

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

NANOCO TECHNOLOGIES LTD.,
Patent Owner.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

Record of Oral Hearing
Held Virtually: Wednesday, February 23, 2022

Before ERIC A. FRANKLIN, GRACE KARAFFA OBERMANN, and
CHRISTOPHER M. KAISER, *Administrative Patent Judges*.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

APPEARANCES:

ON BEHALF OF THE PETITIONER:

F. Christopher Mizzo, Esquire
Gregory Arovas, Esquire
KIRKLAND & ELLIS LLP
601 Lexington Avenue
New York, NY 10022
212.446.4800
chris.mizzo@kirkland.com
greg.arovas@kirkland.com

ON BEHALF OF THE PATENT OWNER:

William A. Meunier, Esquire
Matt Galica, Esquire
Michael Newman, Esquire
MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C.
One Financial Center
Boston, MA 02111
617.542.6000
WAMeunier@mintz.com
MSGalica@mintz.com
MCNewman@mintz.com

The above-entitled matter came on for hearing on Wednesday, February 23, 2022, commencing at 1:00 p.m. EST, by video/by telephone.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 PROCEEDINGS

2 COURT REPORTER: And get them, and there is a public
3 line and a form of live stream today. Once I connect the
4 counsel, and say that all parties are connected, I will need
5 just about a minute to get the public line started, and I
6 will say it is connected when it's done.

7 And when I finish the -- when I merge the video from
8 the breakout rooms, there is a tendency to -- for -- for the
9 system to mute your mics. Just make sure that it is unmuted
10 again, just in case, whoev- -- whoever's speaking.

11 Thank you. Give me just a minute. I'll be back. All
12 right. All parties are connected. I'll need one minute for
13 the public line to start. One second. And live stream is
14 connected. You may -- you may begin.

15 JUDGE KAISER: All right. Good afternoon, everybody.
16 Thanks to everybody for being here. This is a hearing in IPR
17 2021-00182, 183, 184, 185, and 186, all of which are
18 captioned Samsung Electronics Company Limited versus Nanoco
19 Technologies Limited.

20 I'm Judge Kaiser and the other members of the panel
21 here with me are Judges Franklin and Obermann. Before we get
22 started, can we do a roll call of the other people here,
23 starting first with Petitioner?

24 MR. AROVAS: Yes, Your Honor. You know, good

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 afternoon to everybody. You -- you have on the line from
2 Kirkland & Ellis for the Petitioner, Greg Arovas and
3 Christopher Mizzo. We'll both be splitting up to the various
4 patents.

5 And then also on the line from Samsung, we have Mr.
6 Tim Jezek, Mr. Dan Girdwood. Also joining us from Korea,
7 Mr. Justin Choi, and Mr. Il-sung Tuk [ph].

8 JUDGE KAISER: Okay.

9 MR. AROVAS: And that's everybody, Your Honor.

10 JUDGE KAISER: All right. Thank you. Anybody here on
11 behalf of the Patent Owner?

12 MR. MEUNIER: Yes, Your Honor. This is Bill Meunier
13 from Mintz, here on behalf of the Patent Owner. With me are
14 my partners, Matt Galica and Michael Newman. Mr. Galica will
15 be handling the argument for the 182 IPR, which I believe
16 we're starting with first.

17 And Mr. Newman will be taking the second session.
18 Also with us is -- on the line is Jim Doyle, who's helping us
19 out with the presentation today.

20 JUDGE KAISER: Okay. Thank you very much.

21 MR. MEUNIER: Thank you.

22 JUDGE KAISER: All right. So the way we set this up
23 in the hearing order, just to refresh everyone's memory, is
24 that first we'll talk about case number 182. We've got 60

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 minutes total for that discussion, with each side having 30
2 minutes.

3 That discussion will start with Petitioner's
4 presentation, continue with Patent Owner's presentation, and
5 then each party can reserve time out of that 30 minutes for
6 its rebuttal, and we'll have the rebuttals after the opening
7 presentations, again with Petitioner going first, and then
8 concluding with Patent Owner.

9 And after we've finished with the 182 case, we'll
10 move on to the discussion of the other cases. That discussion
11 has 120 minutes with each side having 60 minutes total, and
12 we'll split that up the same way.

13 Before we go any further, let me make sure I didn't
14 get any of that wrong or -- and there are no objections to
15 proceeding in that fashion. Petitioner, is that okay?

16 MR. AROVAS: Yes. It is. That's our understanding.

17 JUDGE KAISER: Okay. And then Patent Owner?

18 MR. MEUNIER: Yes. No objection.

19 JUDGE KAISER: Okay. All right. And then just a few
20 last reminders before we begin. First, neither party has said
21 that there's any confidential information that's going to be
22 discussed today.

23 My understanding is that we have someone calling in
24 on the public line, so please keep that in mind before you

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 discuss any non-public information. I don't think there's any
2 in the record, but if anything happens to come up, plea- --
3 please be aware that there are potentially members of the
4 public listening in.

5 Second, the panel has access to all the
6 demonstrative exhibits that each side filed as well as the
7 entire record of all five proceedings, so please feel free to
8 direct us to any portion of the record if you think that's
9 helpful. If you're going to do so, please give us an exhibit
10 number, and page, column, or line numbers as appropriate.

11 And for demonstrav- -- demonstrative exhibits, when
12 you're discussing them, please state o- -- out loud which
13 slide you're discussing, not only because it helps us make
14 sure we're on the same page as you, but also because it makes
15 it clear a record, which will be more useful for our
16 deliberations, and decision making.

17 And then the last set of reminders here is just with
18 respect to everyone appearing remotely by video, that
19 presents different challenges than all being in the same room
20 together. And so there's a decent chance that at some point
21 during the proceeding, some of us will be talking over one
22 another.

23 I -- I think that's probably inevitable, but let's
24 try to minimize that as much as possible, if for no other

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 reason than to make the reporter's job a little bit easier.
2 And if possible, when you're not speaking, please keep your
3 microphone muted, and when you do begin speaking, please
4 identify yourself, again, to try to make a clearer record.

5 So with that, I think we're ready to begin. So I'm
6 not sure who's speaking first on behalf of Petitioner, Mr.
7 Arovas, or Mr. Mizzo, but let me ask you collectively, how
8 much time you'd like to reserve for rebuttal in the 182
9 proceeding out of your 30 minutes.

10 MR. AROVAS: Yes, Your Honor. This -- this is Greg
11 Arovas. I'll be addressing the 182, and would appreciate to
12 reserve 10 minutes.

13 JUDGE KAISER: Okay. All right. So Mr. Arovas,
14 you've got 20 minutes, and I'll -- I'll let you know when
15 that time is up. I will try to give you some warning before -
16 - beforehand but no promises there, and so you can begin when
17 you're ready.

18 MR. AROVAS: Well, thank you very much. So there --
19 there are three grounds, and just to set the stage a little
20 bit, I'm going to send -- spend most of my time on ground
21 one, and make a -- a few comments as well on some of the key
22 points on ground three. Ground two, I think from the
23 briefing, it's pretty clear is entirely subsumed in the
24 disputes of ground one, so there's nothing unique to address

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 with regard to ground one.

2 Turning to -- to slide two, just to set the stage
3 with the 068 patent, and a few of the key disclosures that
4 are relevant to understanding the context of the prior art,
5 first there's one and only one claim we have to deal with
6 here.

7 So I'll be talking about claim one, and that is the
8 only claim in the patent that exists, as well as what's
9 disputed. Slide three, gives some of the background of the
10 068 patent.

11 And I think what's significant here, and we see a --
12 a -- a number of excerpts from Exhibit 1001, the 068 patent,
13 is that the problem that's addressed by the 068 is really a -
14 - a well-known problem that quantum dots, which are
15 extensively used, need protection, or they're vulnerable to
16 environmental stressors like oxygen or moisture.

17 And significantly, whether you look at the known
18 prior art disclosed in the background of the 068 or Dubrow,
19 or Nelson, the two references relied on by the Petitioner,
20 the solutions all are different ways of implementing the same
21 thing, was basically some form of encapsulation or barrier
22 between the quantum dots and the environment, you know, the
23 sources of oxygen and moisture.

24 Now, if we look at slide five on the left-hand side,

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 you have claim one on the right-hand side, you got figure
2 four which shows the process. The 068 particular approach
3 that's claimed is to form an emulsion of first and second
4 phases.

5 Now what's important here is that the pricing
6 language is used in the claim, so the emulsion is an emulsion
7 of a phase one, and a phase two, or first phase and second
8 phase material.

9 And each of those phases separately comprise
10 different substances that go into it. So, for example, a
11 first and second polymer and quantum dots, but the disclosure
12 within the 068 contemplates certainly other things or -- or
13 substances being added as well. This is comprising language.

14 The other thing I'd point out about the claim
15 language itself is that, solids are in fact required to be
16 included, and those are the quantum dots are one of the
17 required elements of the comprising language.

18 Then turning to slide six, the last of the
19 background slides, is claim construction. And I think here,
20 it's important to note that the -- the board in the
21 institution decision did put forth the claim construction of
22 the key term in this dispute, emulsion.

23 The parties, and the -- the experts, and the
24 depositions, and the briefing, both agree. The experts agreed

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 that that is in fact the ordinary meaning, construction of
2 the term emulsion.

3 And I think what's telling as we go through the
4 Patent Owner's arguments here is, for the Patent Owner's
5 distinctions of Dubrow to be accepted, we need to conclude
6 that the use of the common ordinary meaning, well understood
7 term, emulsion, is actually being used contrary to the
8 ordinary meaning construction of the board.

9 Contrary to what both experts have agreed is the
10 ordinary meaning of emulsion in the art, to a person of skill
11 in the art, and additionally would be a use of the term that
12 as far as the record is concerned, and the experts who have
13 searched for it, it would be a use of the term that's never
14 been used in any of the record evidence.

15 Nobody has ever used it that way in any reference
16 article, other patent that's -- that's been cited in the
17 record. So it would really be a somewhat unusual, pretty
18 extreme situation for the term to be used in Dubrow in -- in
19 such a fundamentally different way.

20 So now, what I'd like to do is go through some of
21 the -- the points in -- in Dubrow with regard to ground one.
22 And turning to slide eight, starting with the problem, and
23 the solution in the Dubrow disclosure, we see in Dubrow the
24 exact same problem.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 They're confronting the issue that quantum dots are
2 vulnerable to environmental stressors, particularly oxygen
3 and moisture, so the same stressors that the 0 -- that the
4 068 talks about. And the solution is exactly the same
5 solution that's claimed in the 068, which is to protect those
6 quantum dots with a two phase emulsion that includes first
7 and second polymers, quantum dots, as well as potentially
8 other substances a- -- as well.

