16 MR. COLIN: Yes, of course, because that's exactly what -- well,
17 this is saying it's the capacity of the cathode active material per mass unit, so
18 that specific capacity and the amount of cathode active material in the mass
19 unit. So, it's saying multiply by, and here I'll show you exactly how you
20 calculate it, because this is what we did. It's specific capacity times the mass
21 unit. So, that's the total capacity, and I'm looking at slide 27, that's the total
22 capacity of your cathode divided by specific capacity times the mass. So,
23 that's your total capacity of the anode. And that's exactly what Uemura says.
24 If you look at paragraph 33, he's talking about total capacity. So, that's how,
25 exactly how RJ Tech told the court you calculate this ratio limitation. It's
26 your total capacity of the cathode divided by the anode. So, that's

1 (CROSSTALK) --

2 JUDGE TORNQUIST: What exactly then is a theoretical capacity
3 in comparison?

4 MR. COLIN: Hmm?

5 JUDGE TORNQUIST: What exactly is a theoretic capacity in
6 comparison to a specific capacity?

7 MR. COLIN: So, theoretic capacity is defined by the patent as
8 they told the court. It means the capacity at 4.2 volts.

9 JUDGE TORNQUIST: Okay. But the claim says specific
10 capacity of 4.2 volts too. Maybe I'm just not understanding this. How are
11 they different?

12 MR. COLIN: RJ Tech has taken the position that specific capacity
13 in Claim 1 can be -- it's broad. There's no limitation on it. It could be
14 practical specific capacity. It could be theoretical specific capacity. Specific
15 capacity just means it's per mass unit. So, they've treated in their briefing to
16 the court and in their POR, which they say Claim 5 is the same limitation
17 and is representative of Claim 1. They've taken that position here. So, that's
18 what we applied.

19 JUDGE TORNQUIST: Okay. And if we say that, yes, theoretic
20 capacity should be in the construction, can you prevail with your petition?

21 MR. COLIN: We can, Your Honor. I think as an additional
22 matter, I mean, we can't ignore the express definition. I mean, what they're
23 doing is -- it's interesting because if you actually read their brief, they don't
24 quite say we're we agree with the court's construction. They don't quite say
25 we disagree. So, that's honestly a question you may want to ask them. They
26 say -- accuse Samsung of misrepresenting it. But if you look at what the

1 court's construction is, it's simply the capacity ratio, which the prior art
2 teaches and that's what we applied. But I'm sorry, I think I lost my train of
3 thought, Your Honor. Could you ask your question one more time?

4 JUDGE TORNQUIST: Well, the question is if we say yes, it
5 should be a theoretic capacity, you prevail because you've just shown a
6 capacity.

7 MR. COLIN: Theoretic capacity as defined in this fact means
8 capacity. So, yes. They've argued something entirely different here, and I
9 can point that out to you. So, looking at slide 46. So, this is now, RJ Tech
10 in the POR and the sur-reply, they have no response at all to the point that
11 they told the court explicitly, theoretic capacity means capacity. They don't
12 adjust that. They have no response whatsoever. What they do is they tell
13 you, the Board, something different. They say, so if you look at the top of
14 46, a POSITA would know further that theoretical capacity of an electrode
15 when the voltage is 4.2 is the maximum capacity of that electrode, e.g., the
16 cathode when the battery is set to 4.2 volts. The only cite there is to Dr.
17 Yao's declaration. Dr. Yao didn't cite a shred of intrinsic evidence
18 supporting that. He didn't cite any publications saying that. There's not a
19 publication in the record that talks about theoretic capacity at 4.2 volts, that's
20 not anywhere to be found. So, what they're telling the court ignores what
21 they told, sorry, what they told the Board ignores what they told the Board,
22 the court, is inconsistent with what they told the court and there's frankly no
23 support for it whatsoever. I mean they essentially say, oh, you slowly
24 charge it.

25 JUDGE TORNQUIST: My understanding is what they did with
26 the Uemura one is they said wait a second, if you want -- if it's theoretic you

1 have to go to the number that you would drive usually by having a very low
2 charge and get to the highest number possible, and that's the theoretic
3 capacity.

4 MR. COLIN: That's their argument.

5 JUDGE TORNQUIST: If we applied that then do you prevail?

6 MR. COLIN: Frankly, there's no support for that argument. The
7 one, let me find there's a slide kind of on this issue and it's right here. So,
8 Mr. Juzkow, looking at what they actually did with Uemura, so he notes that
9 they pulled this 270 milliamp hour per gram value from the Armstrong
10 reference and as initial matter it's undisputed. We we point this out in the
11 reply, you know, RJ Tech tells you it can't be a measured value but that 270
12 is the measured value. That's undisputed. They tell you it can't be -- it has
13 to be a reversible capacity. That's not a reversible capacity that's an initial
14 capacity which Dr. Yao admits declines rapidly among cycling. Yeah, I
15 could point -- I think I have a slide on that. So, he said it must be reversible
16 that's what should be used to calculate. But there's no dispute what they
17 used was an initial.

18 And then so Mr. Juzkow points out when Armstrong actually
19 employed a much higher current which is 0.5 milliamps per centimeter
20 square, he obtained a specific capacity of 200, and he says this is the same
21 current density that Uemura used and Uemura got 180. So, frankly his
22 position is that if, looking at paragraph 64 this is now on slide 52, you know,
23 what they're relying on relies on a C rate of C over 150 or C over 200. So,
24 what they're saying is the theoretic capacity is this value which you charge
25 and discharge over 200 hours. So, each way he says that's not something a
26 POSITA would do. So, that's not actually correct. So, really --

1 JUDGE TORNQUIST: Okay. So, two questions there. If we are
2 using their theoretic capacity going down this line, should we also take into
3 consideration what the charge density was in addition to the voltage, kind of
4 voltage?

5 MR. COLIN: Well again, this is the point, Your Honor, that
6 they're just saying a slow charge. They look at a reference and they say, oh,
7 yeah, this is the number, but that number is not a full -- they contradict
8 themselves by that choosing that number. So, they're literally just saying,
9 this is the invention, I could pull whatever number I want out of a reference.
10 There's frankly no support for that. There's no extrinsic support for that.
11 There's no intrinsic support.

12 JUDGE TORNQUIST: These three paragraphs here that you're
13 citing, did you actually cite them and make this argument in your reply?

14 MR. COLIN: That's correct, Your Honor. That's in --

15 JUDGE TORNQUIST: If you just give me the page number in the
16 reply. Yes we made this argument. You can do it on rebuttal if you'd like.

17 MR. COLIN: Okay.

18 JUDGE TORNQUIST: Just have to make sure that this whole
19 thing was fleshed in the reply.

20 MR. COLIN: Yeah, and honestly, we make these are right before
21 this. I mean, this whole analysis that they apply, is it consistent. For
22 example, when they're talking about this low charging now, which you
23 pointed out, so that's what they're arguing about their new definition of what
24 theoretic capacity means, which again, is different what they told the court.

25 If you look at slide 47, this is what Dr. Yao told the court. He
26 says, the theoretical capacity of lithium cobalt oxide is 137. And if you look

1 down, he actually cites evidence for this. So, he says the 137 number is
2 based on X equals 5, which is the percentage of lithium extracted from the
3 cathode active material, even though higher values may be obtained in
4 practice. So, with the Handbook of Batteries, which he cites, it says X is a
5 value that's measured capacity. So, it's not some theoretical calculation. But
6 so many people have tested lithium cobalt oxide that it's generally known
7 that the capacity that you get upon actual experimentation is 137. But higher
8 values may be obtained in practice. So, if you slow charge it, you're going
9 to get something higher. You're going to get 170. You're going to get 180.
10 You're going to get 190.

11 So again, their position that is a maximum, Dr. Yao contradicted
12 that with what he told the court. So, there's frankly just no position for that
13 whatsoever. And again, there's no rebuttal to any of this in the sur-reply
14 because, again, they're just contradicting themselves every which place they
15 change their position from the Apple litigation to the Samsung litigation to
16 the IPR.

17 So, we've already done this, except for I'm just turning back to
18 slide 27 for one additional point. So, even though they told the court, again,
19 the capacity is, well, this is, I guess, a new point. They told the court
20 capacity is measured, which is consistent with what they told the court is
21 defined. If you look at the bottom of slide 27, they say Apple defines
22 theoretic capacity in a way that ignores the claim expressly provides that the
23 capacity is measured at 4.2 volts. They have no response to this admission
24 in any of their papers. And again, above that, which is this is the ratio
25 calculation we looked at before, it says CP is a capacity per mass unit of the
26 cathode active material, typically measured in milliamp hours per gram.

1 Again, they tell you it's measured. Here, they say it's a distinct from
2 experimentally measured. So, even though the court's construction is
3 capacity, that can't be practical specific capacity.

4 And you see down below, Dr. Yao admitted practical specific
5 capacity is a type of capacity, but it is new understanding where they're
6 applying theoretic to the court's construction, even though they argued it
7 shouldn't be there. He says a practical specific capacity does not meet the
8 claim construction. Correct. So, they're making this new argument and
9 frankly, it's inconsistent with what they told the court and we think judicial
10 estoppel should be applied. They said it's defined in the spec to mean
11 capacity of 4.2, the court adopted that, and now they're changing their
12 position to the detriment of Samsung, which relied upon that in filing their
13 IPR.

14 So, unless there's any more questions on that, we'll turn to you
15 Uemura. Okay. So, there's no dispute over the preamble. There's no
16 dispute over any of the dependent claims with respect to Grounds 1 and 2.
17 Again, the dispute lies within the charge cut-off voltage and again, it's clear
18 the charge-discharge is repeatedly performed at a constant current from 2.0
19 volts to 4.3 volts. Uemura discloses this happened hundreds of times. I
20 charge it up to 4.3. Thus, that's the maximum value to which that battery is
21 configured to be charged under the court's construction based on RJ Tech's
22 own admissions. And again, this is what Mr. Juzkow opined in his
23 declaration. And I'll point out the very first line of RJ Tech's sur-reply
24 concerning Uemura, and that's on page 8, is a misstatement. It says
25 Petitioner incorrectly asserts for the first time in the reply since the petition
26 did not raise this issue, that Uemura discloses a battery voltage of 4.3 volts.

1 That's incorrect. We opined on that in the petition, and it's also noted in the
2 institution decision, this same paragraph.

3 And again, just to make this entirely clear, Mr. Juzkow was asked
4 about this paragraph at his deposition. They said, Uemura is describing
5 constant current charging. Is that fair? He said yes. Uemura doesn't
6 disclose that constant voltage charging was performed in the experiment
7 described. Correct? Correct. It's not constant voltage. It's not an applied
8 voltage. It's constant current. So, he says, and this is slide 32, the way a
9 POSITA would read this is saying that if there's not using constant voltage
10 mode, they're fully charging and fully discharging it at that rate, which is the
11 current. And again, RJ Tech comes back and says, oh, well, Uemura
12 discloses an applied voltage. And he says, that's not correct. My
13 understanding of Uemura is consistent with what Dr. Yao -- and sorry, that's
14 the typo, should be RJ Tech -- previously told the court regarding constant
15 current charging. And that's with the batteries charged at a constant current
16 until it reaches the charge cut-off voltage.

17 So, under their own analysis, what they told the court, and again,
18 Dr. Yao's statement, which we looked at before, is in the second bullet on
19 this slide. And then in paragraph 59 of his declaration, he says, as shown by
20 RJ Tech's own statement, a POSITA would understand that constant current
21 charging involves the use of a constant current, not an applied voltage.
22 You're not applying a voltage to that battery. It's constant current. That's
23 what RJ Tech previously described constant current charging as. And here,
24 they honestly just try to have a red herring with applied voltage.

25 So, turning to the capacity of ratio limitation and Uemura. The
26 petition says, Uemura anticipates and renders obvious this limitation in two

1 different ways. The first way is by disclosing a range, and that's in
2 paragraph 33, which we've looked at today. The second way is by
3 disclosing specific embodiments, and that's examples 1 to 17. And the POR,
4 as we know in Samsung's reply, failed entirely to rebut or even discuss
5 whatsoever paragraph 33. So, it's un rebutted that this meets the court's claim
6 construction. They don't deny that. And Mr. Juzkow provided a detailed
7 analysis that Uemura's capacity ratio is calculated at the voltage. It's
8 intended to be operated at 4.3 volts.