9 And that's what we see in, for example, paragraphs
10 125 and 188. You know, paragraph 125, discussing how the
11 multiphase encapsulation will be impermeable to moisture and
12 oxygen, the goals of the 068. And explicitly in paragraph 188
13 of Dubrow which is Exhibit 1005, that it is a QD-APS-epoxy
14 emulsion, so using the ordinary meaning term emulsion. Now, -
15 -

16 JUDGE KAISER: Mr. Arovas, can I interrupt you just
17 for a moment. This is Judge Kaiser. The -- there's some
18 possibility, I suppose, that paragraphs 125, and 188, and 187
19 of Dubrow are -- are talking about different -- sorry.

20 I'm blanking on the word, different embodiments. Is
21 there any connection in Dubrow between them? I mean, is there
22 any way that we can be sure that when it's talking about a
23 QD-APS-epoxy emulsion in paragraph 187, for example, that
24 that's also applicable to whatever mixture of quantum dots

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 APS and epoxy as in paragraph 125.

2 MR. AROVAS: Ye- -- yes. Yes, Your Honor. I think
3 it's -- it's explicitly connected. I think it's the only
4 possibility. And so if you were to connect, let's say
5 paragraph 128, which discusses the formation of the -- the
6 QD-APS-epoxy using toluene -- toluene, and you look at all
7 the different embodiments that exist, and then you go to
8 paragraph 188.

9 188 specifically refers to a QD-APS-epoxy emulsion,
10 okay? There are other embodiments certainly, like there's a
11 PEI embodiment, right? But that's -- this is obviously
12 not talking about that because it is explicitly calling out
13 the constituent elements. And then if we go back through the
14 disclosure, we'll see two things.

15 One is 128 is the main disclosure of the QD-APS-
16 epoxy embodiment, so there's a direct linguistic connection
17 there. Also we see that it doesn't re- -- refer to let's say
18 removal like paragraph 129 does of the solvent, which is a
19 PEI embodiment, but it doesn't talk about that language.

20 And instead it -- it -- it has a process consistent
21 with performing or creating an emulsion, which is, is that
22 spatial dis- -- distribution, and in- -- immiscible liquids,
23 which then again ties exactly to the ordinary meaning of the
24 notion.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 So there's really kind of no other embodiment to
2 point to, so it's explicitly in the disclosure connected
3 together.

4 So moving to -- and I think actually that if we look
5 at slide 10, we'll see that the -- actually the connection of
6 that evidence that Dubrow dis- -- you know, expressly
7 discloses this due phase emulsion which is that combination
8 of substances in 187, 188 and in 128.

9 So if we look at the right-hand side of slide 10,
10 you'll see that in 128, where it goes to the details of
11 preparing that -- that combination of materials, it comments
12 due to the immiscibility of APS in the epoxy, APS coded QDS
13 are located in a spatial -- in spatial domains throughout the
14 epoxy.

15 That is a -- a -- a very clear disclosure of the
16 microstructure of an emulsion. And then in 187, of course,
17 it's talking about QD-APS-epoxy emulsions, the same thing as
18 188. And significantly here too, because there's a discussion
19 of the emulsion in the context of the first element where
20 it's, what's created and in the deposition.

21 187 and 188 specifically referred to curing that
22 emulsion which is post deposition, so all ties together very
23 clearly. And moving to slide 11, if I could, what I'd like to
24 do is respond to the Patent Owner's arguments in the briefs

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 on two levels.

2 So first, that there are arguments made that are
3 inconsistent with the express requirements of claim one, so
4 therefore whether or not correct, and we do believe they're
5 technically incorrect, it actually doesn't map to the result
6 of this petition.

7 And second, to talk about the technical correctness
8 of some of those -- those positions, based on the express
9 disclosure of Dubrow, as well as other record evidence that
10 the -- the Petitioner has put in the record.

11 So first point, this issue of is an APS -- is APS a
12 solid alone at room temperature, and therefore, does that
13 mean that the emulsion, the ordinary meaning of emulsion,
14 that's discussed in Dubrow somehow doesn't apply?

15 And so even if that were correct, and I'll show
16 later why it's not correct based on Dubrow that APS and
17 toluene is -- is a solid, it doesn't actually matter because
18 if we look at, for example, slide 11, which has claim one as
19 the -- the first bullet, we see that the claim requirement is
20 actually a first and second phase, and uses comprising
21 language to discuss the constituent elements, the required
22 constituent elements of that first and second phase.

23 So there is no exclusion of other components in the
24 first phase or the second phase. And in fact, we know that it

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 must include the first phase solids because the quantum dots
2 themselves are solid, so there'd be no inconsistency there.

3 So first point, the claim language is, the emulsion
4 is formed of a first and second phase that are liquids under
5 the ordinary meaning construction. And it -- the polymers
6 themselves do not have to be liquids or entirely liquids.

7 Second, it is admitted, nobody can test that toluene
8 is in fact a liquid, and so putting the qu- -- quantum dots
9 and APS in that will be a liquid that is undisputed. We go to
10 slide 12, looking at some of the other record evidence.

11 And again, this is -- this is not really disputed
12 that for example, Exhibit 1029 and 1030, which are
13 contemporaneous publications note that -- that the state of
14 the phase one material would be determined by the solvent,
15 not the solute.

16 So the presence of -- presence of solids in the
17 liquid is not going to be disqualifying. And as we saw, it
18 would in fact be required for the phase one material because
19 the quantum dots themselves are solids, which is admitted on
20 the right-hand side of slide 12 by Patent Owner's expert in
21 Exhibit 1026, the expert deposition.

22 Moving to slide 13, additionally addressing kind of
23 this issue of APS as a solid and whether it matters or not.
24 We -- if we look through the embodiments of the 068 patent,

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 the 068 expressed and contemplates, not just the quantum dots
2 as being solids, but lists a series of substances that can be
3 used for this -- this phase one material.

4 It includes polystyrene, which by admission of the
5 expert correctly so, polystyrene is in fact also a solid at
6 room temperature. And so it's clear that the first phase can
7 include polystyrene, which is a solid, so again, consistent
8 with the disclosure of the 068. And so if we go to slide 14 -
9 -

10 JUDGE FRANKLIN: Counsel? I'm sorry, counsel. This
11 is -- this may be a minor point, but -- so are you saying, in
12 other words, that although we're looking for a liquid, it can
13 be a suspension, is essentially that what it is, it's a liquid
14 suspension?

15 MR. AROVAS: I -- I -- I think I want to make sure
16 we don't get hung up on the word suspension. But I -- I think
17 I -- I agree with you. So what I'm saying is that --

18 JUDGE FRANKLIN: Because it -- it's a liquid that
19 contains solid.

20 MR. AROVAS: Right. So the --

21 JUDGE FRANKLIN: And the solid is suspended in the
22 liquid.

23 MR. AROVAS: Yes. Yes. You still need the emulsion,
24 right? Because that's the phase one phase two claim

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 requirement of the motion, but there can be solid suspended
2 in the phase one liquid, or the phase two liquid.

3 And in fact, we know from the claims, there's a
4 requirement that quantum dots once solid are suspended in
5 that liquid. But if -- whether there are other solids is not
6 disqualifying in any way of whether the Dubrow disclosure
7 meets the claim requirements of claim one.

8 JUDGE FRANKLIN: And when I refer to suspension, I'm
9 referring to the two separate phases.

10 MR. AROVAS: That's right. I mean, there'll be a --
11 an emulsion can be a suspension. And I think the patent
12 owner's expert has a -- also agreed with that.

13 JUDGE FRANKLIN: Okay.

14 MR. AROVAS: So looking at slide 14, to put these
15 pieces together, it has four different excerpts from Dubrow
16 Exhibit 1005. And first, what do we know? We know it is a
17 liquid in liquid combination of immiscible materials,
18 expressly stated by Dubrow in paragraph 128.

19 If we look at the first highlighted portion of box
20 one, it says a matrix material, that's the epoxy, which is
21 admitted to be a liquid, is added to the solvent mixture,
22 which is the APS-QD-toluene combination, so you have a liquid
23 in a liquid.

24 Also we know that that produces in -- because of the

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 immiscibility of the APS and the epoxy, that you have APS
2 coded QDs in spatial domains throughout the epoxy, which is
3 describing basically the suspension, Your Honor, that you
4 pointed out to.

5 It's a suspension with some solids, but in the form
6 of a mi- -- emulsion microstructure. If we go just to the
7 right, what do we know in paragraphs 187, also in 188? The
8 same language that that is described pre-cure -- pre-cure as
9 a QD-APS-epoxy emulsion using the ordinary meaning term
10 emulsion.

11 We know that that is what is deposited between on
12 the barrier layers. We see that at the bottom in paragraph
13 128 as well, and we know that if we go to 0.4 bottom left,
14 also from Exhibit 10- -- 1005 Dubrow, that the two phase
15 system upon curing, is created upon curing the QD-APS-epoxy
16 emulsion.

17 So we know it's an emulsion pre-cure, which is
18 what's deposited on the barrier sheets. So this is exactly
19 what is disclosed in claim one, and is all that's required.
20 So this subst- -- substantiates the anticipation of claim
21 one.

22 As I mentioned before, this is using claim language
23 of claim one ordinary meaning of emulsion and disclosure of
24 Dubrow. Assuming some of the arguments made by the patent

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 owner, in fact, correct, what I would like to do is spend a
2 little bit of time, and just note how some of those arguments
3 are in fact incorrect.

4 First, slide 15, does APS dissolve in toluene? The
5 argument is made by Patent Owner, it does not. Well, if we
6 look at the express disclosure of Dubrow, which is on page --
7 slide 15 to the left-hand side, paragraph 128.

8 We see that, it says there's a mixture of APS and
9 toluene, right, to provide the APS coded QDs and a matrix --
10 and a matrix material is added to the solvent mixture. But
11 what do we know about the word solvent?

12 A solvent, it's typically a liquid, but it's a
13 substance that in which other substances would dissolve.
14 There are only two things that are put into that solvent,
15 APS, and QDs. We know the QDs don't.

16 The only thing that Dubrow could be referring to as
17 being solvated right, or -- or dissolved is the APS. So
18 express disclosure which is confirmed by Dr. Moffitt, slide
19 16, what else do we know?

20 Well, we know that APS is almost all styrene groups.
21 It's eight to one styrene. Dr. Swager, as well as
22 contemporary references note that styrene will dissolve in
23 toluene, and Dr. Moffitt commented that with the eight
24 styrene groups or molecule or -- or components, it will

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 dissolve, and in fact, the immune group will make it more
2 soluble, as he points out in Exhibit 2034, his deposition
3 page 24 lines seven to nine.

4 Second point that's made by the Patent Owner is, and
5 this is slide 17, even if APS is soluble in toluene, it
6 becomes insoluble once it bonds to the quantum dots. That
7 again is resolved by the Dubrow disclosure.

8 If we look on the left-hand side of slide 17, you
9 can see, paragraph 128 talks about a solvent mixture, which
10 is the combination of QD-APS --Toluene, okay, which is after.
11 So it's a solvent mixture after the QDs, and the APS was
12 added.

13 So that interaction has already occurred, and it's
14 still described by Dubrow as a solvent mixture, which is
15 confirmed by Dr. Moffitt, that the hydro- -- hydrophobic
16 sections of the chain will extend into the toluene solvent to
17 maintain their solvated state.

18 We also know that APS is provided in excess, as we
19 see in paragraphs 118 and 119, so there'll be APS bonded to
20 the QDs, and APS in excess as well. Third, and I'll go one
21 more --

22 JUDGE KAISER: Mr. Arovas -- sorry. You're -- you're
23 about to run into your rebuttal time which is fine, but we'll
24 just take time out of your rebuttal, if you keep going.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 MR. AROVAS: Thank you. Yep. I'll use just one more
2 -- or two more minutes if I may, on this issue of evaporation
3 slide 18. Evaporation is a well-known way of producing
4 emulsions, Exhibit 1036 as well as to point out slide 19, the
5 express disclosure of -- of Dubrow is residual solvent
6 exists, which we see in paragraphs 132, and also 187.

7 Of course, after the evaporation step is where 187
8 describes it as emulsion. And if I can go to the second --
9 third ground, I'm going to jump forward a little bit, and
10 just make a couple of very quick points on the third ground.

11 Moving to slide 27, ground three, which is Nelson in
12 view of the teachings of Dubrow about emulsions. First, same
13 problem. The problem is to protect QDs not the particular
14 solution of creating an IPN or an emulsion.

15 Second, same components. QDs, the same two polymers
16 descr- -- described in the 068, as well as Dubrow and Nelson,
17 the methacrylate, and epoxies. Third, most critically, is
18 admitted by the experts that both the IPN and Dubrow are
19 known techniques, known microstructures to be used.

20 And so, as we see, for example, if we go forward to
21 slide 31, in the Uber tax case, that when you have a
22 situation relying on KSR, when you have a situation where it
23 is known to in the art, that two or more known techniques can
24 be used, it is not inventive.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 It's a design choice to pick one or the other. And
2 that is the reason for this combination. Slides 28, 29 and
3 30, I won't go through in detail, but they all address a
4 question raised in the institution decision about the motive
5 for combination.

6 The IPN is admitted to be not as good as phase
7 separated materials. The problem of defects as we see in
8 slide 29, is obviated by using the emulsion because it is the
9 thermal cure of the epoxy that causes the problem which is
10 eliminated using an emulsion because the QDs are in the first
11 phase, not the epoxy phase.

12 In slide 30, there will be additional protection
13 from using the emulsion over the IPN because the QDs will be
14 entirely in phase one, and not in phase two. And with that,
15 Your Honors, I'll save the rest of the time for rebuttal.

16 JUDGE KAISER: Okay. Thank you. You -- you have
17 about seven minutes left, so that's what -- what you'll have
18 for rebuttal.

19 MR. AROVAS: Thank you, Your Honor.

20 JUDGE KAISER: All right. And then, let's see. I
21 don't remember who was going to -- was it Mr. Galica who was
22 going to do Patent Owner's presentation on this case?

23 MR. GALICA: Y- -- yes, Your Honor.

24 JUDGE KAISER: Okay. Let's see, first let me get

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 from you how much time, if any, you'd like to reserve for
2 your surrebuttal?

3 MR. GALICA: I'll shoot for 15 minutes, and reserve
4 15.

5 JUDGE KAISER: Okay. All right. Then you've got
6 about 15 minutes before you start to run into that rebuttal
7 time, and you can start whenever you're ready.

8 MR. GALICA: Thank you, Your Honor. So the -- the
9 question to answer in this proceeding is whether the material
10 that the Petitioner has pointed to, is being deposited
11 between gas barrier sheets in grounds one, grounds two, and
12 grounds three.

13 The question is whether that material is an emulsion
14 as the claim requires. The answer is no. This is because the
15 method that Petitioners rely on, involve a solvent
16 evaporations step, which eliminates the liquid solvent from
17 the material, leaving behind only solid encased quantum dots
18 in epoxy.

19 And as Petitioner's counsel talk through, and I
20 believe in response to one of the questions asked, a solid in
21 a liquid alone does not constitute an emulsion. So for this
22 reason alone, all the grounds should fail. And Jim, if we can
23 bring up slide four.

24 Okay. So for the record, I'm on slide four now.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 There -- there's an additional reason that the Petitioner has
2 failed to demonstrate that emulsion ever exists in the first
3 place, let alone if the material is deposited between gas
4 barrier sheets.

5 So what we see on the slide, it should be slide four
6 -- apologies the wrong deck. Okay. So what we see in the
7 claim is that an emulsion, as stated, comprises -- first
8 phase comprising, first polymer, quantum dots, and a second
9 phase comprising second polymer.

10 The figure, annotated figure on the right of the
11 slide visually depicts what's required. You have in your
12 first polymer phase annotated in blue liquid surrounding
13 quantum dots, and then that is phase separate immiscible,
14 does not mix with the second polymer phase, which also has to
15 be a liquid, and that is depicted in the yellow annotation of
16 the figure.

17 So an easy way to think about this is oil and water.
18 When those two materials are combined, the two materials stay
19 separate, and they don't mix. And Petitioner has failed to
20 demonstrate the material that relies on in a Dubrow method
21 phase separates, or exists as two separate liquids.

22 So for this additional reason, all of Petitioner's
23 grounds should fail. So I -- I'm going to turn to slide nine
24 now for the record because it's important to -- to understand

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 what Dubrow's method actually states and discloses.

2 And in reviewing it, there really can't be any
3 debate that the material deposited between gas barrier sheets
4 in Dubrow is not an emulsion as the claims requires. So the -
5 - the first step of Dubrow involves coding quantum dots with
6 amino polystyrene.

7 And this is done by placing both the APS, I'll use
8 as shorthand for amino polystyrene and quantum dots in
9 toluene. So at -- at this point in Dubrow's method, you have
10 solid APS coded quantum dots in toluene.

11 The next step, and it's a two-part step, involves
12 adding to the combination toluene -- sorry, epoxy, and
13 evaporating toluene. For the purposes of the question or
14 issue in this proceeding, it doesn't matter the order in
15 which those two steps occur.

16 Put in another way, the toluene could be evaporated,
17 and then the epoxy could be added, or it could happen in the
18 opposite sequence. You could add epoxy, and then evaporate
19 toluene.

20 The -- the -- the important point to take away from
21 this is that once toluene is evaporated, what you're left
22 with is solid APS coded quantum dots in epoxy. And this does
23 not satisfy the claimed emulsion because there are not two
24 liquid phases.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 They're not phase effort, and that's the material
2 that's deposited between the gas barrier sheets. And I'll
3 jump very quickly because it -- it was asked by Your Honor.
4 Are there any other embodiments that talk about the use of
5 QD-APS and epoxy?

6 And Petitioner throughout this proceeding has relied
7 on paragraphs 125, 187, and 188, and I believe your question
8 was, how do we know that those embodiments are the same as
9 what's being described in paragraph 128, which is the method
10 that Petitioner has relied on throughout the duration of this
11 proceeding?

12 And the answer is they -- they aren't the same. And
13 we know that because different materials are used and a
14 different method is used as well. In all of paragraphs 125,
15 187, 188, there is no toluene mentioned.

16 Toluene is the linchpin to Petitioner's arguments,
17 and it's not mentioned in any of those embodiments. There's
18 also no solvent evaporation step mentioned. And there are em-
19 -- other embodiments specifically paragraph 130 of Dubrow,
20 that talk about the use of -- or combination of QD-APS, APS
21 coded QDs in epoxy.

22 And the steps used to make that are forming solid
23 particulates, shaved particulates of APS coded quantum dots,
24 and then placing that into epoxy. And that's more similar to

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 the method embodiment and materials described in paragraphs
2 125, 187, 188.

3 So we know that the -- there is no similarity
4 between the embodiments 125, 187, 188, and the method that
5 Petitioner actually relies on throughout this proceeding.

6 JUDGE KAISER: Mr. Galica, can I -- can I ask you?

7 MR. GALICA: Yes.

8 JUDGE KAISER: If that's the case, it sounds like
9 what you're saying is, in paragraphs 187 and 188, that
10 there's no toluene present in I -- I presume either phase. So
11 what -- what's the second liquid there?

12 MR. GALICA: There wouldn't be a second liquid.
13 That's -- that's the point.

14 JUDGE KAISER: I -- I guess I -- then I'm curious
15 how we -- we get away with Dubrow talking about an emulsion
16 in those paragraphs.

17 MR. GALICA: It -- it -- it -- it's a good question.
18 And Dubrow shows that word to describe the materials and
19 method in paragraphs 187 and 188. The -- the fact of the
20 matter is, the materials and method in paragraphs 187, 188
21 only include result in and use solid APS coded QDs in epoxy.

22 So if that's what Dubrow chose to call an emulsion,
23 that was his choice. But what is actually being described,
24 the method and materials are APS coded quantum dots solid in

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 epoxy, no mention of toluene.

2 JUDGE KAISER: Is there any evidence in the record
3 that a person of ordinary skill in the art would interpret
4 the word emulsion in this sort of non-standard way that
5 you're suggesting that Dubrow is using it there?

6 MR. GALICA: I -- I'm sorry. Could you repeat that?
7 I didn't -- you were breaking up a little.

8 JUDGE KAISER: Oh, I'm sorry. The -- the use of the
9 word emulsion that you're talking about here in paragraphs
10 187 and 188 of Dubrow is sort of non-standard it sounds like,
11 compared to the way that a person of ordinary skill in the
12 art would normally use the term, which I think everybody
13 agrees is it requires two liquid phases.

14 Is there evidence in the record that it has in this
15 sort of broader meaning that can incorporate -- that can
16 encompass solid particles suspended in a single liquid phase?

17 MR. GALICA: Sure. And -- and -- and that's a fair
18 question. I'll -- I'll start with saying, the -- the burden
19 is on Petitioner to demonstrate that what's being described
20 in 187, 188 does meet the claim language, as the board has
21 interpreted it, as all the parties have applied it throughout
22 this proceeding.

23 And they haven't -- they haven't tried to do that.
24 What 187 and 188 actually show at the end of the day, that

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 there's no toluene, there's no solvent evaporation, and
2 there's a solid quantum dot coded with APS in epoxy.