9 Now I'm looking at slide 36. RJ Tech had no response to this.
10 This analysis is undisputed as to the calculated at 4.3. And then it's also
11 undisputed they have no response to Mr. Juzkow's analysis saying, even
12 though it would be calculated at 4.3 because that's what Uemura says to
13 charge it to, if you did calculate at 4.2, that's still going to be within the
14 claimed range. The 1 to 1.5 range is going to go up a little bit, because
15 you're not pulling as much lithium from the cathode, so there's not quite as
16 much in the anode. So, the range will go up. But looking at the charge and
17 discharge curves, which are pictured here, the capacity change is not going
18 to be that different between 4.2 and 4.3 to pull you out all the way up to over
19 2.5. Again, that analysis is undisputed on the calculated part, and there's no
20 dispute about paragraph 33.

21 JUDGE TORNQUIST: Counsel, this is Judge Tornquist. Just so
22 you know, you're into your rebuttal time, but there's a lot to cover in this
23 case. So, we're going to give each side an extra 10 minutes.

24 MR. COLIN: I appreciate that, Your Honor. I'll try to be brief.

25 JUDGE TORNQUIST: That'll put you on to 1:52 before you start
26 getting into your 20-minute rebuttal.

1 MR. COLIN: Okay. So, the second part about paragraph 33, so
2 they try to address it the first time in the sur-reply, which is, again, improper
3 because they messed up. They didn't discuss in the POR. But they try to
4 equate paragraph 33 with the specific points within Figure 3, and that's just
5 legally incorrect. You can't limit a range of 1 to 1.5 to discrete points 1 to
6 1.3, 1 to 1.5, 1.1. That's improper. That's reading out 1.2, 1.4, and it also
7 ignores the court's teaching, for example, in UCB v. Actavis, which says you
8 have to apply a different analysis for a prior art range that anticipates or
9 renders obvious a claim versus a prior art point within that range. So again,
10 that's cited in the petition. That's also cited in the POPR. So, the UCB v.
11 Actavis says their approach trying to equate paragraph 33 with Figure 3 is
12 legally incorrect.

13 So, the second point was we also says disclose specific
14 embodiments. There's no dispute. RJ Tech does not come out and in any of
15 their papers and say, this capacity balance doesn't meet the court's
16 construction. They just say it's not theoretical capacity. That's not the
17 court's construction. That's not what applies. So frankly, that argument
18 should be rejected.

19 So again, we've discussed a line charge, cut-off voltage, their
20 critiques on capacity ratio limitation. So, I'll jump ahead to their argument
21 that Uemura is not enabled. So, they argue that Dr. Liang tested examples 1
22 to 3 and he wasn't enabled to create certain cathode materials. But frankly,
23 their analysis falls flat because they ignore we don't even need Figure 3.
24 That's an alternative argument. So, based on the chart -- the fit disclosure in
25 paragraph 33, Uemura provides a roadmap to the claimed invention, which
26 they don't even address. There's no dispute it teaches secondary batteries.

1 There's no dispute that a POSITA would know how to charge a battery to
2 4.3 volts using constant current. That's not addressed in their POR. They
3 tried to make a new argument in the sur-reply, which is incorrect and it's
4 pure attorney argument. And they don't adjust paragraph 33. So, they're not
5 enabling an argument, which is looking at cathode materials falls flat
6 because there's no cathode material requirement of Claim 5. It could be any
7 cathode material, so you don't need to enable that. We don't need to even
8 rely on it.

9 The second point is this is presumed to be enabling. They need to
10 provide evidence. There's no evidence that examples 5 to 17 are not
11 enabled. And if you see here on the left of slide 56, Dr. Yao admitted he
12 provided no comparative analysis on the two different methods disclosed in
13 Uemura. So Uemura discloses two ways to make those 17 examples. One is
14 a coprecipitation method. One is a solid phase mixing method. They have
15 no response to the solid phase mixing method. So again, the argument falls
16 flat and same thing with the anodes. They look at one of them, which has
17 higher reversible capacity. There's no analysis that that's representative
18 lower initial capacity. So again, that argument falls away.

19 Third argument, even examples 1 to 3, they say are not enabled
20 based on Dr. Liang's testing. But as Mr. Juzkow pointed out, he didn't even
21 try to create Uemura. He had a different color, and frankly, it's junk in, junk
22 out. I mean, the first step, he got something wrong, and he didn't repeat it.
23 He tried the experiment one time, for example one, one time for example
24 two, one time for example three. Didn't get the right color. Used his own
25 pre-annealing step. Didn't follow Uemura to heat to remove the electrode.
26 Multiple steps, which Mr. Juzkow said in his declaration, that's going to

1 change the results. And we saw that from his own testing results. Dr.
2 Liang's materials couldn't be charged over 4.0 volts without degrading.
3 That's not what Uemura does. That's not what the prior art, which says you
4 could charge these things up to 4.4. Some of them, Kajiyama said, charge it
5 up to 5.2. His degraded before it reached 4, so he failed to make Uemura's.
6 So frankly, that testing should be discounted. Plus, it's interesting that the
7 petition, sorry, the POR didn't indicate that Dr. Yao retained his own
8 company to do that testing. This is not an independent testing lab. This is
9 from his co-founder of LiBeyond. So frankly, that raises some questions
10 about this testing. He used no experimental controls. You're going to see
11 slides. Counsel says, oh, yeah, there's experiments. That's attorney
12 argument. It's not scientific, and it's incorrect.

13 Again, Mr. Juzkow -- they also said there's no literature out in the
14 record that shows that coprecipitation was used to make similar methods.
15 Mr. Juzkow again showed that it's incorrect. He pulled to a POSITA
16 reference, the Yang reference on slide 61, which used coprecipitation
17 methods and had material which you could charge up to 4.4 volts and had
18 very good cyclobility. So, he said, your testing is flawed and your analysis
19 of the literature is flawed.

20 The last argument on Uemura has to do with they argue that there's
21 errors in Uemura that would cause a POSITA to ignore its disclosures. And
22 again, their argument falls flat because they didn't address paragraph 33. So,
23 as an initial matter, it doesn't even matter about the examples because we
24 don't need it to show anticipation or obvious, and that's unrebutted based on
25 paragraph 33. But essentially, their argument boils down to the capacity
26 measurements. What they argue is capacity measurements in Uemura is too

1 uniform. But then Dr. Yao rejected that argument at his deposition when he
2 said, based on his review of Figure 3, he believes that Uemura multiplied the
3 molar amount of lithium by 180 to get his capacity values. So, it's a
4 calculated value. So, there's no issue. There's no errors they point out.
5 They just disagree. They say, oh, well, we should use 270. We disagree
6 with using, you know, 180, or with the 200 in Armstrong. We want it so cell
7 slow charging, which again is not based on any evidence.

8 JUDGE TORNQUIST: Counsel, this is Judge Tornquist. They do
9 argue though that it was improper that they just made assumptions when
10 they made these calculations, and that these same similar compounds, but
11 that are different at the exact same weight shouldn't have the same capacity.
12 Would you address that?

13 MR. COLIN: That's an interesting criticism, Your Honor, because
14 that's the exact same analysis Dr. Yao applied in manipulating the figures of
15 Uemura. When he says, oh, it should just be higher, he just says you
16 multiplied it by the wrong number, should have been multiplied by 270. So
17 frankly, this is another evidence where RJ Tech's points are internally
18 consistent. They criticize Uemura for doing exactly how they say you use
19 theoretical capacity. I mean, that's their point, Your Honor. They say
20 theoretic capacity saves you from doing the actual experiments. It's
21 basically like a rule of thumb.

22 So, you could say, well, rather than doing those 17 experiments on
23 electrodes, and you'll see they're going to come back and they're going to
24 say, well, paragraph 81 shows its actual experiments. Paragraph 81 has to
25 do with battery capacity. If you read it, it's talking about battery capacity.
26 And this ties back to the point that I'm not sure if they are intentionally

1 mixing up capacity of the battery with the electrode, but paragraph 81
2 doesn't talk about electrode capacity, that's done a different way. When it's
3 talking about the experiments in paragraph 81 and Figure 3, that's battery
4 capacity. So, they had to do those, those are actual measurements, that's the
5 cycle data. But how he determined the cathode capacity, that's exactly how
6 Dr. Yao says it should be done under theoretic capacity, he just says it
7 should be a different number. So again, they're internally inconsistent on
8 that.

9 So, then turning to Abe again, there's no dispute over the
10 dependent claims or the preamble, again, as charged cut-off voltage. And if
11 you look at this paragraph, it talks about the predetermined voltage is zero
12 point volts at the vapor phase carbon fiber negative electrode. So, this is
13 talking, if you look at the very first sense of the paragraph, it's talking about
14 the batteries. This is talking about you have a carbon negative electrode and
15 at the positive electrode, the voltage is set to a range in which no electrolyte
16 decomposition occurs and no irreversible structural breakdown. And then
17 for lithium manganese oxide, that's 4.2 to 4.3. So, you're charging it to 4.2,
18 4.3 relative to the carbon fiber negative electrode. And this is also
19 consistent, like we said before, with Uemura saying charges the 4.3 with
20 Guyomard, which published in 1993, saying you could charge this the 4.3
21 volts before any structural breakdown occurs at the higher temperature. So,
22 this is something that's known. And then, again, it goes on to say lithium
23 cobalt oxide, lithium nickel oxide. These aren't as stable, so you charge
24 these at most to 4.2 and preferably 4.1. So, we believe the 4.2 to 4.3 is a
25 range that overlaps and renders obvious anticipates this limitation.

26 JUDGE TORNQUIST: Okay. Counsel, this is Judge Tornquist.

1 On this one the critical piece seems to be whether that carbon anode it's
2 going to have some voltage contributions of this battery, right? They're
3 arguing that's at least 0.1 and therefore that 4.3 number is actually 4.2 or
4 lower?

5 MR. COLIN: Their argument requires you to read this sentence
6 where it says, for example, lithium manganese oxide is 4.2 to 4.3. There's
7 nothing in that sentence that says for a half-cell. And if you look at the
8 context paragraph 78 is talking about the battery. Paragraph 80, which they
9 rely on, which is talking about lithium nickel oxide, it says the battery is
10 charged to 4.1 volts, which is consistent, which again is preferably 4.1 volts
11 being a battery voltage. It doesn't say here charge it relative to lithium. It's
12 not in there. They're trying to read that in, and frankly, it's not there. This is
13 consistent with what's known in the art. And this is what we argue in the
14 petition and in the reply. I mean, it's known that lithium manganese oxide is
15 charged to 4.3 whereas lithium cobalt oxide, like the patent says, it's charged
16 to 4.2.

17 JUDGE TORNQUIST: But isn't 78 talking about a half-cell
18 measurement?

19 MR. COLIN: So, if you look at the very first sentence of it, it talks
20 about a non-aqueous electrolyte based secondary battery according to the
21 present invention. And then it talks about the design capacity. So, we agree
22 with you that it's -- the paragraph is talking about batteries, but it's saying to
23 measure the design capacity. And it tells you how to do that for the negative
24 electrode and the positive electrode. But the sentence that we're focused on
25 here, for example, it's not saying charge it to that versus a half-cell. That's
26 not what it says. This is known. You charge the, when you're using this

1 type of cathode, you charge it to 4.2 to 4.3. Relative to lithium, relative to
2 cathodes, graphite, that's what the charging voltage is. There's no limitation
3 on here that they would like to read it to be a half-cell. That's just not there.
4 And if you look at, like I said, the paragraph 80 --

5 JUDGE TORNQUIST: It's one of the critical questions then that
6 we have to resolve with Abe, is whether that 0.3 is in a half-cell and
7 therefore would need to be adjusted.

8 MR. COLIN: I mean, it's interesting point, Your Honor, because
9 we have Mr. Juzkow providing his opinions on that. Dr. Yao, he admitted
10 the key text. I mean, so if you look at his declaration, this is what the point
11 of on slide 74 is. He literally altered this paragraph, so it looks like you're
12 just talking about a half-cell relevant to lithium. He pulled out that where
13 omits key text, the language, the predetermined voltage is zero volts at the
14 vapor-phased-grown carbon fiber negative electrode. So, he provided no
15 opinion on that. He literally tried to pull that text out so it looks like
16 something other than what it is. And if you look at, again, paragraph 80, and
17 you look at the embodiments, because it's talking about lithium nickel, he's
18 talking about lithium cobalt, they say charge the batteries to 4.1 volts, which
19 corresponds to what they're saying here for preferably 4.1 volts for lithium
20 nickel oxide and lithium cobalt oxide.

21 So, if you look at the context around it, and you consider it with
22 what's known in the art, which is what, again, we argue in the petition and in
23 the POR when you're talking about combining it with Abe and talking about
24 what would be known to POSA, they're ignoring all that. Again, they take
25 the position, no reference anywhere. It teaches charging a charge cut-off
26 voltage above 4.3. I mean, I asked Dr. Yao about Guyomard where it says

1 charge cut-off voltage of 4.5 and 4.9, does that meet your construction? And
2 he said, no, even though the Patent Office said he did. I asked him about
3 Kajiyama, which he relies on and says charge at a constant current up to 5.2.
4 Does that meet your construction for charge cut-off voltage? And he says,
5 no. So frankly, his position on this, he's saying whatever it is, it could be
6 charged to 5.2 and it's still not meeting the court's construction. So frankly,
7 we just don't find his opinion to be credible. And he didn't opine on the fact
8 that this talks about the carbon fiber and have a good electrode. So frankly,
9 they don't have expert support for their opinion and say so. And it ignores
10 the weight of the whole body of art, which talks about this stuff being well
11 known.

12 I mean, that's in Uemura, that's in Abe, that's in Guyomard, it goes
13 back a long time.

14 Again, I'll move on. They have these criticisms, which we don't
15 think they apply the right construction. So, for Claims 9 to 18, again, they
16 don't raise any dispute in the POR about this. They just say it falls for the
17 same reasons. So, we're not going to address that here unless you have
18 questions. And the same with 7 and 10, they don't raise any issue with
19 actual combinations teaching the dependent claims. They only say there's no
20 motivation to combine or no reasonable expectation of success. And
21 frankly, that just ignores the arguments in the petition at 48 to 51, as shown
22 on slide 80.

23 So, with that, unless there's any questions, I'll save the rest of my
24 time left the rebuttal.

25 JUDGE TORNQUIST: This is Judge Tornquist. I do have two
26 questions. For the cycling data, Guyomard says cycle 5 to 500. What's your

1 position or argument that that covers recycling ratios in the patent?

2 MR. COLIN: So, we set forth in our petition that that covers it
3 because the patent doesn't say -- it just says, it's very broad if you look at
4 that language, it says after 400 cycles. It doesn't say whether it's before
5 formation, it doesn't say after formation, it just says the capacity remaining
6 after 400 cycles is over, you know, I believe it's 80 percent. So frankly, it's
7 irrelevant that Guyomard says after five cycles, you retain this capacity.
8 And, you know, again, this is a new argument in the sur-reply as we have on
9 slide 84. But Mr. Juzkow said, it's very typical that you would start
10 measuring that capacity after the formation, which is the first five cycles.
11 That's why Guyomard says after the first five cycles, because, again, in the
12 first five cycles, that's when you're losing some reversible capacity, that's
13 your initial cycling, and then you have some formation period. And again, I
14 asked Dr. Yao that same question. He said, he provided no opinion on
15 whether cycling should be measured pre-formation or post-formation. And
16 then he said, manufacturers report it post-formation. So, that's what a
17 POSITA would understand that you report what's done after the first five
18 cycles, because again, there's usually a steep drop off sometimes depending
19 on the material. So, it's customary back in that time to measure it -- capacity
20 after those first five cycles. But again, this is a new argument that was
21 raised in the first time in the sur-reply, it's attorney argument, and it's just not
22 supported by any expert testimony.

23 JUDGE TORNQUIST: Okay. And the second argument, or a
24 second question I have is, if we find your arguments for Abe and Guyomard
25 to be persuasive, but not your arguments just based on Abe, can you prevail
26 on obviousness for the dependent claims and not on the independent claim?

1 MR. COLIN: Sorry, can you ask me that one more time, Your
2 Honor?

3 JUDGE TORNQUIST: Sure. Is there a possible situation where
4 we don't find your arguments on Abe sufficient by itself, but your arguments
5 for the combination of Abe and Guyomard to be persuasive? Can you
6 prevail on those dependent claims, but not on independent claims?

7 MR. COLIN: For Abe specifically, that, I mean that's a possibility,
8 Your Honor. I mean we wouldn't obviously agree with that, but they don't
9 address that combination whatsoever, so frankly they have no rebuttal to it.
10 Again, they only address the motivation to combine and the reasonable
11 expectation of success which, I mean, this is pretty much the most expressed
12 motivation I've ever seen before in terms of how these two are
13 complementary and literally Guyomard says optimize it so they don't
14 address that. So, I mean, that could be a possibility with respect to Abe. We
15 don't -- yeah, so I'll leave it at that.

16 JUDGE TORNQUIST: Obviously, you're going to disagree with
17 that, but it was whether we can legally do it with how you wrote the petition.
18 And that was the question I had. So --

19 MR. COLIN: Legally, yes, because they don't address the
20 combination. They don't say the combination doesn't meet any of the
21 dependent claims whatsoever. I mean, it rises -- I mean, their argument, the
22 primary argument on Abe is respect to the charge cut-off voltage, and there's
23 no dispute that if you combine Abe with Guyomard, you would charge it to
24 4.5. So, yeah, I mean, I agree with you that could be a possibility.

25 JUDGE TORNQUIST: Okay. I have no further questions.

26 MR. COLIN: Thank you, Your Honors.

1 JUDGE TORNQUIST: So, you were in 10 minutes, even though
2 we gave you 10 minutes, you're still 10 minutes into your rebuttal. So, you
3 have 10 minutes left over when you come back.

4 MR. COLIN: Appreciate that very much. Thank you, Your
5 Honors.

6 JUDGE TORNQUIST: Okay. With that, Patent Owner, when you
7 are ready. I have we added 10 minutes to their time. So, you have 85 with
8 the 15 in that for your LEAP practitioner.

9 MR. STAMATOPOULOS: Thank you, Your Honors. George
10 Stamatopoulos with Kobre & Kim. With me is my colleague, Robert Zhou,
11 also from Kobre & Kim. He'll be covering part of the argument today for
12 Patent Owner. And I would like to, since I now have 85 minutes, allot 15 to
13 Robert and then reserve 20 for rebuttal.

14 So, you know, a lot has been said about us being inconsistent with
15 respect to the Apple litigation. I think what I'll do, and I would invite you at
16 any point in time to jump in and just ask me questions about anything that
17 you think pertinent. But I'll sort of go through my points and I can take up
18 questions as you see fit.

19 So, I'd like to start from the claim construction issue with respect
20 to the charge cut-off voltage. The construction for this term is the maximum
21 voltage to which the battery is configured to be charged. So, you can see
22 that in Patent Owner's slide 5. If you just read this language, it's very clear
23 that we're talking about a battery voltage. It's the voltage to which a battery
24 is configured to be charged. If you go to slide 6, you'll see that the petition,
25 this is a quote from the petition, it's based on the construction that Patent
26 Owner proposed and its patent litigation against Samsung. And it's the same

1 construction that we're proposing here. And it's also the same construction,
2 by the way, that we proposed and the court agreed with in the Apple
3 litigation. If you go to slide 7, you'll see that the court in the Apple litigation
4 adopted that same construction.

5 Slide 8, you'll see that Samsung proposed this same construction in
6 our litigation against Samsung. If you go to slide 9, you'll see that the
7 expert, Mr. Juzkow, agreed that this is the plain and ordinary meaning of the
8 term.

9 JUDGE RANGE: Counsel, this is Judge Range. Same question I
10 had for Petitioner. What does maximum refer to in this context?

11 MR. STAMATOPOULOS: So, that's a great question, Your
12 Honor. So, we're talking about a battery property here. We're talking about,
13 so the battery has certain chemical properties, right? It has a structure. If
14 you go above a certain threshold, certain ill effects begin to occur with
15 respect to its structure, with respect to its cathode. Mr. Juzkow actually
16 testified to these effects in his deposition. He talked about the cathode
17 material bleeding into the anode and poisoning it once you go above a
18 certain threshold. The key issue, the inventive thrust, let's say, behind this
19 patent, is that once you adjust the structural properties of the battery, which
20 are reflected in the capacity ratio between the cathode and the anode, and
21 sometimes those are inverted, right? In the art, sometimes you refer to the
22 inverse ratio, but it's the same thing, really. So, once you adjust that ratio,
23 the inventive insight of the patent is that you can actually raise that
24 threshold. The core question for this IPR, the heart of the dispute between
25 the parties, is whether it's a battery property or an applied voltage. And you
26 can see that this is at the heart of the dispute. If you go to the reply page 4 --

1 JUDGE RANGE: So, to follow up on that, your description of
2 maximum in that way is, I guess it's inconsistent with the way I understand
3 batteries, in that we're talking about these chemical things. And my
4 understanding is that when you apply a higher voltage, it will always cause
5 some problems. But even when you get a lower voltage, it will eventually
6 cause some problems. And this is all really a matter of degree. Like, I don't
7 know how you could ever say, here's the bright line, I wrote at this number,
8 and now there's a sudden jump up in problems. I don't have that impression
9 about the way things work.

10 MR. STAMATOPOULOS: Well, I think your question makes
11 sense to me as an engineer, right? I think as a lawyer, the parties have
12 agreed that this is the construction, right? So, whether you look at it as
13 applied voltage or as a battery voltage, it's still a maximum voltage to which
14 the battery is configured to be charged, right? The question then becomes,
15 and I'll get back to what you just said, the question then becomes, you know,
16 what are we talking about? Are we talking about a battery property or are
17 we talking about an externally applied voltage? I'm going to put that to the
18 side because that doesn't get to your question. I think the scientific issue
19 behind your question, maybe the answer to your question, is that we're
20 talking about a voltage that was agreed upon in the art as a threshold at
21 which ill effects began to occur. I think you're absolutely right that you can
22 actually be beneath that threshold and still cause structural issues after let's
23 say repeated cycling. That's where the dependent claim limitations come in,
24 where you see that certain capacity levels need to be maintained after a
25 certain amount of cycles.

26 JUDGE RANGE: It could be above that voltage and it might still

1 work a couple of times.

2 MR. STAMATOPOULOS: That's right. And actually, if you look
3 at Mr. Juzkow's deposition, I think it's page 126, and I can get to that. It's
4 actually not in our papers. But he testifies, and this is consistent with what
5 we set to the court in Apple, that you can have instances where you exceed
6 that threshold temporarily and nothing will happen. That's why that
7 configured language is in there. It's a design property, right? We're talking
8 about commercial batteries here. We're talking about products that are
9 ultimately sold to the consumer. The way to do that, in patent-speak, is to
10 use that configured to language, to make clear that this is a design property.
11 And then, I don't know if that answers your question, but I'm going to move
12 on to my point. Feel free to interrupt me, obviously.

13 JUDGE RANGE: Well, so it seems like you're saying though that
14 the maximum is more what people of skill in the art would understand you
15 shouldn't go beyond before you start to cause more problems.

16 MR. STAMATOPOULOS: That's right. That's right. That's right.
17 And the reason, by the way, that persons of skill in the art wanted to go as
18 high as possible is because there's a benefit to that, right? You extract more
19 ions. You intercalate more ions from the cathode into the anode. That
20 increases the amount of lithium held in the anode. It increases the amount of
21 time, let's say, a cell phone user can use their phone without having to go
22 back and recharge.