3 And that's -- that's what Dubrow chose to identify
4 as an emulsion. And there isn't -- to -- to -- to directly
5 answer the question, there's not record evidence that I'm
6 aware of, in one way or the other, suggesting that it's not a
7 common use, or it is a common use of the term from either
8 party or any expert.

9 But the fact of the matter is, it's a different
10 embodiment. It's a different method using different materials
11 than paragraph 128 in Dubrow. If -- I'll -- I'll wrap up
12 slide nine where I left off.

13 So we -- we've gone through the steps of creating
14 solid APS coded quantum dots. We've evaporated the toluene,
15 and now we just have the solid APS coded quantum dots in
16 epoxy. That's the material, and -- and Dubrow does not call
17 that material an emulsion.

18 In paragraph 128, Dubrow refers to it as a mixture,
19 but we know based on the method and materials, that it's just
20 solid APS coded quantum dots in epoxy. That's what's
21 deposited on gas barrier sheets, and then cured.

22 And the claim requires that the material deposited
23 has to be the claimed emulsion and it isn't because they're
24 not two separate liquid phases. Now, for -- for the record,

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 I'm going to turn to slide 19. And this addresses the
2 additional reason that I mentioned in my opening that
3 Petitioners fail to demonstrate an emulsion exists at all.

4 Not just limited to the time of depositing it in
5 between gas barrier sheets, but we know that APS -- first of
6 all -- I'm sorry. I'm on the wrong slide.

7 So even if there is a point in Dubrow's method that
8 we were just discussing, paragraph 128, where toluene APS
9 coded quantum dots and epoxy coexist, this mixture is still
10 not emulsion because they're not too phase separate or
11 immiscible liquids.

12 We know that APS and QDs are solid. There's really
13 no question on that. So then the question is, are toluene and
14 epoxy distinguishable, separate liquid phases that don't mix
15 one another.

16 That's the question that Petitioner had to answer,
17 and proven the affirmative, but they didn't. We know first,
18 Petitioner's own argument when talking about the teachings of
19 Dubrow's, that they never argue that toluene is immiscible
20 with epoxy.

21 The -- the -- the question is answered right there.
22 The issue is resolved. We know that there is no emulsion
23 because Petitioner hasn't even argued that toluene is
24 immiscible with epoxy. But addressing what Petitioner

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 attempts to do then, is that they look at the solubility
2 parameters of polystyrene, toluene, and epoxy to suggest --
3 and it -- it's a tough argument to follow, but to suggest
4 that toluene is immiscible with epoxy, because toluene would
5 prefer to mix with APS, instead of epoxy.

6 There are -- are a few issues with that logic.
7 First, Petitioner is relying on solubility parameters of
8 materials not used in the method in Dubrow that they actually
9 rely on.

10 Petitioner's expert has confirmed that APS and
11 polystyrene are structurally different, and that the
12 structural differences need to be considered when evaluating
13 or calculating the solubility parameter of APS, which
14 Petitioner's expert did not do, and did not include in his
15 declaration, and it's not in any Petitioner's papers.

16 So they don't know what the solubility parameter of
17 APS, or how it will relatively behave with respect to
18 toluene, or epoxy. And lastly, even if they had, Petitioner
19 hasn't explained how the solubility of APS and toluene says
20 anything about the miscibility of toluene and epoxy.

21 And that's what they had to prove, and they failed
22 to do that. And I'm going to turn now to slide 15. To
23 reiterate, even if there was a question as to whether an
24 emulsion ever existed at any point in time, temporary point

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 in time, we know that it doesn't exist after solvent
2 evaporation occurs, and that is a step that Petitioner
3 overlooked originally.

4 But it exists in Dubrow, and it occurs before the
5 material deposited between -- the material is deposited
6 between gas barrier sheets. Petitioner --

7 JUDGE KAISER: Mr. Galica?

8 MR. GALICA: Yeah.

9 JUDGE KAISER: I'm sorry to interrupt you. You're
10 about 30 seconds into your rebuttal time which [talking over
11 each other].

12 MR. GALICA: Okay. I appreciate that. I'll -- I will
13 wrap up quickly. So Petitioner seems to have raised the
14 question, in -- in some of its arguments as to whether
15 toluene can be completely evaporated from a system.

16 But Petitioner's expert answered the question for
17 us, and has confirmed that yes, you can completely evaporate
18 toluene from a system. And you would do it -- do it using
19 ordinary techniques like heating and vacuuming, which are
20 disclosed in Dubrow.

21 Now Petitioner in its opening, mentioned the
22 disclosure of residual toluene in Dubrow, specifically
23 paragraph 132. And again, like paragraphs 125, 187 and 188,
24 these are different embodiments, demonstrably different

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 embodiments than the one Petitioner relies on in paragraph
2 128. It -- specifically in the context of paragraph 132,
3 there's no epoxy.

4 So we had four critical ingredients in paragraph
5 128, quantum dots, APS, toluene, and epoxy. We don't have
6 epoxy in paragraph 132, and we're missing the critical step
7 from paragraph 128, no solvent evaporation occurs.

8 So it -- it's perfectly understandable why in this
9 embodiment, there might be residual toluene left over. It's
10 because it wasn't evaporated. So -- but the point remains,
11 this is a different embodiment, using different materials,
12 and a different method than the one that petition relied on.

13 And so -- so taking all of this together, we know
14 that after toluene is evaporated, there is no emulsion.
15 What's deposited between gas barrier sheets is not an
16 emulsion. That's because once toluene's evaporate, no
17 emulsion.

18 Petitioner's expert explicitly said that. So what's
19 being deposited between gas barrier sheets is not an
20 emulsion, so all grounds fail for that reason alone. I won't
21 hit on ground two unless there are any specific questions.

22 I think it's subsumed as Petitioner's counsel
23 mentioned with grounds one. And with respect to ground three,
24 I -- I -- I think the board in its institution decision,

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 correctly concluded, based on the briefing to that point,
2 that there wouldn't be a motivation to combi- -- combine
3 Dubrow and Nelson for a number of reasons.

4 I -- I don't think Petitioner has advanced or
5 evolved the argument in any meaningful way with respect to
6 why a person of ordinary skill might be motivated to combine
7 Dubrow and Nelson. So unless there are any specific questions
8 on that issue, I'll reserve the remainder of my time for
9 rebuttal.

10 JUDGE KAISER: All right. Thank you very much.
11 You've got about 11 minutes left for rebuttal, so that's what
12 we'll give you when you come back up. So --

13 MR. GALICA: Thank you.

14 JUDGE KAISER: -- Petitioner, I think you have seven
15 minutes, and we'll hear from you now. And then when you're
16 done, Mr. Galica, you'll come back up for your 11 minutes.

17 MR. AROVAS: Thank you. Just going off -- off mute.
18 May I begin?

19 JUDGE KAISER: Yes.

20 MR. AROVAS: Okay. So let -- let me hit a few
21 points. The first -- there's actually four points I'd like to
22 hit. The first is to pick up on a question that Your Honor
23 asked Patent Owner about the use of the term emulsion in
24 Dubrow.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 And what would that second liquid be, right? What --
2 what is -- why is Dubrow using the term emulsion, which has
3 an admitted ordinary meaning, if it doesn't mean emulsion?
4 And there was really no answer.

5 I think the answer you got was, well there's no --
6 there's no evidence to the contrary. It's the -- the patent
7 owner -- the petition -- Petitioners burden. So let's a- --
8 actually kind of take a look at that, and unpack that a
9 little bit.

10 First, it is admitted by both experts, liquid and
11 liquid is the ordinary meaning of emulsion. Second, we know
12 that Dubrow uses the term emulsion to describe the material
13 that is deposited. Right there, that meets the burden.

14 We have an ordinary meaning term, and an explicit
15 disclosure that an emulsion is being used that meets the
16 Petitioner's burden. But the evidence actually doesn't stop
17 there. If we look at it, and you'll see it in slide 18,
18 Exhibits 1035 and 1036, it is also of record evidence that
19 evaporation is a technique known to people -- person of
20 ordinary skill to create an emulsion.

21 That's significant, not necessary, but also of
22 record for the board to consider, which is not disputed, that
23 evaporation is a known technique. And then in slide 19, as we
24 see in paragraph 132 of the Dubrow disclosure, Dubrow

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 explicitly discloses residual solvent being present in the
2 material, so that is additional evidence.

3 So when we look at the record evidence, far less
4 than what's in the record would meet the pa- -- the -- the
5 Petitioner's burden. And when the -- I think the Patent Owner
6 is saying there's nothing in the record, they were talking
7 about nothing in the record, contradicting that it has -- the
8 term has an ordinary meaning.

9 The term is used in Dubrow. Evaporation is a known
10 technique for creating emulsions in that there is residual
11 toluene solvent disclosed in the patent, Dubrow itself. So
12 that is far more than what's necessary to meet the
13 Petitioner's burden.

14 The -- the second point I'd like to address is this
15 issue of the embodiments, and there was some discussion about
16 the different embodiments. And so one thing that struck me,
17 is when Your Honors were asking questions about the 188, and
18 does 188 or 187 go with 128, paragraph 128.

19 What I'm left asking myself is, if the term
20 emulsion, that specifically described and disclosed in
21 Dubrow, as being the APS-QD-epoxy emulsion, doesn't go with
22 128, which is the fulsome disclosure of how to make that?

23 What is the emulsion, right? So what we keep hearing
24 from the Patent Owner is well, it's not that embodiment.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Okay. Well, which embodiment is it in Dubrow where they're
2 disclosing an emulsion?

3 The only embodiment that that correlates with is
4 128, because we know the constituent elements, but the patent
5 owner's position really is, the term emulsion is used in 188
6 without any embodiment being an emulsion.

7 It's not like they're pointing to a different
8 embodiment that is that -- that emulsion. And certainly one
9 with APS-QD and epoxy. And so I can't -- I -- I'm not sure
10 what other embodiment that could possibly go with given the
11 express disclosure of the constituent elements.

12 Second, related to that, I think Patent Owner
13 mentioned that, well, there would be steps like a vacuum, and
14 heating, and other things like that used to -- to remove the
15 solvent. But if -- what's interesting is if we contrast
16 paragraphs 128 and 129, what we'll see is that paragraph 129
17 talks about using a vacuum in removal of the solvent in the
18 PEI embodiment, not being relied on by Petitioner.

19 But if we contrast that with paragraph 128, we see
20 very different languages used there. It just says evapo- --
21 evaporating, and that would be consistent with evaporating
22 the solvent to create the emulsion, or evaporating part of
23 the -- the solvent.

24 It never says completely evaporate, or complete- --

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 or completely removed. So the Dubrow disclosure, one of skill
2 in the art would see, different languages being used in
3 different embodiments, and the PEI embodiment uses the
4 removal language.