23 So, everybody's trying to get as high as possible. And at some
24 point in the art, there's this common sort of commonly accepted threshold,
25 which is 4.2 volts. That's what's in the patent. And we disagree with
26 Petitioner that that's not reflected. By the way, there's been this argument or

1 this assertion by Petitioner that there's this huge body of art that talks about
2 going above 4.2 volts. However, if you look at the actual grounds, and I
3 think Your Honor touched on this when you asked if it's possible to find the
4 dependent claims invalid, but the independent claims valid in light of Abe.
5 That is reject the Abe ground. The only art that has been asserted in this IPR
6 with respect to the charge cut-off voltage limitation is Uemura and Abe.
7 Those are the two references that we're talking about today. Were there
8 experiments where folks went above 4.2 volts? Sure. Does Uemura and
9 Abe disclose experiments that are actually, you know, that cover the claim
10 language that satisfy the claim constructions that went above 4.2 volts? No.
11 And here's why. The reason why is because the charge cut-off voltage is
12 undeniably a battery property. It is not an applied voltage. And there's been
13 an allegation, I'm going to jump to that. Well, before going to that, actually
14 I invite your attention to the claims.

15 If you go to slide 10 of Patent Owner's deck, you'll see that Claim
16 5 talks about a secondary lithium-ion cell or battery that has a charge cut-off
17 voltage. You don't need to go to the construction, which says the battery is
18 configured to, which implies a, if not expressly states a design property, you
19 can go to the claim language, which says that this is the battery property.
20 You can go to the specification, slide 11. There's relevant portions of the
21 specification. Again, we're talking about a design property that the battery
22 has.

23 On slide 13, you will see that Dr. Yao explains that upon the
24 completion of charging, the battery voltage does not necessarily equal the
25 maximum applied voltage. And here's the key point, all right? There's been
26 this insinuation that somehow the applied voltage and the battery voltage,

1 that we're saying that those two concepts are completely divorced. That's
2 not true. That's unscientific. It's not true. It's not something that we've said.
3 The two concepts are, of course, related. You charge a battery with an
4 applied voltage in order to get to a battery voltage. And the way you do that
5 can be accomplished in a number of different ways. There's a constant
6 current algorithm where you apply a constant current over the charging.
7 You probably have to apply it at a very slow rate to get to a particular
8 voltage, but that's still one method that you can do it. You can apply a
9 constant voltage where the battery voltage eventually converges to the
10 applied voltage. Sorry, yes, to the applied voltage. And you can apply a
11 constant current constant voltage algorithm. And that's illustrated in slide
12 12. And you'll see in slide 12, on the lefthand side, you see the constant
13 current phase of the charging. On the right hand side --

14 JUDGE RANGE: Counsel, this Judge Range. I'm not sure if
15 you're intending to share your slides, but I'm not seeing them right now.

16 MR. STAMATOPOULOS: I wasn't intending to. I was --

17 JUDGE RANGE: Oh, okay.

18 MR. STAMATOPOULOS: I was trying to guide you. But if you
19 want them to, it will be easier.

20 JUDGE RANGE: I can follow along if you want to do it that way,
21 but.

22 MR. STAMATOPOULOS: It's easier for me, but if it's easier for
23 you for me to share, then I'm happy to do that too.

24 JUDGE RANGE: Yeah, either way is fine.

25 MR. STAMATOPOULOS: Okay. So, if you go to slide 12 of
26 Patent Owner's deck, you'll see this concept illustrated, of constant current

1 and constant voltage charging, and the relationship between the battery
2 voltage and the applied voltage. On the lefthand side of this graph, you have
3 the constant current phase, where the current is kept constant, the applied
4 voltage, which is shown here in green, keeps rising until it reaches a certain
5 point. The battery voltage, which is in light blue, also keeps charging --
6 keeps rising. And then, once you reach a certain threshold, which doesn't
7 need to be the charge cut-off voltage by the way, you have a transition from
8 constant current to constant voltage charging. What happens there is that
9 you keep the voltage constant that is being applied until the battery voltage
10 converges. So, the point here is that there is a delta, there is a difference
11 between the applied voltage and the battery voltage. And what we're saying
12 is that the battery voltage is what governs.

13 Now, this is, I think, the biggest controversy in this IPR. We've
14 been accused, repeatedly, of, you know, being inconsistent between the IPR
15 and the Apple litigation. That's simply not true. Simply not true. If you go
16 to slide 17 of Patent Owner's deck, this is a transcript from the Markman
17 hearing at the Apple litigation. It's actually one of Petitioner's exhibits. And
18 you'll see highlighted where my colleague argued to the court, specifically,
19 the physical characteristics of the battery are what counts here. There are
20 physical properties of the battery that set the maximum to which it is
21 charged. And then he goes on and says, and then obviously in the devices
22 themselves, they are charged up to a particular level. That is not the
23 subjective intent of the designer. It's not the subjective intent of the user. It
24 is the physical characteristic of the battery. That's what matters. It's the
25 battery voltage.

26 Now, by way of background, the dispute in the Apple litigation

1 was not about whether this is a battery property or not. The dispute was
2 about whether the claim actually required a particular method of charging.
3 Remember when we just talked about constant current and constant current
4 constant voltage? That was the dispute. And what we were saying is that
5 the claims don't limit the way in which you reach a particular voltage.
6 Whereas Apple was saying that you need to look at the actual algorithm and
7 it's at that transition point from constant current to constant voltage, that's
8 the cut-off. We were saying that the claims are not limited, basically what
9 Samsung is saying here. However, both parties agreed, and the court agreed,
10 by issuing this construction, which clearly shows it's a voltage to which the
11 battery is configured to be charged, that it's a battery property.

12 So, I think, and let me just point one more thing, that Apple also
13 argued, and that's on slide 16 of Patent Owner's deck, that we're talking
14 about a physical property. Now, they disagreed with other positions we took
15 in that claim construction dispute. But what they're saying here is that we're
16 trying to inject, you know, this configure to language, which I just explained
17 the significance of it. But they're saying that what that does is it transforms
18 it such that it is not just a physical property. And the argument we just
19 discussed on slide 17, which is from the Markman hearing, that my
20 colleague presented to the court in California, is that it's the physical
21 characteristics of the battery. Lest there be any doubt, it's the physical
22 characteristics and properties, the design properties of the battery that
23 counts.

24 Samsung disagrees. They're saying that the charge cut-off voltage
25 is not a battery property. They're saying that we're wrong. Respectfully, we
26 disagree. We disagree because that's not what's reflected in the claims. It's

1 not what's reflected in the spec. It's not what's reflected in the claim
2 construction to which they agreed, which says it's a voltage to which the
3 battery is charged. And it's certainly not what we said to the Apple court.
4 And I'll pause here for a moment. I can address some of the examples that
5 Samsung brought up in the specification and your question earlier about the
6 formation period. But I'd like to pause for a second just to see if you have
7 any questions about our representations to the Apple court.

8 JUDGE TORNQUIST: I have a question. It's not necessarily in
9 your presentation today. But you put in some articles, for example, Exhibit
10 2020 that charged the exact same -- it looks like it charged the exact same
11 commercial battery to five different cut-off voltages from 4 to 4.3. That
12 seems to me to say the cut-off voltage is what you're deciding you're going
13 to drive this battery to. It's not some physical property of the battery. It's
14 somewhat like what Judge Range was talking about. And so, that's why I'm
15 catching up on what you're trying -- what your construction is trying to do
16 here.

17 MR. STAMATOPOULOS: Sir, you mentioned, I think, did you
18 mention Exhibit 2020, Your Honor?

19 JUDGE TORNQUIST: Yes.

20 MR. STAMATOPOULOS: Let me jump to that real quick.

21 JUDGE TORNQUIST: And there's a Table 2, and there's
22 discussion on the left side paragraph.

23 MR. STAMATOPOULOS: So, you said Table 2. Okay. So, there
24 can be a cut-off voltage, like the term cut-off voltage versus charge cut-off
25 voltage versus the way that it was construed in the court and the way that it's
26 defined in the patent doesn't necessarily need to reflect exactly what's

1 mentioned in this article. But what I would say is that it is possible that
2 there are batteries that are configured to different -- to different cut-off
3 voltages. Are you suggesting that here, this is the applied voltage that is
4 being discussed?

5 JUDGE TORNQUIST: No, what I noticed about this, if you go to
6 the page before it, it says the experimental results, they use a specific type of
7 cell -- lithium-ion cell obtained from a company with initial capacity of 1050
8 milliamps hours. And then they took that battery, and they drove it to
9 different cut-off voltages, or what they also call it a cut-off potential.

10 MR. STAMATOPOULOS: So, my, without having read this, and
11 this is a long article, and I apologize.

12 JUDGE TORNQUIST: I understand that. I understand that. No,
13 I'm just -- it's one of the things that I saw as I was going through the record
14 you guys put in.

15 MR. STAMATOPOULOS: So, without having read this in its
16 entirety, I'm not fresh on this, and I'm happy to take a closer look at it and
17 answer questions you may have in rebuttal. But what I would say is this,
18 that, you know, batteries can be tested to see what their cut-off voltage is,
19 you know, where degradation starts, performance degradation starts, et
20 cetera. What I would say here is that, you know, for these particular
21 batteries, it looks like what was being done, there was an applied voltage,
22 and it was leading the battery to a particular internal cut-off, to its internal
23 cut-off. What do I mean by that? Let's say I'm applying a 4 volt external
24 voltage, applied voltage to a battery. If I apply that voltage for a brief
25 enough period of time, the battery voltage will not necessarily reach that
26 value. I have to drive it, in other words, to that voltage. And if you look at

1 Mr., you know, if you look at the experts' testimonies, you'll see that both
2 experts agree that you need to move -- you need to have a greater external
3 voltage than the battery voltage in order to move ions from the cathode into
4 the anode. For example, if you go to slide 14, this is Mr. Juzkow's testimony
5 on this issue where he's asked, so in order to move ions from the cathode to
6 the anode, one would have to apply voltage external to the battery that is
7 greater than the open-circuit voltage, right? Answer, yes. That -- I think
8 that is what is shown in Exhibit 2020 that you're -- and I haven't seen what
9 algorithms being used. If it's constant, current constant voltage, I think both
10 are mentioned, but the idea is that you're applying an external voltage and
11 you're driving that battery to different -- or batteries to different cut-offs.

12 Now, whether those particular batteries are test cells, or they're
13 configured, already configured, based on their capacity ratios and other
14 factors, to be able to sustain those particular cut-offs, that I haven't seen, and
15 I would need to take a closer look in order to answer that question. But the
16 core issue here, I think, is that what we told the Apple court, what's reflected
17 in the claims, what's reflected in the specification, is that this is a battery
18 property. Samsung disagrees with that. And one of the core arguments I
19 think Samsung makes is that there are examples in the spec that, you know,
20 have identical chemical properties or structural properties, and yet have
21 different charge cut-off voltages. Those are examples 14 and 15, I think.

22 Now, Dr. Yao explained at his deposition, and that's at, 107, 16 to
23 108, 12 of his deposition, which is Exhibit 1043. I think that's cited in our
24 sur-reply. The concept of a formation period. The reason he didn't address
25 examples 14 and 15 expressly or directly, is because he wasn't asked about
26 examples 14 and 15 in his deposition. And in addition to that, I would say

1 the disclosures, and that's in the patent, the disclosures of examples 1 to 13
2 refer to battery properties after formation and test. It's clear that examples
3 14 and 15 are examples that fall within that set. So, you're looking at
4 batteries with charge cut-off voltages that are informed by the formation
5 period.

6 And something that is in our sur-reply is that, you know, the
7 invention actually says, sorry, the patent actually says that the invention is
8 advantageously carried out during the formation of the cell. What does that
9 mean? That means that the formation period matters. Not all batteries are
10 the same simply because they have the same structural characteristics. You
11 have to look at the formation period. And if batteries have different
12 formation periods, as is the case in the '641 patent, then they're going to have
13 different charge cut-off voltage. So, respectfully, we don't think that this is a
14 persuasive argument. But in any event, even if it were the case that these
15 batteries were completely identical, let's say the patent didn't say anything
16 about formation periods. Let's say the experts can testify that the formation
17 periods are significant. If you look at these two batteries and they're
18 structurally identical, that would imply that they would need to have the
19 same voltages, whether it's an applied voltage or a battery voltage. So, the
20 argument fails in either possible construction. Therefore, it cannot possibly
21 inform what the right construction should be in this instance.

22 There's also a question about whether the charge cut-off voltage is
23 the full-cell voltage or a half-cell voltage. Now, that argument is relevant, or
24 that dispute, I should say, is relevant to Petitioner's grounds with respect to
25 the Abe reference, which we submit discloses a half-cell voltage between 4.2
26 to 4.3 volts, which is below the claimed range. Now, as Your Honors

1 pointed out during opposing counsel's argument, and I think opposing
2 counsel actually agreed, the claim clearly recites a secondary lithium-ion
3 cellular battery with a charge cut-off voltage in a particular range. So, I
4 don't think there's really any genuine dispute as to this.

5 Now, if Abe discloses a half-cell voltage in paragraph 78, then it's
6 clear that it doesn't satisfy this claim limitation. I don't see any way around
7 that. So, the real question is whether Abe discloses a half-cell voltage or if it
8 discloses a full-cell voltage. And I think it's pretty clear that Abe discloses a
9 half-cell voltage. What I think would probably make sense is to move to
10 Abe, skip ahead a little bit.

11 JUDGE TORNQUIST: Counsel, this is Judge Tornquist. Can I
12 just ask you a question? It seems like for both of these grounds, while
13 there's claim construction issues, the real question is what these references
14 actually disclose. So, for like Uemura, is it 4.3 -- is 4.3 the voltage that the
15 battery is actually internally driven to, --

16 MR. STAMATOPOULOS: No.

17 JUDGE TORNQUIST: -- or is it just an external voltage?

18 MR. STAMATOPOULOS: It is not. It is absolutely not --

19 JUDGE TORNQUIST: So, that's the question.

20 MR. STAMATOPOULOS: Sorry, go ahead.

21 JUDGE TORNQUIST: Is that actually the question that's actually
22 dispositive here and not whether we call it a battery property or external
23 voltage?

24 MR. STAMATOPOULOS: In order to get to that first question, I
25 think you need to get to the first question or maybe vice versa. Let me try to
26 articulate it maybe in my own words. In order to get to the question of

1 whether Uemura satisfies the claim, you need to first answer the question,
2 what does the claim require, right? And our position is that the claim
3 requires a battery voltage. We think that's borne out by the intrinsic record.
4 We think that's consistent with the claim construction that we proposed in
5 earlier cases than that Samsung agreed with. We think that's borne out by
6 the language of that construction. And I think we've pretty much addressed,
7 you know, the parties' positions with respect to that dispute. I'm not going to
8 belabor that point.

9 If you look at Uemura, paragraph 81, it clearly says there is a
10 constant current with a certain charging rate and that goes up to 4.3 volts,
11 right? There's no question about that. That's on the face of the reference. It
12 goes up to 4.3 volts. The question is, is Uemura talking about an external
13 voltage, or is it talking about a battery voltage? And that's the first question.

14 The second question is, to the extent that Uemura is talking about
15 an applied voltage, would a person of ordinary skill in the art understand that
16 applied voltage to drive the battery to 4.2 or above? I should say 4.2. Did I
17 capture your question?

18 JUDGE TORNQUIST: Yes, and it kind of even more crystallized
19 it. I'm not sure I have to construe this. I have to analyze this disclosure as to
20 whether that 4.3 volts is actually something during the cycle discharge,
21 charge discharge cycle, the battery actually got to 4.3 volt.

22 MR. STAMATOPOULOS: In order -- that means, your question
23 implies to me or suggests to me that you agree with our construction.
24 Because if you are saying that I need to look at where the battery is driven,
25 that means that you acknowledge that the charge cut-off voltage is a battery
26 property. If it's an external voltage, if the charge cut-off voltage is an

1 external voltage, then we lose, right? We concede that, that we lose. Of
2 course, we don't think that we should lose. We think that it's very clearly a
3 battery voltage. So, I don't think we're trying to toe any lines here.

4 JUDGE TORNQUIST: I think the problem is that it seems like
5 what you're doing with your battery property is adding something extra
6 beyond proving that they actually drove it to 4.3. It seemed like you were
7 adding something to effect of that's where you wanted it to be, or the battery
8 told you it had to be there. That's why I'm having trouble with your
9 construction. I think I might be agreeing with you that the battery does need
10 to get to 4.3 volts.

11 MR. STAMATOPOULOS: Because it's an apparatus, Your
12 Honor. I think it's the way the claims are written, right? It says it has a
13 charge cut-off voltage. So, you know, how it's being used by a user is
14 almost irrelevant. We're talking about a device here. That's what's being
15 claimed. So, the structural properties of the device, the way that it's
16 designed, its tolerance to current and to voltage, they matter. This is what
17 we're claiming. That's our invention. We are claiming we have invented a
18 battery that could withstand that higher charge cut-off voltage, could operate
19 within that higher charge cut-off voltage. That's why it's claimed that way.
20 And that brings us to your latter question, I think, which is, what does
21 Uemura show?

22 So, Uemura talks about a constant current, right, with a charging
23 rate of 0.5 milliamperes per centimeter squared, that's charged and
24 discharged repeatedly from 4.3 to 2.0. And, you know, I asked Mr. Juzkow
25 at his deposition, that's on slide 29, according to Uemura's description, the
26 charging would stop once the externally applied voltage would reach 4.3

1 volts, correct? That's the way it's written in paragraph 81, or the way it's
2 written in paragraph 81, yes. Is there any other way to understand what's
3 written in paragraph 81? Now, this is not some hard cross-examination here.
4 These are open-ended questions, genuine questions. No, unless they left out
5 the constant voltage component, if they left that out. But when you charge
6 and discharge a cell, if you charge it at a slow enough rate, you don't need
7 that constant voltage component if you charge at a slow enough rate. He's
8 referring to the rate. Remember, when we were talking earlier about
9 constant current, constant voltage, and the delta, he's referring to that delta.
10 He's saying when you have an externally applied voltage, there's a difference
11 between that voltage and the battery voltage. And in order to determine that,
12 you need to take a look at the rate. Is it slow enough?

13 JUDGE TORNQUIST: The problem -- I guess the problem I'm
14 having here with that, I understand what your argument is, but that battery is
15 probably getting charged to what, 50, 60 percent?

16 MR. STAMATOPOULOS: Actually, if it's getting charged to 50,
17 60 percent, it's not reaching that voltage. And you actually beat me to the
18 punch. If you go to slide 33, you know, that's another part of Mr. Juzkow's
19 testimony. When you charge at a constant current, you don't -- you can't
20 move all the lithium from the cathode that you want into the anode. You
21 have some diffusion limits, et cetera. So, he says it's a very common
22 method. If you only did a constant -- he's talking about constant current
23 constant voltage when he's talking about very common method. If you only
24 did a constant current charge, you might only get, let's say, 80 percent
25 charge if you don't like -- if you don't do the full charge. If you charge at a
26 very high rate, like a 2C rate, remember we were talking about the rate, you

1 might only get 60 percent capacity in the cell if you only do the constant
2 current portion.

3 Now, let's remember what Uemura teaches, constant current alone.
4 And then I ask him, that's on slide 35, is that a fast discharge rate or a slow
5 discharge rate? Response, that would be kind of in the middle of your
6 typical 10 hours, in middle of the ground. That's consistent with what Dr.
7 Yao testified, which is on slide 34. A person of ordinary skill in the art
8 would understand that generally this is a relatively medium charging rate,
9 but certainly not the kind of slow charging that could charge a battery to its
10 full capacity using only constant current charging. That answers your
11 question. If you agree with Dr. Yao and you agree frankly with Mr. Juzkow,
12 as well, it answers your question that it doesn't drive the battery above 4.2
13 volts, right?

14 And there's another part of his testimony, of Mr. Juzkow's
15 testimony, where he says, that's on slide 37, it's difficult for the amount of
16 information they give you whether or not that's a low or a high rate. Now,
17 this is not a person of ordinary skill in the art saying this is, this is Samsung's
18 expert. This is somebody who is above the level of ordinary skill in the art.
19 And he's saying, based on what I see in Uemura, I can't tell if this is a high
20 or low rate. So, he's answering indirectly your question, which is, I can't tell
21 if we're driving the battery up to that voltage level. And you have the other
22 expert, Dr. Yao, okay, who is telling you -- and this is also, I know that there
23 have been some photos in Samsung's demonstrative where he's made to look
24 a little bit like a Bond villain. But this is a renowned expert. He teaches at
25 the University of Houston. He's an esteemed academic. And he's telling
26 you this is a medium charge rate. It's a medium charge rate that will not

1 produce this battery voltage.

2 JUDGE TORNQUIST: So, by that kind of understanding, we
3 don't know then what Uemura was -- what's its charge-discharge cycle
4 actually was for the battery.

5 MR. STAMATOPOULOS: Could you repeat your question?
6 Sorry.

7 JUDGE TORNQUIST: Normally, my understanding of a charge-
8 discharge cycle is you take the battery up to a certain voltage, you discharge
9 it at whatever particular constant current, and you take it down to another
10 voltage. It could be 2, it could be 2.5, something before you're going to start
11 damaging this battery, and then you stop. Then you charge it back up to the
12 top, whatever your top was, then you do it again. This says, hey, there's a
13 charge-discharge cycle here at 4.3 to 2. It seems that way, but you're saying
14 that's not what it is. We can't know what this voltage was.

15 MR. STAMATOPOULOS: Correct. Correct.

16 JUDGE TORNQUIST: So, they are really giving us very little
17 information.

18 MR. STAMATOPOULOS: I'm not saying it actually. If you look
19 at slide 38, if you look at Mr. Juzkow's testimony, so just to sum things up a
20 little bit, there's a number of things that you would need to look at in order to
21 determine whether the charge -- the discharge rate you just calculated for
22 Uemura's example is slow or fast, correct? Yes. And that information that
23 would be necessary for you to consider in order to make that determination
24 is not available in Uemura, correct? That's correct. He's answering your
25 question. He doesn't have the information is the answer.

26 Now, my suspicion, this is not in the record, my suspicion is that

1 Uemura is probably trying to go somewhere near 4.2 fast, right? So, they're
2 doing constant current in 4.3 because maybe that's a good proxy for getting
3 somewhere around 4, 4.1, 4.2 perhaps. But it's not giving the information,
4 and you have Dr. Yao's testimony that it doesn't get to 4.2. Now, 4.2 is the
5 conventional wisdom as to -- it's unsurprising that Uemura is trying to get
6 near 4.2, right? That's the limit that was known in the art at the time. And
7 it's also unsurprising that they're okay with using a 4.3 external voltage,
8 right, that's not driving the battery above that threshold, because they're
9 doing it at a fast rate, or they're doing it at a medium rate that's not slow
10 enough to drive the battery to that, let's say, unacceptable threshold, to that
11 unacceptable limit. That's what's going on with Uemura. And that's not just,
12 you know, that's not me. You have to piece together the expert testimony
13 that's in our slide that I just talked about, but you can see that that's what's
14 going on.

15 I would like to turn to Abe briefly, unless you have further
16 questions about Uemura. Very, very briefly, I'd like to turn to Abe. So,
17 Abe, if you look at paragraph 78, and you look at the full context, and you
18 can see that either in slide 63, or if you go to Abe itself and look at that full
19 paragraph, you'll see that this is clearly talking about a triode cell, a three
20 electrode cell, in which both the counter and the reference pole are made of
21 metal lithium. And then it talks about the potential difference between the
22 metal lithium and the positive electrode material. It's very clear that this
23 paragraph is describing a setup in which a lithium anode is being used. And
24 if it's a lithium anode that's being used, that's what we refer to also as the
25 half-cell. That's in our papers. That's what the experts testified. That's
26 different than a lithium-ion battery. And if you go to, and actually, if you go

1 to slide 64, you'll see that's again, Mr. Juzkow's testimony. Secondary is
2 analogous to rechargeable. Lithium is the material that's used in the battery.
3 When you say lithium-ions, that will mean that you don't use lithium metal
4 anodes. That's what Abe is doing in 78, paragraph 78.

5 Now, you know, Petitioner's counsel is right that that particular
6 sentence where 4.2 to 4.3 volts is referred to doesn't spell out we're using a
7 lithium anode. But the whole paragraph is talking about that. That's the
8 context in which that sentence appears. And Dr. Yao was accused of, you
9 know, intentionally omitting a part of this disclosure. Frankly, that part that
10 he omitted, I went back, I've read it numerous times. I would invite you to
11 do the same. It doesn't change the context, which is that this paragraph is
12 talking about a lithium anode. There's nothing about that part omitted in
13 ellipses, by the way. The ellipses are intended to signify to the reader that
14 something's been omitted. There's no -- there's no sleight of hand here.