5 A fourth point which was made, is about this issue
6 of miscibility of toluene in the epoxy. And so for that, if
7 we turn to slide 21, the first answer is that it -- it's
8 really irrelevant. That's not the question of whether toluene
9 is miscible or not miscible in the epoxy.

10 As was admitted by Dr. Swager, we could see on the
11 left-hand side, if you have the same molecule in both phases,
12 it doesn't mean you don't have an emulsion. And probably even
13 more importantly, also on the left-hand side to the bottom,
14 Dubrow never states toluene is in the epoxy phase, but it
15 does say that there is a resulting emulsion in paragraph 188.

16 And secondly, on this point if we look at the expert
17 evidence of record, Dr. Moffitt, Exhibit 1027, paragraph 37,
18 reproduced on -- on the right-hand side of slide 21, he says
19 that APS -- that polymers like APS are significantly more
20 soluble in toluene than the epoxy is, and that the toluene
21 disclosed in Dubrow will continue to solvate the preferred
22 APS polymer molecules.

23 So specific evidence that in fact, that would be
24 greater solubility, but that doesn't really matter at the end

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 of the day, because Dubrow says there's an emulsion, and
2 whether or not some toluene will -- is miscible with the
3 epoxy is really irrelevant to the question of whether we have
4 an emulsion. We know we do, that's what Dubrow says.

5 And with that, Your Honor, those are the end of my
6 comments.

7 JUDGE KAISER: All right. You wrapped up just
8 exactly on -- on time. Thank you for that. And let me just --
9 before I switch over to Patent Owner, let me just make sure
10 that the rest of the panel doesn't have any questions for
11 you. Looks like no. All right. So thank you very much, Mr.
12 Arovas. Mr. Galica, you've got 11 minutes.

13 MR. GALICA: Thank you. I'll try to hit the issues
14 that Petitioner just raised in -- in the sequence that they
15 were. Petitioner talked about what would be an emulsion in --
16 in Dubrow, and what embodiment discloses that -- that patent
17 owner's responses. That's not our responsibility to
18 determine.

19 They haven't shown that the method embodiment and
20 materials that they rely on, satisfy the court's construction
21 of emulsion. In fact, they haven't even tried to map the
22 disclosures to the specific language that the court issued in
23 its claim construction of the term emulsion.

24 And I think Petitioner's counsel was just raising

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 question as to whether or not -- what the immiscibility or
2 phase separation has to do with the court's construction. As
3 -- as part of the party's agreement on the meaning of
4 emulsion, Patent Owner's expert described that his
5 understanding was that, yes, this -- what [inaudible]
6 construction, proposed construction means is that you would
7 need to have two immiscibility liquids.

8 And Petitioners cited that in saying that there's no
9 disagreement on what the term means. They haven't tried to
10 apply that meaning, that interpretation or the board's
11 construction with respect to the embodiment in paragraph 128
12 of Dubrow.

13 And in -- on -- on a related point, Petitioner's
14 counsel talks about the use of the term emulsion in
15 paragraphs 187 and 188 as definitive proof that an emulsion
16 exists in those embodiments.

17 The easy question then is why does -- why isn't the
18 term used in paragraph 128 with respect to the method and
19 materials that Petitioner relies on? It -- it isn't. What
20 Dubrow calls the materials in paragraph 128 as part of the
21 method used and described there.

22 After solvent evaporation occurs, Dubrow describes
23 that mixture as QD-APS-epoxy mixture, not emulsion. Next,
24 Petitioner's counsel talked about the performance of solvent

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 evaporation as creating, or contributing to an emulsion.

2 Th- -- the only record evidence that exists from
3 Petitioner's expert is citing exhibit 1039. And slide 24 for
4 the record, from Patent Owners' demonstratives, discusses
5 this. So Petitioner's expert relied on exhibit 1039 to say
6 that, "the first phase disclosing Dubrow's necessarily liquid
7 phase, even after solvent evaporation."

8 Exhibit 1039 does not stand for that proposition. To
9 start it's -- I -- the -- the materials and method used in
10 exhibit 1039, first, the materials polystyrene, polymethyl- -
11 - meth- -- methacrylate.

12 Those aren't the materials that are disclosed in
13 Dubo- -- Dubrow's embodiment, or that Petitioner relies on,
14 and they haven't even tried to explain any similarity or
15 connection between the two.

16 Second, the method used in Exhibit 39 subjects the
17 mixture to an electric field. That is the purpose of the
18 experiment that's conducted in Exhibit 1039. There's no
19 electric field mentioned in paragraph 128 of Dubrow.

20 Even if one were to accept that Exhibit 1039 were
21 relevant at all, and Petitioner says it is, Exhibit 1039,
22 explains that even at high concentrations of solvent, so just
23 a little evaporation perhaps.

24 Even at high concentrations of solvent, the system

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 solidifies. You don't have two immiscible liquids when you
2 have a solidified system. So Petitioner's argument that
3 solvent evaporation results or forms an emulsion based on
4 Exhibit 1039, it is directly rebutted. Petitioner's counsel
5 then talked again about the residual toluene in paragraph 132
6 of Dubrow.

7 Again, the presence of residual toluene, in that
8 specific embodiment, would be expected because no solvent
9 evaporation occurs. Paragraph 132 is dissimilar from
10 paragraph 128 for the additional reason that it doesn't use
11 epoxy.

12 Petitioner then talked -- on -- on Petitioner's
13 slide, for the record, Petitioner's slide 21, they pointed
14 to, excuse me, testimony from Dr. Swager, Patent Owner's
15 expert, stating the proposition, it seems that toluene
16 immiscibility with epoxy is irrelevant, because you could
17 just mix everything up.

18 That's a quote taken out of context. What Dr.
19 Swager actually said, in the full context, is the proceeding
20 passage pages 99, lines 12 to 20 that a phase can have ratios
21 of different chemicals provided they are still different.

22 So you still have the requirement of two
23 identifiable, and different phases that are miscible with one
24 another, and that's the requirement of an emulsion. And

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Petitioner hasn't attempted a -- a -- as -- as best I can
2 tell based on this, to meet that definition.

3 Now Petitioner's counsel ended with pointing to on
4 the same slide, Petitioner slide 21, an excerpt from their
5 expert's second declaration, where he's discussing for the
6 first time, the solubility parameters of AP- -- polystyrene,
7 toluene, and epoxy, again, to suggest that toluene would
8 solvate the APS polymer.

9 Necessary to make that determination, would be
10 knowing the solubility parameter of APS. Petitioner's expert
11 admitted that he doesn't know it. So he makes the statement,
12 and Petitioner's counsel descr- -- characterized it as clear
13 record evidence, but it's unsupported by anything.

14 In fact, contradicted by his own statements, that he
15 doesn't know the solubility parameter of APS. So he could not
16 tell whether or how it would solvate or not with toluene.
17 With that, I think I've addressed all of the points raised by
18 Petitioner's counsel.

19 And I know I'm rapidly approaching the end of my
20 time, but I'm happy to answer any questions if there are
21 issues outstanding in the board's perspective.

22 JUDGE KAISER: Let me open it up to the other
23 members of the panel. I think I've got one question, but. No
24 one else is going to bite, it looks like. So you get -- you

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 get me, Mr. Galica.

2 On rebuttal, I -- Petitioner's counsel made the
3 point that paragraphs 187 and 188 are, we must be talking
4 about the same embodiment as paragraph 128, because if
5 there's not, there's really -- if they're not, there's
6 nothing else that they could really be talking about.

7 And I guess, I -- I -- I wonder if you could address
8 that briefly, and let me know, is there any -- is there any
9 rebuttal to that position? I -- I -- I really -- I mean, I
10 think a -- a big linchpin in this case is going to be, you
11 know, Dubrow talks about an emulsion in those two paragraphs.

12 And if that language is talking about the same thing
13 that's in paragraph 128, then I -- I think you've got an
14 uphill battle here. But there's certainly a possibility that
15 they're talking about different embodiments. And -- and I
16 really would like to know what sort of the best evidence is
17 that they are talking about different embodiments.

18 MR. GALICA: Yeah. I -- I -- I think from our
19 perspective, it would be the method and materials described
20 in each embodiment. They use different materials, and
21 different methods. In the context --

22 JUDGE KAISER: I'm sorry to interrupt. I -- they're
23 both using epoxy. They're both using APS. They're both using
24 quantum dots. What's the difference in materials?

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 MR. GALICA: They -- they don't use toluene in
2 paragraphs 125, 187, or 188. So that -- and -- and that is
3 the critical ingredient to Petitioner's argument for the
4 presence of an emulsion at any time. And a -- as Petitioner's
5 counsel just raised in rebuttal, the evaporation of the
6 solvent is what contributes to the formation of the emulsion.
7 That step doesn't occur in 125, 187.

8 JUDGE KAISER: They don't -- they don't describe
9 that step, but I mean, I -- I -- I suppose it's -- it's a
10 fair point to say, and I -- and I suspect Petitioner would
11 say that once you've talked about how to make the emulsion in
12 paragraphs 125 and 128, then later on, you don't need to
13 describe every step in graphic detail.

14 Again you can just say, hey, by -- by the way, this
15 is the sort of shorthand explanation, shorthand description
16 of what we did before.

17 MR. GALICA: U- -- u- -- understood. My -- my
18 response to that would be if 128 was the paragraph in the
19 first instance, and the method and the materials that Dubrow
20 chose to describe its emulsion, why didn't Dubrow call it an
21 emulsion? He called it a -- a mixture. He did not call it an
22 emulsion.

23 JUDGE KAISER: Okay. All right. Thank you very much.
24 I don't have any further questions. Let me let the rest of

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 the panel have an opportunity. Looks like no. All right. Well
2 thank you, Mr. Galica and Mr. Arovas.

3 We -- we've -- at least I think both of the
4 presentations were very helpful. And we'll take this case
5 under advisement, and issue a decision in due course. That
6 leaves us with other four cases to discuss.

7 It sounds like there were going to be different
8 counsel perhaps presenting on those cases, and maybe while
9 we're making that shift, everyone could take a -- a short
10 break, if that's amenable to everyone.

11 MR. AROVAS: Yes, Your Honor. That works for
12 Petitioner.

13 MR. GALICA: S- -- same for Patent Owner. Is there a
14 specific amount of time everybody would like?

15 JUDGE KAISER: I -- I had in mind about five
16 minutes, but I'll leave it open to discussion if there's some
17 reason that we need more.

18 MR. GALICA: That's fine by Patent Owner.

19 MR. AROVAS: Same for Petitioner.

20 JUDGE KAISER: Okay. So I've got 13 past the hour.
21 Why don't we start up again at what? Let's just call it 20
22 past.

23 MR. GALICA: Thank you.

24 JUDGE KAISER: Thank you very much.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 COURT REPORTER: Hello. This is the court reporter.
2 Can I have the spelling of Michael Galica's name, last name?
3 This is the court reporter. I needed the -- the correct
4 spelling of Michael Galica, the attorney that --

5 MR. GALICA: It's Matthew Galica. It's G-a-l-i-c-a.

6 REPORTER: G-a-l- continue.

7 MR. GALICA: i-c-a.

8 REPORTER: G-a-l-i-c-a.

9 MR. GALICA: That's right.

10 REPORTER: G-a-l-i-c-a. And that's Matthew. I
11 apologize. Matthew Galica, G-a-l-i-c-a. Thank you. And who's
12 presenting -- Mr. Newman is next?

13 MR. MIZZO: Good afternoon. This is Chris Mizzo.
14 I'll be presenting first for Petitioners, and then I believe
15 Mr. Newman will present for the Patent Owners.

16 REPORTER: Okay. Could I have Mr. Newman's full name
17 please? I'm sorry. I couldn't hear you.

18 MR. GALICA: Michael. I think you're muted.

19 MR. NEWMAN: It's Michael Newman, N-e-w-m-a-n.

20 REPORTER: N-e-w-m-a-n. Thank you.

21 MR. NEWMAN: You're welcome.

22 JUDGE KAISER: Okay. I think we've got everyone
23 back. Let me make sure that -- I think Mr. Mizzo, you were
24 going to pre- -- present for Petitioner. Looks like you're

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 here. Are you ready to proceed?

2 MR. MIZZO: Yes, Your Honor.

3 JUDGE KAISER: Okay. And I think it was Mr. Newman
4 for Patent Owner. Are -- are you present and ready to go?

5 MR. NEWMAN: Yes, Your Honor. I am.

6 JUDGE KAISER: Okay. And I guess I'll ask -- open
7 this up to both sides. Is -- is there anybody else that we
8 need to wait for?

9 MR. MIZZO: Not from Petitioner side, Your Honor.

10 MR. NEWMAN: Not from Patent Owner side, Your Honor.

11 JUDGE KAISER: Okay. All right. And it looks like
12 the panel is back, and ready to go. So, all right. We have
13 two hours for this, each side has 60 minutes. Mr. Mizzo, let
14 me ask you how much time you'd like for rebuttal.

15 MR. MIZZO: I'd like to reserve 20 minutes, Your
16 Honor.

17 JUDGE KAISER: Okay. So you'll have 40 minutes to
18 make your opening presentation. And then after that, we'll
19 hear from Mr. Newman. So Mr. Mizzo, you can go ahead whenever
20 you're ready.

21 MR. MIZZO: Thank you, Your Honor, and -- and good
22 afternoon Your Honors. My name is Chris Mizzo. I'll be preve-
23 -- presenting this discussion on behalf of the Samsung
24 Petitioners.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 And if we can turn to slide one, I'm going to
2 quickly address the summary of the IPRs and disputed issues.
3 And then I'm going to turn to the two primary grounds, the
4 Banin grounds, and the Zaban grounds.

5 In -- and -- and -- and that's going to be the focus
6 of the discussion for today. There is a third ground, the
7 Lucy grounds that is -- or was raised in three of the four
8 petitions.

9 While we believe the Lucy ground supports the
10 unpatentability of the challenge claims, we also believe the
11 Banin and Zaban grounds are even stronger, and therefore
12 we're going to withdraw the Lucy grounds and focus Your
13 Honor's attention on the Banin and Zaban grounds.

14 And -- and what we'll see is in, I think, in the
15 institution decisions, there were some questions that were
16 raised by Your Honors as to what expert discovery would show
17 during these proceedings, and how it would support
18 Petitioner's arguments.

19 And I think expert discovery at -- at bottom amply
20 supports Petitioner's positions, because what we have been
21 able to demonstrate both in the papers and what I look
22 forward to discussing today, is that the use of MCCs or
23 molecular cluster compounds, apologize.

24 I might refer to it as MCCs at times, but molecular

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 cluster compounds was a simple design choice. Molecular
2 cluster compounds were known, they were [talking over each
3 other] --

4 JUDGE OBERMANN: Mr. Mizzo? Mr. Mizzo? I'm sorry.
5 It's Judge Obermann. I just want to confirm for the record,
6 did I hear you actually withdraw the Lucy grounds from
7 contention?

8 MR. MIZZO: Yes, Your Honor. That's what I did.

9 JUDGE OBERMANN: Is it your position that we need
10 not address them in the final written decision?

11 MR. MIZZO: That's correct, Your Honor.

12 JUDGE OBERMANN: Thank you, Mr. Mizzo. Please
13 continue.

14 MR. MIZZO: You're welcome. So yes, as I was saying,
15 the use of molecular cluster compounds, simple design choice,
16 they were known. They were known to provide certain benefits,
17 and they were known to provide benefits in the for -- in --
18 in terms of the formation of nanoparticles.

19 Thus, as -- as the evidence shows, a person of
20 ordinary skill in the art using his or her knowledge,
21 ordinary creativity, and common sense, would've been
22 motivated to combine the teachings of the prior art
23 combinations that we rely on here to reach the claimed
24 inventions.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 And I'll quickly address the patents on slide two,
2 it shows all four patents. They all concern nanoparticles and
3 -- and formation thereof. They share similar titles. They
4 share overlapping inventors.

5 They share an alleged priority date in 2004. And --
6 and so there's a lot in common. And turning to slide three,
7 at its core, and -- and what is the -- what I expect to be
8 the vast majority of our discussion today, is that the four
9 patents concern the disclosure of molecular cluster
10 compounds, and using them to seed growth of nanoparticles.

11 And we see this as an example on slide three from
12 the 423 patent. And in the patents themselves, they discuss
13 two known advantages of using molecular cluster compounds.
14 One is that by using them, you get a -- a more uniform
15 resulting nanoparticle.

16 And the second is you can eas- -- more easily scale
17 up the process for industry. As we'll see, undisputed
18 evidence show these were well known advantages in the art for
19 using molecular clusters.

20 JUDGE OBERMANN: Mr. Mizzo?

21 MR. MIZZO: Yes, Your Honor.

22 JUDGE OBERMANN: Since you have it on your slide, do
23 you admit that the claims require the MCC to provide a
24 population of nanoparticles that is essentially mono

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 dispersed?

2 MR. MIZZO: I'm sorry. Are -- are you referring to
3 slide three or slide four, Your Honor? I was just about to
4 transition.

5 JUDGE OBERMANN: Slide three, the second paragraph
6 that you've highlighted, the very first part that's
7 highlighted in yellow. I'm asking you whether the Petitioner
8 concedes that a molecular cluster compound within the scope
9 of the claims requires providing a population of
10 nanoparticles that is essentially mono dispersed.

11 In other words, can you have an MCC within the
12 meaning of these claims that does not produce an essentially
13 mono dispersed population of nanoparticles?

14 MR. MIZZO: The answer is yes, Your Honor. You can
15 have such an MCC that can -- that can produce nonessentially
16 mono dispersed populations of nanoparticles.

17 And -- and the reason is, if we can turn to slide
18 four, where I've put representative claims from the 423 and
19 828 patents is, there is nothing about requiring essentially
20 mono dispersed nanoparticles in the claim language.

21 JUDGE OBERMANN: Why is the part of
22 the specification that describes the molecular
23 cluster compound in this way not limiting?

24 MR. MIZZO: Well, first, Your Honor, I don't believe

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 anyone's argued that it is limiting. And second, because
2 while that is identified as an advantage of using an MCC,
3 it's not required by the claims. It was --

4 JUDGE OBERMANN: My under -- my understanding is
5 that Banin produces a population of nanoparticles that can
6 differ in size by up to 25 percent. So I think it is -- am I
7 -- am I incorrect there?

8 MR. MIZZO: I believe in the example, there is a
9 variation in size of the nanoparticles, Your Honor, but what
10 -- what we will see, and --and -- and what I can address now
11 is, the size is not -- a size of the resulting nanoparticle,
12 is not determinative as to whether the prior art references
13 disclose an MCC, disclose the use of an MCC, and disclose the
14 use of an MCC to form nanoparticles that satisfy the claimed
15 inventions.

16 It -- now looking at the claims, Patent Owner tries
17 to read in limitations regarding size, and -- and regarding
18 method in terms of particular process being used, but that
19 isn't in these claims.

20 These claims are about the use of mo- -- molecular
21 cluster compounds to produce nanoparticles, or in the case
22 of, for example, the 828 patent claim one, a nanoparticle. So
23 I -- I think it -- while it is an -- a known advantage of
24 using MCCs or molecular cluster compounds, that you can

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 produce more uniform nanoparticles.

2 I think what you'll see is including an expert
3 testimony, there is nothing about what essentially mono
4 disperse or more uniform means. This is just a known
5 advantage of using MCCs to make nanoparticles.

6 Turning to slide -- the molecular cluster compound
7 construction on slide five, and this -- this goes to I think
8 Your Honor's point, which is that the parties agree. There is
9 a dispute in the district court regarding the meaning of a
10 molecular cluster compound.

11 MR. MIZZO: Your Honors don't need to dec- -- decide
12 that dispute, and it had to do with the fact that there were
13 conflicting statements in the different nanoparticle patents.

14 The court came up with an amalgamation, a
15 combination of those statements, and the parties have focused
16 on that which is a more restrictive view of the term for
17 purposes of these proceedings.

18 And as you'll know, for a molecular cluster
19 compound, it focuses on molecular formula, doesn't say size.
20 It says molecular formula. And that is what the focus of what
21 your analysis should be on, is whether the references
22 disclose something that is the same relative molecular
23 formula, not same size.

24 And I'll get into why size is not determinative as

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 to whether you have a molecular cluster compound or not. So
2 I'd like to now start with the Banin anticipation grounds,
3 and turning to slide eight.

4 Banin discloses a method of making nanoparticles in
5 the presence of an AU101 molecular cluster compound under
6 conditions permitting seeding a growth. This anticipates and
7 renders obvious challenge claims from 423 and 365 patents.

8 It's also relevant to the requirements of an MCC and
9 seeded growth in the 557 and 828 patents. The -- the two key
10 disputes that Patent Owner raises here are number one,
11 whether Banin discloses a molecular cluster compound, the
12 answer is it does.

13 And number two, whether Banin teaches away from
14 seeded growth, and the answer is it does not. It actually
15 teaches seeded growth. We turn to slide nine. Banin discloses
16 the use of a molecular cluster compound.

17 We can see this from page six of Exhibit 1005, which
18 is Banin, where it talks about the main idea is the use of a
19 metal catalyst that serve as starting nanocrystals from which
20 nano-rods of inorganic semiconductors grow in solution.