15 So, the paragraph talks about a half-cell. The experts agree that the
16 half-cell is different than what's required by the claims. And then if you go
17 to slides 66, 67, 68, 69, 70, I don't want to tire you with walking you through
18 all of the evidence. I think that's also in our papers. But it's clear that the
19 half-cell, you know, 4.3 volts in a half-cell translates to something less, 0.1
20 to 0.2 volts less in the full-cell. I don't think there's any genuine dispute
21 about this. And if you have questions, I'm happy to go into that evidence.
22 But if not, I don't want to tire the Board. I don't want to belabor points that
23 are already, I think, easily understood. But the bottom line is that as long as
24 we're talking about a half-cell in Abe, the 4.3 volts in Abe translate to 4.2
25 volts in a full-cell.

26 And in fact, there's other parts of Abe, it's unsurprising that Abe

1 would describe a lower voltage. Because, in fact, there are parts of Abe
2 where Abe teaches against using higher voltages. It says, for example, that
3 4.2 volts is -- let me just try to find that. Well, if you go to slide at 78, which
4 is again about paragraph 78, but it focuses on this part. It says, for example,
5 lithium manganese oxide is 4.2 to 4.3 volts, preferably 4.2, okay? And it's
6 referring, again, it's referring to the half-cell. What is it advising a person of
7 ordinary skill in the art to do in a full-cell? To go below 4.2 volts. So, it's
8 actually teaching against even approximating what was known as the limit as
9 of that time, which was 4.2. It's telling a person of ordinary skill in the art,
10 stay well below, because otherwise you get all these adverse effects.

11 In a different part, Abe talks about, you know, potential explosions
12 that might occur. And I have to apologize to you because I went off -- that's
13 paragraph 9 in Abe. There is a risk of explosion when the battery is charged
14 above certain voltages and advises limiting the voltage to 4.1 volts.

15 If you go to paragraph 9 of Abe, again, you will find that
16 admonition. So, unless there's other questions about the charge -- about the
17 voltage disclosure in Abe, and the voltage disclosure in Uemura, I would
18 like to turn a little bit to talk about the theoretic capacity issues.

19 By the way, how much time do I have in my reserve, in my
20 unreserved time?

21 JUDGE TORNQUIST: I have you -- what you -- obviously need
22 to get 15, I want to see your LEAP. So, I have you at about, you need to
23 hand it over about 2:55 or so.

24 MR. STAMATOPOULOS: Okay. Thank you. I appreciate that.

25 So, with respect to the capacity ratio. Again, there's been this
26 accusation that, you know, we've misrepresented, we've taken inconsistent

1 positions, et cetera. I don't want to touch on the tenor of those accusations.
2 But I do want to touch on the substance.

3 So, if you go to Patent Owner's slide 21, you'll see clearly that the
4 theoretic capacity is recited in the claims, right? And theoretic capacity
5 needs to mean something. And I think here, you know, maybe it's due to
6 confusion. The question is, is theoretic capacity at 4.2 volts, which is what's
7 recited here in the claims, is that the max absolute maximum capacity? The
8 answer is no. Okay. The absolute maximum capacity of the battery is not
9 obtained at 4.2 volts. It's obtained at some higher voltage. And by the way,
10 if you get the battery to -- if you intercalate all of the ions such that you
11 obtain the maximum capacity, you also destroy the battery, right? So, that's
12 a theoretical value. So, that's question number one.

13 Question number two, is theoretic capacity of 4.2 volts just any
14 capacity measured at 4.2 volts? No, it's not. A theoretic capacity of 4.2
15 volts is a specific number. It's not an abstract number. It's not an abstract
16 value. It's a theoretic capacity that is obtained. It's a fraction of the
17 maximum capacity that is obtained at 4.2 volts. And if you go to the
18 patent -- because counsel said that we said that the patent defines this
19 parameter, that the patent defines this parameter -- if you go to the patent, at
20 column 4, lines 5 through 9, you'll see that it -- there is a definition. You'll
21 see that it says, in addition, theoretical capacities of positive electrode and
22 negative electrode means the capacities of the positive electrode and the
23 negative electrode calculated -- calculated -- not measured, with a charge
24 cut-off voltage set at 4.2 volts. Why is it that it says calculated?

25 Well, if you go to slide 26, that's explained again by my colleague
26 at the Markman of the Apple litigation. With theoretical capacity in the way

1 that we use it, it's close to the bottom, theoretical capacity in the way that we
2 use it, determine it by using a particular coefficient, a particular
3 mathematical reference adjustment to determine how much is pulled out at a
4 particular voltage. So, it's a value that you can literally look up in a book,
5 right? The theoretic capacity of 4.2 volts can be calculated. It can be looked
6 up in a book. It doesn't need to be measured.

7 Now, the fact that it doesn't need to be measured doesn't mean that
8 you can't measure it. And as you heard from counsel for Samsung, if you
9 measure it, if you actually try to measure it, practically, you would need to
10 probably spend 150 to 200 hours. That's why you measure it once, and then
11 you put it in a book, and you look it up, rather than have to measure it every
12 time. That's why it's called the theoretical value. Uemura didn't use that
13 value. Uemura didn't use a value taken out of a book and with a parameter
14 coefficient applied to it, such that it would correspond to the theoretic
15 capacity at 4.2 volts. What you Uemura did is something else, and frankly,
16 it's unclear what you Uemura did because it doesn't disclose what it did. But
17 what it did is certainly not what's required by the claims, which clearly state
18 that you need to use the theoretic capacity at 4.2 volts, not the maximum
19 capacity, the absolute maximum, which is different, not any capacity at 4.2
20 volts, the theoretic capacity at 4.2 volts. And that's describing --

21 JUDGE TORNQUIST: This is Judge Tornquist. I have two
22 questions, and you can keep going forward. First is, it seems like the parties
23 have completely ignored the specific capacity language of Claim 1.

24 MR. STAMATOPOULOS: Yeah.

25 JUDGE TORNQUIST: What does that require?

26 MR. STAMATOPOULOS: The specific capacity, Your Honor,

1 is -- Claim 1 is not part, first of all, of this proceeding. Let me start from
2 there. The specific capacity is -- I think counsel captured what the specific
3 capacity is. He captured the definition of a specific capacity. But when you
4 say it's 4.2 volts, more likely than not, and I have to say, I would have to
5 read the patent again to see exactly what that means, because that's not an
6 issue that was in our papers, as you know. It's not an issue that we've
7 considered, as you pointed out. But, you know, depending on what the
8 patent says, that could be a value that is synonymous, for example, to the
9 theoretic capacity, or it could mean something else. But it's not an issue that
10 was part of this proceeding. So, I'm --

11 JUDGE TORNQUIST: Excuse me there. Because their grounds
12 actually have Claim 1 in them. And maybe that's why there's such confusion
13 here. I think maybe in the Apple IPR that Claim 1 didn't come in, I would
14 have to check that. But as far as I'm looking at these papers, Claim 1 is
15 challenged by Petitioner.

16 MR. STAMATOPOULOS: Well, let me -- Your Honor, if it's
17 okay with you, is it okay if I look at this and respond in rebuttal?

18 JUDGE TORNQUIST: Sure.

19 MR. STAMATOPOULOS: Because I'm not, I have to confess, I'm
20 unprepared to answer your question, regrettably.

21 JUDGE TORNQUIST: Okay, no problem. I would like to get that
22 answered before we leave this hearing.

23 MR. STAMATOPOULOS: Absolutely, absolutely. I'd be happy
24 to do that. I'd be more than happy to do that.

25 JUDGE TORNQUIST: Okay. The second question I have is, on
26 your theoretic capacity, the article that you actually provided to give those

1 numbers gave two different numbers depending on what charge density was
2 used. And your expert says, commonly, it's used at a much lower rate, but it
3 doesn't say it's always used that way. So, I'm trying to figure out, do we
4 need to also consider charge density?

5 MR. STAMATOPOULOS: I don't think that it -- you know, I
6 don't think that it's necessary to consider charge density because it's very
7 clear that Uemura just didn't use like the theoretic capacity. But I think the
8 bigger point that our expert was getting at is that in order to arrive at that
9 value, you really need to apply a very, very low current. That's the only way
10 you can get to the theoretic value. That's the whole point of the theoretic
11 value, that it is a maximum at a particular voltage. And it's kind of tied to
12 the charging rate that we were talking about earlier. And that I suspect you
13 may even be better versed at than I am as a technical matter. But the point is
14 that if you apply a low enough rate, you can arrive at that theoretic value,
15 kind of like squeezing a lemon. If I squeeze it slow enough and hard enough
16 gradually, I can probably get all the juice out. But if I apply a blunt force,
17 maximum force instantaneously, there might be juice left. That's what I
18 think that the best analogy that I can come up with is with respect --

19 JUDGE TORNQUIST: I understand your argument. The problem
20 is that your expert only said it's a common way. He didn't say it was the
21 only way, the best way. And that's what I'm trying to figure out, what are of
22 the other ways. And so, how can we limit it to that?

23 MR. STAMATOPOULOS: Because I think, Your Honor, the
24 more salient point is if you look -- the patent gives the answer itself. If you
25 go to column 4, you'll see that it's generally speaking, it's a calculated value.
26 So, you look it up. You can look up this value. And I think our expert has

1 provided that article which shows, reports that value, what that value would
2 be at that particular voltage. You can also do it by measuring, right? But if
3 you measure it, you'd have to be consistent with that calculated value. I
4 think that's something that should resolve any issue that might linger with
5 respect to what the best approach might be as a practical matter.

6 JUDGE TORNQUIST: Okay. Just think about that as you go
7 along because the reference he did provide and picked a number out of, has
8 two numbers in it. One at a real slow electrical charge, and one at the exact
9 same charge density that's actually used in Uemura. So why wouldn't we
10 use that? Because it does give you the right calculated number for what
11 you're actually doing. That's what I'm thinking. So, you can come back in
12 rebuttal after you've thought that through and just let me know your position.

13 MR. STAMATOPOULOS: So, that's one point that Your Honor
14 raised, and then the other one is about specific capacity. So, I will come
15 back to you with both of those on rebuttal.

16 Before turning it over to my colleague, Mr. Zhou, I just want to say
17 that, touch on one other point, which is this question of irreversible, or sorry,
18 inactive materials. Just like to point out that the inactive materials, which
19 are the non-carbon materials, should not contribute. They should be
20 excluded from the capacity calculation. That's something that again, Mr.
21 Juzkow, and it's in our papers, testified to. He said that the active materials
22 are the ones that contribute to the intercalation, and those are the carbon
23 materials. And we have excluded, or Dr. Yao excluded, the non-carbon
24 materials, the inactive materials, from the capacity calculation. And that's an
25 additional reason why the Uemura reference fails to meet the capacity ratio
26 limitation.

1 In any event, unless there are questions on this point, I'll turn it
2 over to my colleague, and then I'll take it back to wrap up this opening
3 argument.

4 JUDGE TORNQUIST: Okay.

5 MR. ZHOU: Thanks, Judge. Your Honor, I'm going to address
6 the issue about Uemura is not an enabling reference. First, Petitioner relies
7 upon Uemura as a standalone reference for both anticipation and
8 obviousness. In slide 49, we cited to the recent case which held that a
9 skilled artisan must be able to make and use a portion relied upon by
10 Petitioner, which we are going to go to that in the next few minutes, to
11 practice the claimed invention.

12 In the presentation just now, Petitioner seems to argue that
13 paragraph 33 of Uemura alone is sufficient to enable everything. But that's
14 just not true. Paragraph 33 only discloses something called capacity
15 balance. It does not disclose anything about charge cut-off voltage.
16 Petitioner's only reliance about charge cut-off voltage is at paragraph 81 of
17 Uemura. So, for Uemura to be an enabling reference for the claimed
18 invention of '641 patent, a POSA must be able to practice paragraph 81 of
19 Uemura. And that means that the skilled artisan must be able to reproduce a
20 battery as described in paragraph 81.