21 In other words, the catalyst is the seed from which
22 the nano-rods grow. That catalyst can include metals such as
23 zinc, cadmium, alloys of such metals, and particles that
24 include such metals.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 On page 20 of Banin, it discloses a specific and
2 singular molecular formula AU101(PPH3)21CL5, that the
3 reference denotes as AU101 and I'll refer to as AU1 -- AU101,
4 just simply because it's easier, but that is the molecular
5 cluster compound.

6 It has more than three metals. It has associated
7 ligands and it satisfies the construction, because it is a
8 single formula. On the right-hand side of slide nine, you can
9 see from figure one of Banin which has been annotated by Dr.
10 Green, that you have seeded growth.

11 You have the circle that's colored in yellow with
12 eminent, that is the cluster compound. And then you have --
13 and it seeds nanoparticle growth. The InAs nanoparticle grows
14 there from. Turning to slide 10, now the PO or Patent Owner
15 would like to focus your attention on Hutchison.

16 And admittedly Banin refers to Hutchison and says it
17 makes its whole cluster using Hutchison. But what patent
18 owner and its expert failed to appreciate, and what is
19 established in the evidence is, Banin improves on Hutchison
20 and it says so in its description.

21 First from Banin, we know it discloses a single
22 formula as I've just discussed. And on the right-hand side of
23 the slide, you could see doc- -- Dr. Green noted that a
24 POSITA, a person of ordinary skill in the art would recognize

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 that as a single formula, and appreciate that that is an MCC.

2 Further, Banin refers to size selection. On page 22,
3 it states that figure 10A presents, a TEM image of the AU101
4 clusters without further size selection.

5 And Dr. Green in his declaration in paragraph 22
6 notes that that disclosure, about being shown without further
7 size selection, would mean to a person of ordinary scale in
8 the art that size selection was previously used to obtain a -
9 - a particular size particle.

10 Turning to slide 11, now PO or Patent Owner argues
11 that Hutchison discloses size selection, that its method
12 provides size selection. But that conflates using a process
13 that produces a -- a certain sized nanocluster or -- or -- or
14 a cluster with what you do after you have that cluster, which
15 is the size selection.

16 That is done here by Banin and referred to by Banin.
17 And if we look at the tested sample description in Hutchison,
18 and this is the bottom left of slide 11, it extends from page
19 one to page two of Hutchison.

20 It specifically identifies an impurity, and -- and
21 the impurity is -- is AUCLPPH3. And Dr. Green, as we know,
22 from the right-hand side of slide 11, comments that sure,
23 Hutchison refers to this impurity, but a person of ordinary
24 skill in the art would find that that reference itself is

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 irrelevant in the context of Banin because a person of
2 ordinary skill in the art would've understood that Banin does
3 not have a size distribution, but instead has uniform MCCs.

4 Turning to slide 12, Patent Owner's arguments about
5 the MCCs having a mean diameter, a range of sizes, and -- and
6 the specific reference, I think is a -- a -- a mean diameter
7 of 1.4 nanometers.

8 And the Banin reference is not relevant or misses
9 the mark. And -- and the reason is, as I showed before, the
10 focus for molecular cluster compound is whether there's the
11 same formula or not. It's not about size.

12 And there's a very good reason which is size doesn't
13 determine whether you have an identical formula, but I --
14 having identical formula will dictate if you have an MCC.

15 And as we can see on slide 12, Dr. Green, who is the
16 only expert to have looked at the TEM from Banin, and provide
17 an opinion about Banin, how a person of ordinary skill in the
18 art would interpret it, says this illustrates more consistent
19 uniform AU101 cluster.

20 And that a POSITA would recognize that the MCCs in
21 Banin are purified and size selected. In paragraph 21 of his
22 declaration, that in his opinion this improvement over
23 Hutchison's gold particles is common and expected in the
24 field.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 An initial paper that describes a synthesis of a
2 molecule will often have byproducts, and subsequent papers
3 that employ the same molecule will use a purified form.
4 Turning to slide 13, further illustrating why size doesn't
5 dictate why you have an MCC, is it's undisputed that Banin's
6 MCCs are not perfectly spherical. They're not the same.

7 JUDGE FRANKLIN: Counsel.

8 MR. MIZZO: Go ahead.

9 JUDGE FRANKLIN: I'm sorry to interrupt that
10 thought. I want -- I don't want you to get too far without
11 addressing a question I have relating to your slide 10.

12 MR. MIZZO: Okay.

13 JUDGE FRANKLIN: Where you begin talking about this
14 size selection that Banin describes. And we can see there in
15 your slide where it discusses that there's no further size
16 selection and it may be reasonable to take
17 that to mean what you are arguing, that there was some prior
18 size selection.

19 You've mentioned that Patent Owner's position is
20 that Hutchison, is that prior size selection, if I understood
21 you. My question is, where do we look to in Banin, for some
22 indication of what that prior size selection was, and when it
23 occurred?

24 MR. MIZZO: So that -- that's a good question, Your

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Honor. And -- and the point is, it's looking at the two
2 references in combination. In Hutchison, when you're looking
3 at the tested sample, there is the impurity. And so right
4 there, you can understand that size selection wasn't used.

5 And when you look at Banin and it says, the TEM
6 image that is shown here, was shown without further size
7 selection, then that -- the natural implication, and as Dr.
8 Green has opined, that means size selection has been
9 performed. And since we know it hasn't been done in
10 Hutchison, that means it was --

11 JUDGE FRANKLIN: So you're saying there was some
12 effort to purify what we have in
13 Banin, and that -- and the efforts to remove those impurities
14 amounted to a size selection?

15 MR. MIZZO: That's correct, Your Honor. In fact, I -
16 - I -- I will note that in Hutchison -- in Hutchison itself,
17 before it gets to the discussion of the tested sample, it
18 refers to the ability to use purification to remove that
19 impurity.

20 Now, for whatever reason in the tested sample, it
21 doesn't and if that impurity remains, but it makes quite
22 clear, I believe it's the second to last full paragraph in
23 Hutchison, where it specifically says further purification by
24 precipitation from chloroform, upon slow edition of Pentane

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 removed Au salts, such as AUCL(PPH)₃.

2 And it says after purification, the yield is 170
3 milligrams of purified nanoparticle one, and it continues.

4 But what we know from the tested sample, which is the one
5 that the parties that have -- have focused on, which comes
6 down below that, that impurity still exists in that sample.

7 So purification wasn't done there, but we know that
8 Banin refers to without further size selection, meaning size
9 selection had been done after the process, the removal of
10 that impurity so that's why we have the molecular cluster
11 compound disclosed by Banin.

12 JUDGE FRANKLIN: Okay. Thank you for your answer.

13 MR. MIZZO: Okay. I believe we were on slide 13 and
14 -- and if I'm mistaken please, then I apologize. But the
15 evidence shows that identical particles can have different
16 two-dimensional sizes.

17 And this is why focusing on size doesn't get you to
18 where you need to be to answer the question, whether Banin
19 discloses an MCC. Because we know it's uncontested, Banin's
20 MCCs are not perfectly spherical as Dr. Green said in
21 paragraphs 19 and 20 of his rebuttal declaration.

22 The profile of Banin's non-spherical AU101 MCCs as
23 shown in the TEM will vary from MCC to MCC, because each MCC
24 will be oriented differently, even though those MCCs are in

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 fact identical.

2 And he provided an illustration where if you have
3 identical particles in 3D space, they're all identical, but
4 when you take a 2D image of it, it can look like there's a
5 size variation, even though they are the same size particles.

6 And further, we know, on the right-hand side of
7 slide 13, that Herron, which discloses an undisputed
8 molecular cluster compound, and -- and that starts with CD32,
9 it refers to its MCC as roughly spherical, and says it has an
10 approximate 12 angstroms in diameter.

11 Again, illustrating that, focusing on the fact that
12 there might be a mean diameter, is irrelevant to the question
13 of whether Banin discloses an MCC. Banin does for the other
14 reasons I've explained.

15 Turning to slide 14, in addition to arguing about
16 the mean size of the gold cluster in Banin, Patent Owner also
17 raises an argument and -- and Judge Obermann was touching on
18 this earlier about the variation in size of the nano-rods.

19 But this is irrelevant to whether Banin discloses an
20 MCC as well, because the evidence shows, as I've just
21 addressed, that the MCCs in Banin are not perfectly
22 spherical.

23 The claims do not require that the nanoparticles
24 have the same size and -- and Dr. Obermann -- Your Honor,

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Judge Obermann, I'd refer you to the PO's experts, deposition
2 testimony, where she conceded that none of the challenged
3 claims require that the nanoparticles be of a specific size.

4 And the example that's given here is the 828 patent
5 from her deposition declaration, but there are the cites
6 there as well to that concession for the other patents. And
7 as you can see from claim -- dependent claim seven of 423
8 patent, it talks about monitoring an average size of
9 nanoparticles, not the size of, so it's not uniform.

10 It doesn't have to be the same. It -- it recognizes
11 nanoparticles can have an average size. And -- and this is
12 not surprising because not only do you typically have non-
13 spherical MCCs, but also there are other factors that can
14 influence the size of the nanoparticle.

15 And we see this expressly from Banin page seven,
16 where it talks about these other parameters, such as
17 reaction, temperature, duration of the reaction, and
18 concentration of the precursors, and Dr. Cossairt, and her
19 expert deposition also conceded other factors influenced the
20 size of the nanoparticle, and this is at page 64 of her
21 deposition.

22 Turning to slide 15, Patent Owner argues that
23 Banin's AU101 clusters agglomerate, and therefore they aren't
24 MCCs, but that issue is not relevant because as we can see

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 from Dr. Green's expert declaration, agglomeration is a
2 physical rather than a chemical act, and a person of an
3 ordinary skill would understand that each of Banin's AU101
4 clusters remain identical, even if they physically aggregate.

5 And the claims themselves, as you can see from a
6 representative claim, claim one of the 365 patent on the
7 right-hand side of slide 15, is a comprising claim. So it
8 requires at least one, but doesn't preclude that there could
9 be an additional molecular cluster compound if there happened
10 to be aggregation.

11 On slide 16, one of the things that Patent Owner has
12 argued on this aggregation point is that Dr. Bawendi, who is
13 an expert that Petitioner provided a report for in the
14 district court, offered opinions that, as you can see on the
15 left-hand side of the slide, confirmed that clusters that
16 have a distribution of masses, like the gold clusters in
17 Banin, and the clusters in his own article are not MCCs.

18 But it's -- it -- it's worthwhile noting that that's
19 incorrect, Dr. Bawendi's article and testimony do not concern
20 Banin, do not concern Banin's gold MCCs, or size
21 distributions. It was in a very particular context talking
22 about indium and phosphide growth mixtures.

23 Talking about different clusters of those elements,
24 and how they have different masses, and thus led to his non-

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 controversial testimony that those aggregate -- those
2 aggregates resulted in a distribution of masses that don't
3 have the same molecular formula.