21 And in slide 50, we have a screenshot about paragraph 81, and it
22 says that the results thereof is shown in Table 1 together with other values.
23 And Table 1 is Figure 3 of Uemura, which includes 17 examples. This
24 means that a skilled artisan must be able to reproduce a battery as described
25 in Figure 3. That is true whether the skilled artisan induces the experimental
26 procedures as laid out in Uemura, or use some other procedures in the

1 literature. Whatever method used by POSITA, the resulting battery must be
2 able to be a second-release amount of batteries that can be charged to 4.3
3 volts.

4 Petitioner argues a lot about Dr. Liang did not strictly follow the
5 experimental procedures in Uemura, but they missed a very key aspect, not
6 Dr. Liang's testing. Dr. Liang's experiments, which he described in
7 paragraphs 36 to 46 of his declaration, which is Exhibit 2031, he used
8 experimental procedures as described in a paper called Kachiyama, which is
9 published after the priority date. And he used that paper and successfully
10 synthesized the layered test material as described in Uemura's example two.
11 There was also no dispute that Dr. Liang successfully synthesized the
12 layered material as example two.

13 He also used an anode material, which is a high carbon that is
14 material identical as the one used in example two. There was also no dispute
15 about that. Dr. Liang then combined those two materials to form a fourth
16 cell, the battery. And the resulting battery, which is structurally identical to
17 Uemura's example two, does not enable the invention because that battery
18 cannot be charged to 4.3 volts. As we show in slide 53, once we apply the
19 voltage reached about 4 volts, the battery started to degrade. That means
20 that it's not safe to charge it even further.

21 Petitioner did not really like rebut all those evidence in their
22 papers. Their response currently is that, oh, Petitioner should have tested
23 every single example in Figure 3 of Uemura. But that's not the requirement.
24 And Dr. Liang actually explained why we picked those examples, examples
25 one to four as representative to do the testing. (INDISCERNIBLE) explains
26 that those are representative. And if we find that those examples cannot be

1 reproduced, then there is no need to reproduce all the other examples.

2 First, Dr. Yao in paragraph 147 of his declaration explains that
3 examples one to four are representative of the kinds of materials as all the
4 other examples. Again, I don't see Petitioner challenged that argument. And
5 if you look at Uemura, Uemura does not distinguish among the various
6 different doping elements without examples either. Actually, Uemura
7 describes the choice of cobalt, which is used in examples one to four as
8 desirable.

9 Second, example two battery has all the special features as claimed
10 by Uemura to be advantageous -- advantages. So, example two has a doped
11 lithium magnetic oxide material with a layered structure that has some
12 doping element as the cathode and hard carbon as the anode. I heard from
13 Petitioner earlier that, well, that's not enough because we did not combine a
14 battery that has anode material similar to, for example, example one or the
15 other examples, which has many more amounts of irreversible capacity. But
16 we don't need to do that because example two, according to Uemura actually
17 has like better feature. According to Uemura, I think it's paragraph 26 --
18 paragraph 25, it said that it's desirable to have more irreversible capacity as
19 the anode than less. So, if the best battery in Uemura cannot work, then the
20 remaining battery cannot work either.

21 JUDGE TORNQUIST: Counsel, this is Judge Tornquist. Can I
22 ask just a couple baseline questions for you? Would you agree that Uemura
23 being a patent is presumed enabled?

24 MR. ZHOU: Yes, I agree with that.

25 JUDGE TORNQUIST: Okay. And would you agree that it's
26 Patent Owner's burden then to show that Uemura is not enabled?

1 MR. ZHOU: Correct. It's already, it's up to the -- if we meet that
2 burden then it's up to the Petitioner to try to (INDISCERNIBLE).

3 JUDGE TORNQUIST: Okay. And it's also a highly fact-
4 dependent analysis with the Wands factors and the like.

5 MR. ZHOU: Yeah, correct.

6 JUDGE TORNQUIST: Okay. I just want to make sure we're all
7 on the same baseline. And would it be Patent Owner's burden by a
8 preponderance of the evidence?

9 MR. ZHOU: That's my understanding, yes.

10 JUDGE TORNQUIST: Thank you.

11 MR. ZHOU: Okay. So, going back to the arguments that I'm just
12 making. So, example two, and examples one through four, they're actually
13 not just the only evidence we provided to show that Uemura is not enabled.
14 In paragraphs 162 to 179 of Dr. Yao's declaration, we provided extensive
15 evidence to show that why the capacity data in Figure 3 of Uemura are all
16 wrong.

17 So, I heard that from Petitioner that there is no dispute that the data
18 in Figure 3, they are calculated. That part is correct. But Dr. Yao went
19 further. Dr. Yao analyzed the assumptions made by Uemura and established
20 that those assumptions are wrong. So, all of those data are wrong. And in
21 page 47 of our Patent Owner response, we say that because all of the data
22 are wrong and a person of ordinary skill is going to disregard all those
23 examples, then Uemura does not include even one single working example.
24 So, a POSITA has to do undue experimentation to try to have even one
25 working example just based on Uemura's disclosure. And we did -- and Dr.
26 Liang did that by trying to replicate example two based on procedure that is

1 dated after the priority date, and he even failed.

2 So, and I also heard from a Petitioner that this is like the first time
3 Dr. Liang did this kind of synthesis and all of this is unreliable and this is
4 done by a company that is affiliated with Dr. Yao, but they could have like
5 excluded that evidence based on some grounds. They have the chance to do
6 that, but they decided not to file any motion. So, I think that established that
7 actually partly our method is reliable.

8 I also heard from the Petitioner that they cited a few papers to
9 show that contradicts Dr. Yao's testing, for example, too, and all the other
10 testing. But what I think that is shown in slide 61 of their demonstratives.
11 What they failed to tell the Board is that none of the paper they cited, they
12 are similar to the battery as described in Uemura. Again, Uemura uses a
13 battery that has layered the version of magnesium outside of the cathode,
14 and hard carbon at the end. All those articles they concern lithium metal
15 battery. In other words, they're just testing the actual capacity and the anode
16 material is lithium metal. And those materials are material -- those batteries
17 are a material difference from what Uemura describes.

18 Okay. So, the next part is about Dr. Yao's testing. So, Dr. Yao
19 tries to replicate the experimental procedures as described in Uemura.
20 Petitioner made a lot of assertions against Dr. Yao's testing in their slide 57,
21 and also in their reply. We rebutted every single argument in our sur-reply
22 at pages 14 to 19. So, I'm not going to repeat everything, but I think there
23 are two points that I want to highlight. The first is that the assertion that Dr.
24 Liang did not put enough control is just absurd. There are two layers of
25 control that Dr. Liang designed in their system -- in his testing. The first is
26 that he tried to replicate Kajiyama.

1 So, he used the same experimental setting. He followed the
2 procedures in Kajiyama, and he finds that the cathode material he
3 synthesized has XRD patterns that shows that it's a layered structure
4 consistent with what he's teaching -- what is taught in Kajiyama. He then
5 does the testing in a half-cell, trying to see what kind of capacity those
6 materials test. And then those half-cell capacity that also is consistent with
7 what is reported in Kajiyama. So, the fact that he can reproduce the data in a
8 reported paper shows that Dr. Liang has the skill and his experimental
9 setting worked. And it's inside the material that Petitioner's false dispute has
10 a layer structure. He then does the full-cell testing and shows that the
11 battery failed. So, that first part has shown that everything worked.

12 The second part is that he tried to synthesize materials, the cathode
13 materials, in examples one, two, three. The three example cathode
14 materials, they only differ in their DCM content. There's no other
15 difference. If you look at slide 54 of Patent Owner's demonstratives,
16 paragraph 19, the highlighted portion is the only difference for the three
17 examples, the DCM content. The fact that all three examples, they don't
18 have layer material, they have similar XRD patterns, demonstrated that Dr.
19 Liang's testing worked and they produced consistent results. We think the
20 consistency in the three examples showed that it worked.

21 Again, also like Petitioner cited has like a big table showing that
22 Dr. Liang's testing is different from what Uemura teaches. So, Uemura is
23 not a testing recipe. It does not try to spell out every single minute detail
24 about how the experiments should be done. So, a person like a skilled
25 artisan reviewing Uemura and trying to reproduce it has to make judgment
26 calls about like to fill the gaps basically, and rely upon his or her knowledge

1 and expertise. That's what Dr. Liang did. And if you review all the
2 difference, all the differences between our testing and Uemura's
3 experimental procedures, I think the takeaway is that Dr. Liang tried to make
4 the experiments better. He tried to make Uemura work, but he cannot. For
5 example, Uemura uses like the current as 0.5 milliamp per square
6 centimeters. Dr. Liang used a slower charging rate. As every, as both
7 experts testified, a slower charging rate is going to get you a better
8 performed battery. So, he used that to try to improve that.

9 I think there is also something about like in the whole precipitation
10 method, we did not use citric acid or ammonium bicarbonate during that
11 process. But the (INDISCERNIBLE) did not mention that in that same
12 paragraph, Dr. Liang used the DCM hydroxide solution, which is described
13 by Uemura as the most suitable method. So, we picked actually the best
14 among the three of them. The list actually goes on and they are all laid out
15 in our sur-reply at pages 16 to 18. And despite all those efforts, experiments
16 consistently show that by following Uemura, you are not going to get the
17 layered material. So, a person of ordinary skill following Uemura cannot
18 even synthesize the first step, not the battery, which is a cathode material.

19 Finally, I want to discuss about like Uemura's data. So, Petitioner
20 relies upon Figure 3 and the paragraph 33 for the ratio notation. And I think
21 it's very clear from this disclosure of Uemura that paragraph 33 is based on
22 the data reported in Figure 3 because the ranges overlap. And Dr. Liang
23 calculated a very extensive analysis to show that all those data are wrong.
24 Again, I don't see any rebuttal to that. So, under the controlling Federal
25 Circuit precedent, which is the LG case, and also the In re Yale case, a
26 POSITA is going to disregard those disclosure because it includes so many

1 obvious errors that it cannot be said to anticipate those limitations.

2 Yeah, regarding, Uemura, is there any other questions?

3 JUDGE TORNQUIST: I see no questions. Thank you very much.

4 Okay, so, Patent Owner, you'll have 20 minutes remaining on your sur-
5 rebuttal when you come back.

6 MR. STAMATOPOULOS: If I may, Your Honor before that, I
7 just want to see if there's any other questions on the other grounds. But
8 maybe I can address those in the sur-rebuttal. Maybe that's better plan.
9 Thank you. Sorry.

10 JUDGE TORNQUIST: No problem. I'm not seeing any other
11 questions. So, like I said, you'll have 20 minutes when you come back on
12 your sur-rebuttal. And Petitioner, I have you with 10 minutes for your
13 rebuttal. When you're ready.

14 MR. COLIN: Okay. Thank you, Your Honors. Would you like --
15 do you have any questions that you would like me to start with? Okay.
16 Assuming no. In the last couple of minutes, I've heard a couple of new
17 arguments about paragraph 81 of Uemura not being enabled. Again, that's
18 not in the POR, so that's an untimely new argument that we're objecting to.
19 And there's also a new argument about paragraph 33, again, being based on
20 the data in Figure 3, that's not in the POR, that's an untimely new argument.
21 And, frankly, I don't even think that one's in the sur-reply that it's actually
22 based on the data. And it's just legally incorrect, as you said before, to treat
23 a range as one and the same as specific embodiments. That's just not
24 correct.

25 So, turning back then to the charge cut-off voltage. I heard Patent
26 Owner talk a whole lot about being fully charged. And here, let me -- I'm

1 sorry, let me throw up some slides again. Sorry. And frankly, one of the
2 things that we did, well, we did hear new arguments about what the intrinsic
3 evidence shows. Again, that's not stuff that was in the POR. That's an
4 untimely new argument. But one of the things that they're talking about with
5 it being actually configured to be charged, not actually charged. I mean,
6 they're rewriting the court's construction to be actually the maximum voltage
7 to which the battery is charged. So, they're reading out that configured to be
8 by requiring fully charged. And again, that's inconsistent with what RJ Tech
9 told the court.

10 For example, we see that here on slide 17. Again, they talked
11 about -- and we didn't hear any response to these statements. So, there's
12 some arguments about what Uemura discloses, what it doesn't disclose. Oh,
13 I'm sorry. I wasn't sharing. But there's no rebuttal that RJ Tech told the
14 court repeatedly, the battery is charged at a constant current until it reaches
15 the charge cut-off voltage. That's what they told the court. They say that's
16 what Uemura discloses. You know, sometimes they say there's also an
17 applied voltage, I also didn't understand yet. And they provided no
18 explanation of how there's an applied voltage in connection with a constant
19 current. Because this is not constant current. I think all the parties agree,
20 Uemura is constant current charging. There's an applied constant current.
21 There's not an applied voltage. So again, when they say that, that's
22 inconsistent with their own statements. It's inconsistent, frankly, with the
23 technology. And again, it's inconsistent with the statement that, you know,
24 when you charge constant current, you charge it until the charge cut-off
25 voltage. They distinguish constant voltage as being charged until it's fully
26 charged. That's not what they say the charge cut-off voltage is. It says it's

1 the upper charge limit. It's the designed limit of the battery. And that's what
2 Uemura teaches when it says, cycle it up to 4.3 volts.

3 The patent itself offers no guidance about its view, reflecting what
4 the charge cut-off voltage is. We know certain things which Patent Owner
5 talked about. There's an overcharged condition. There's a fully charged
6 condition. And there's a condition in which the battery is not fully charged.
7 Uemura is best understood as teaching the charge cut-off voltage at 4.3
8 volts, because that's the maximum voltage that the battery is designed to be
9 charged. And also, because it's a well-known maximum voltage for lithium
10 manganese oxide-based cells, as shown across the references. That's shown
11 in Abe, it says charge it to 4.3. That's shown in Uemura. It's shown back in
12 Guyomard, as reflected in the prosecution history, back to 1993 saying, you
13 could charge lithium manganese oxide to 4.3 volts before it has any ill
14 effects. That's the sweet spot for lithium manganese oxide. And I heard
15 counsel, I believe, say before that you charge it up to the spot before it's
16 known to have effects. You look at Guyomard, that's what's shown. That's
17 what's known to any POSA, and that's reflected also in Uemura and in Abe,
18 and in frankly, multiple other references which we cite throughout the
19 papers, including the Terrascone paper, the new references cited by Mr.
20 Juzkow, which is Jang, Ceder, Amundsen. Everything says that you could
21 charge these to higher voltages. That's known. And I believe, again, they
22 said you charge -- that voltage is where you charge it before you have ill
23 effects. So, under Patent Owner's own argument, again, Uemura teaches the
24 charge cut-off voltage.

25 Again, there's some new attorney argument that I heard for the first
26 time. This isn't even in the sur-reply, that Uemura was designed to charge it

1 only up to 4.2 volts. That's not in the papers. That's a new argument.
2 Again, that should be rejected. And frankly, when they discuss this
3 limitation in their battery property, they don't discuss at all the connection
4 with the intrinsic evidence to actually support that opinion. We don't see
5 that anywhere.

6 So, turning to theoretic capacity. Again, we still haven't heard any
7 response to the fact that the specification because (INDISCERNIBLE)
8 defines the patent, sorry, defines that term. We actually heard a little bit of
9 new attorney argument on that issue. Again, that's not in the papers. It's for
10 the first time here at the argument. That should be disregarded.

11 There's also a new argument that there's questions about it being
12 calculated versus measured based on that definition in the spec. Again,
13 that's not something them or their experts talked about. That's a new
14 argument. That should be rejected.

15 And again, we've heard the argument that this is something that
16 should just be looked up in the book. I mean, that's based on expert
17 testimony. If you look at Dr. Yao's declaration, there's nothing supporting
18 that whatsoever. There's nothing saying -- there's no reference. They can't
19 point to a single reference that says the theoretic capacity is obtained
20 through slow charging. It's simply not there. And it's simply inconsistent
21 with what RJ Tech told the court about what the actual theoretic capacity is,
22 because as we said before, he told him it's not a maximum based on the
23 Handbook of Batteries. So frankly, there's no support in the patent for that
24 entire position. And frankly, I didn't hear any dispute that what they did is
25 inconsistent with their own arguments by being initial versus reversible
26 versus being measured, I mean.

1 The other new argument that we heard today from Patent Owners
2 about any differences between Claims 1 and Claim 5. Again, there's no
3 information in the POR on that. That's something they just said simply
4 Claim 5 is representative of Claim 1, and they never addressed any
5 differences whatsoever between specific capacity and theoretic capacity.
6 Again, in what they told the court, they treat them as one and the same. The
7 patent only says this is what the capacity ratio is. It doesn't say there's a
8 different one when it's specific capacity versus a different one versus
9 theoretic capacity. I think the parties all agree on that. There's just one
10 disclosure of it. So, it's treated the same in Claims 1 and Claims 5. But I
11 mean, the petition, obviously, counsel for Patent Owner misspoke when he
12 said Claim 1 wasn't addressed. It is obviously in the papers. And the
13 petition went through all Claims 1 and Claims 5 and all the dependent
14 claims. But again, there's no -- the POR never raised any issues. Again, the
15 patent also uses them interchangeably. I think it talks about theoretic
16 specific capacity or theoretic energy. There's a couple of different ways it
17 uses it. It's not entirely consistent, but there's no different treatment between
18 specific capacity or theoretic capacity.

19 Unless the Board has any questions, I'll rest at this point.

20 JUDGE TORNQUIST: Okay. Thank you very much. I don't see
21 any further questions. Let's hear from Patent Owner for your sur-rebuttal.

22 MR. STAMATOPOULOS: Thank you, Your Honor. Sorry, I
23 spoke over you. It's a problem with Webex.

24 So, I think Your Honor had a couple questions before for me to
25 address in sur-rebuttal. So, first of all, with respect to the question of
26 specific capacity versus theoretic capacity, I looked it up. Counsel was right

1 that I was not -- that I misspoke. We told the District Court that the two
2 terms can be used interchangeably, I think the same applies here. There's no
3 issue with that. We're in agreement.

4 Now, I believe Your Honor had another question. I heard
5 something -- and before I get to that, because I think it's relevant, about there
6 being no evidence that you can look up theoretic capacity in a book. I think,
7 you know, if you look at Samsung's slide 47, there's literally a reference here
8 to Dr. Yao's declaration where he talks about how to calculate that value.
9 He also testified at his deposition about how you can also measure that value
10 by applying a slow current, which I think was Your Honor's question before
11 the break about Armstrong. And I think what's shown in Armstrong, you
12 know, you have this 270 value, which is the value that we use. I think if you
13 look at faster charging values, those are actually lower than 270 before you
14 reach 4.2 volts.

15 So, the point here is that if you're going really slow to 4.2 volts, the
16 value you're going to get is 270. And that's a very, very close approximation
17 to that theoretical capacity value that we were talking about earlier, that you
18 can look up. That's, I think -- I believe that addresses your question, but if
19 not.

20 JUDGE TORNQUIST: Well, I guess the question I have is, is
21 there anything that says we can't also look at the number that was derived in
22 Armstrong when they used the same current density is actually used in
23 Uemura, which would drop you to 200 and might, I don't know, I haven't
24 done the calculations, might throw off your calculations that you were
25 showing that the actual capacities are under 1.

26 MR. STAMATOPOULOS: You're talking about the 0.5?

1 JUDGE TORNQUIST: Yes.

2 MR. STAMATOPOULOS: Where you would go up to 200?

3 JUDGE TORNQUIST: Yes.

4 MR. STAMATOPOULOS: The idea is -- and that's, I think that's
5 where Dr. Yao's testimony is, that if you go, if you use a -- by the way, that's
6 a current similar to the one that's used in Uemura, right? 0.5, I believe,
7 maybe it's the exact same current. So, the idea there is that, you know, you
8 have, on the one hand, Mr. Juzkow testifying that that current in a different
9 context -- when I asked him if that's a fast charging rate, slow charging rate,
10 he said he couldn't tell, but it looks like it's probably somewhere in the
11 middle. And then Dr. Yao also testified that that is a middle of the ground
12 charging rate where you're not going to obtain full charging. I mean, up to
13 above 4.2 volts as a result of applying a constant current at 4.3.

14 So, the same rationale applies here. If you use that 0.5, that's not a
15 slow current. That's not a slow charging. And because it's not a slow
16 charging, you're not going to get the theoretic value. And the question here
17 that Dr. Yao was presented with were not all the different ways in which you
18 can obtain the theoretic value. The question he was opining on is, what does
19 this mean? And what this means is that it's the maximum capacity you can
20 obtain at 4.2 volts, which is distinguishable -- again, and this was also an
21 issue, I think, in the Apple litigation -- not I think. This was the issue in the
22 Apple litigation, that the theoretic capacity at 4.2, okay, it's distinguishable
23 from the absolute theoretic maximum. And the reason that's the case is
24 because at different voltages, you get different lithium extraction. I think
25 that's a non-controversial point, actually.

26 JUDGE TORNQUIST: Right. And I guess the thing that I add to

1 that is, yes, the voltage -- what voltage you set it at is going to limit your
2 maximum. But what the Armstrong reference is saying to me is, you don't
3 only have to look at voltage, you got to look at current.

4 MR. STAMATOPOULOS: Absolutely.

5 JUDGE TORNQUIST: That's going to set the top two. And you
6 used a number that was not was actually used. And I'm trying to say, and I'll
7 go back to what I said before, is your expert said commonly the best way to
8 do this is very slow, but didn't say its the only way. So, I'm trying to figure
9 out why we cannot look at that number.

10 MR. STAMATOPOULOS: What you would have to ignore is the
11 word commonly. What you would have to ignore is the word commonly.
12 And I think that when, you know, I don't recall right now if Dr. Yao was
13 asked, is this the only way that you could possibly do it? My suspicion is
14 that when he said commonly, he probably meant, you know, like, ceteris
15 paribus, you know, all else being equal, this might be the only way of doing
16 it.

17 The bottom line is that the claim limitation that requires you to do
18 it slowly is actually the word theoretic. If you just said capacity at 4.2 volts,
19 that's no longer a theoretic capacity and you can use, I don't, like -- I think
20 it's, I'm not sure if the claim is even definite at that point because you could
21 probably use any different charging rate, any different current, and you'd get
22 a wide array of values as a result of that. Now, that's not in the record. You
23 know, this part is attorney argument. There's obviously parts where I think
24 we're well covered in our papers. I'm not going to address every spot where
25 counsel said we're making a new argument. Frankly, I wasn't able to follow
26 it, to be very honest with you. So, if you have a question on what's new and

1 what's not, I'd invite you to ask me that question. I don't want to leave an
2 incomplete record, but I'm not sure that I followed every single spot where,
3 you know, we were told that we're making a new argument.

4 But setting that aside, I think that's the key language. Theoretic
5 means, and theoretic at 4.2 volts, means you have to extract the maximum at
6 that voltage, for that voltage. And in order to do that, Dr. Yao said,
7 commonly the way to do it is by applying a very slow current. I don't know
8 if there's any testimony of the record that there's another way to do it. But
9 the bottom line is that that is a value, right? If you get a different value, if
10 you get 270 and then you get 250 or 240, the lower value is not also a
11 theoretic capacity because you can do it some other way. In fact, what I
12 would argue is the fact that you get a higher value at 270, sorry, at the lower
13 current suggests to me that that's a closer approximation to the theoretic
14 value than if you had used a higher current.

15 In other words, let me put it this way. If I'm a person of ordinary
16 skill in the art, and or let's say a chemistry student, and I'm given the
17 following exercise, figure out how to measure the theoretic capacity of 4.2
18 volts, I would probably start applying slower and slower currents or different
19 currents. And when I reach a point where my values converge, I'll know that
20 I've gone low enough in terms of the current. But if I have a delta in terms
21 of the capacities, that probably suggests to me that I'm not using the right
22 current. I probably need to go lower. That would be my response with
23 respect to Armstrong and its disclosure.

24 Well, with that, I think I have nothing to add further to add for
25 Patent Owner, Your Honors.

26 JUDGE TORNQUIST: Okay. Thank you very much. This was

1 an excellent argument today. And thank you very much to the LEAP
2 practitioner. It's always a pleasure to have LEAP practitioners argue before
3 us. With that, this argument is adjourned.
4 (Whereupon the above-entitled matter went off the record at 3:28
5 p.m.)

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