4 But that is not Banin, that's not consistent with
5 Banin's disclosure, and he wasn't talking about Banin. Slide
6 17, Patent Owner argues that the prior art was unable to
7 chemically characterize the MCC in Banin, and that is
8 incorrect.

9 There's no support for the argument that someone
10 tried and failed. Second, as Dr. Green had -- had -- had made
11 clear in paragraph 25 of his declaration, POSITA wouldn't
12 need to chemically characterize it because a POSITA would
13 understand that the single formula for the AU101 cluster in
14 fact, is an MCC.

15 And consistent with that, the -- the patents
16 themselves list a whole list of molecular cluster compounds
17 that purportedly can be used in the claimed invention, but
18 there's a complete absence of any chemical characterization
19 of those MCCs.

20 And Dr. Cossairt, PO's expert conceded, for example,
21 that none of the patents provide any masks, spectrometry data
22 for those molecular clu- -- cluster compounds.

23 Her answer was that's correct. They don't. And they
24 don't -- and those patents don't provide any X-ray

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 diffraction data. Her answer, that's correct, and this is
2 from pages 35 to 36 of her deposition.

3 I -- turning to slide 18, Banin -- one of the -- as
4 I said earlier, PO argues that Banin teaches away from seeded
5 growth. First, that's not relevant to an anticipation
6 analysis. That's only relevant to obviousness, but in any
7 event, it's just flatly wrong. Banin on page six, clearly the
8 main idea is to use a catalyst.

9 There's a seed for the growth of a nano-rod. And as
10 you can see in figure one, you have the seed that -- seeds
11 growth of the nano-rod. So Banin discloses using a seed for
12 seedy growth right on -- in numerous places in its
13 disclosure.

14 Turning to slide 20, I just very quickly like to
15 touch on Banin obviousness alone grounds. So turning to slide
16 21, for the reasons I explained, Banin discloses expressly an
17 AU101 gold cluster, and it would've been obvious to use a
18 molecular cluster compound given Banin's disclosure.

19 Your Honors, in the institution decision, touched on
20 the fact that Petitioners showing with respect to
21 anticipation by Banin likely is also sufficient with respect
22 to obviousness over Banin at this stage, given the absence of
23 record evidence of objective indicia of non-obviousness.

24 We've now had expert discovery. There's no record

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 evidence of objective indicia of non-obviousness. What we do
2 have is undisputed evidence why a person of ordinary skill in
3 the art would want to use a molecular cluster compound, be
4 reasonably motivated, and have a reasonable expectation of
5 success.

6 And we can see some of this on the right-hand side
7 of slide 21, beginning at the top from page 67 of Dr.
8 Cossairt's expert deposition. She was asked, is it fair to
9 say that prior to 2004, a person of ordinary skill in the art
10 would've desired their nanoparticles to be as close to
11 identical size as possible?

12 Her answer was that was certainly a big goal in the
13 field at that time. Then starting on page 49, question, why
14 is it important that each molecular cluster compound must be
15 identical? In part she answered, so if the goal of the
16 synthesis is to make various size uniform, not --
17 nanoparticles, then you would want your seeds to be
18 identical.

19 In other words, before the priority date, a big goal
20 was to have more uniform nanoparticles, and it was important
21 to use molecular cluster compounds, if you wanted more
22 uniform particles.

23 And at the last Q and A, she was asked, and that was
24 known in the 2004 timeframe, right? And her answer was yes.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 It was understood that using more size uniform seeds would be
2 expected to result in more size uniform products. Yes.

3 So here, we've got not only does Banin expressly
4 disclose the use of an MCC, it would've been obvious to use
5 an MCC in addition with Banin's process, because of the fact
6 that this was a big goal, it was important to use, and it had
7 a reasonable expectation of success in achieving more uniform
8 sized nanoparticles. Now, --

9 JUDGE FRANKLIN: Counsel, I have a question for
10 you here. In the 183, I'll just point to that as an example,
11 in the 183 where we're just dealing with obviousness grounds,
12 you mentioned, or it's mentioned in your Petitioner reply
13 that whether Banin discloses an MCC is irrelevant as
14 Petitioner relies on Herron's and Banin's disclosure of MCC.

15 And I take it also, perhaps you're pointing to
16 Patent Owner's expert testimony here on your current slide.
17 My question is, does the petition support that assertion,
18 meaning has that been argued sufficiently in the petition for
19 us to consider that as an alternative ground?

20 MR. MIZZO: So I -- if I understand Your Honor
21 correctly, I think there's two different questions there,
22 which is first, you asked if we made a statement regarding
23 regardless of whether or not Banin discloses an MCC, it
24 wouldn't be necessary in -- in the combinations involving

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Herron [inaudible].

2 And I think that's a subsequent ground that I was
3 just about to turn to, and I'm happy to address that in that
4 context. But I think your second question perhaps addresses
5 Banin alone for obviousness, which is, has that been set
6 forth in the -- in the petition and the arguments adequately
7 that -- that it's been preserved?

8 And I think the answer is yes. We made the argument
9 that since the get go, the contention has been whether or not
10 the references disclose an MCC, and whether there would be a
11 motivation to combine.

12 And we made clear that Banin discloses it --
13 discloses an MCC and -- and further for those reasons why as
14 a standalone reference, it would render those challenge
15 claims as obvious as well. And so, yes. I believe -- I'm
16 sorry. Did someone ask me a question? Okay. Sorry.

17 JUDGE FRANKLIN: No. Go ahead.

18 MR. MIZZO: So number one, yes. I believe the ground
19 is preserved and -- and laid out and -- and Patent Owners had
20 ample opportunity to respond to it in -- in the various
21 arguments that they've made.

22 And number two, for Herron Farneth, well, I believe
23 Banin does disclose an MCC. I -- I would say if we can turn
24 to slide 25, that with -- and -- and this is the title Banin

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 and Herron, or Farneth render obvious certain challenge
2 claims, that even when Banin discloses as it does the AU101
3 MCC, there was -- there was ample motivation and reason to
4 replace that AU101 cluster with the cadmium based or zinc
5 based MCCs from Herron or Farneth.

6 Those cadmium and -- and zinc based MCCs were less
7 expensive. They were known and used in the field, and a
8 person -- and -- and Banin expressly teaches that you could
9 use zinc and cadmium-based compounds in order to -- in -- in
10 its process.

11 JUDGE OBERMANN: Mr. Mizzo? Mr. Mizzo?

12 MR. MIZZO: Yes.

13 JUDGE OBERMANN: You're -- you're arguing, I think,
14 in the petition, that Banin discloses an MCC, and because
15 Herron does as well, it would've been understood to replace
16 one for the other.

17 But my understanding is that in your reply, you're
18 arguing that even if Banin does not disclose an MCC, that
19 somehow in the petition, you preserved an argument that we
20 can rely on Herron alone for the MCC.

21 I think that's what we're really interested in
22 because it doesn't appear to me that that was articulated in
23 the petition, and obviously you can't change the basis of
24 your challenge in the -- in the reply. Please address that.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 MR. MIZZO: Yes. So, Your Honor, as I had -- as I
2 tried to address when Judge Franklin had asked that, I
3 believe that ground has been preserved. It has been made in
4 terms of this is ground two, in terms of obviousness alone
5 for Banin that has been articulated as to why it would render
6 it obvious, and is supported by the arguments that have been
7 made. I --

8 JUDGE OBERMANN: Mr. Mizzo? Mr. Mizzo, I think we're
9 talking past each other. You just referred to an argument
10 that Banin alone renders the invention obvious. The question
11 is whether if Banin -- if we find that Banin does not
12 disclose an MCC, why don't you lose?

13 Because it does not appear that you have made an
14 argument that we can just look at Herron's MCC. Because my
15 understanding is there's no dispute that Herron discloses an
16 MCC, and I'm sure Patent Owner will correct me if I'm wrong.

17 So what we're really asking is, if we decide that
18 Banin does not disclose an MCC, where in the petition, where
19 exactly in the petition, did you preserve the argument that
20 we can turn to Herron instead, for the basic disclosure of an
21 MCC in any ground?

22 MR. MIZZO: Sure, Your Honor. And the answer is yes.
23 We -- we have made that argument. We -- we have articulated
24 that, so I am just looking at, for example, in the -- I have

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 to get my -- in the 186 proceeding, I'm looking at the
2 petition.

3 I'm flipping, you know, to the table of contents,
4 and I can quite clearly see ground three is that certain
5 claims are rendered obvious by Banin in view of Herron. And
6 so -- and -- and there's a discussion there about certain
7 claims being rendered obvious by Banin in view of Herron.

8 And each of the petitions that we've submitted
9 provide arguments of Banin and Herron, or Banin and Farneth
10 rendering obvious the challenge claims for the 423 and 365
11 patents.

12 And as we disclose, and -- and on this particular --
13 in -- in this particular petition on -- on the bottom of the
14 slide, page 34, for example, there's -- there's a paragraph
15 that begins, a POSITA would've been motivated to replace
16 Banin's AU based MCC with Herron's CD based MCC, because
17 Banin teaches using cadmium-based compounds. CD based MCCs
18 were known and widely used the field, and cadmium based --

19 JUDGE OBERMANN: Mr. Mizzo? Mr. Mizzo, I can read
20 that, and I have read it several times. That particular
21 paragraph depends on a finding that Banin discloses an MCC,
22 and that an ordinary artisan would've been led to simply
23 replace a known MCC for another known MCC.

24 My question to you is, where in this petition, did

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 you argue that even if Banin does not disclose an MCC, that
2 we can turn to Herron and start with its MCC?

3 MR. MIZZO: So I -- I -- I don't have the specific
4 cite off the top of my head, Your Honor. I think it is -- I
5 think it is made as part of our arguments that a person of
6 ordinary skill in the art knowing of molecular cluster
7 compounds, the advantages of molecular cluster compounds, the
8 benefits of using them, and understanding that Banin
9 discloses.

10 And i- -- if -- if Your Honors were to find that
11 Banin disclose -- doesn't disclose an MCC, which I believe it
12 does, but if Your Honors were to find that, the only -- the
13 only reason why would be because there's an impurity or
14 something involved in there, and therefore a person of
15 ordinary skill in the art would know the advantages of using
16 a consistent -- a more consistent uniform cluster.

17 I think Banin discloses that cluster, but a person
18 of ordinary skill in the art, knowing of MCCs, and knowing of
19 Herron, and knowing of Farneth, and knowing of the advantages
20 of using a cadmium-based or zinc-based cluster, it -- it's --
21 it's obvious as the day is long that this combination would
22 render those challenge claims obvious.

23 JUDGE OBERMANN: I will just note for the record
24 that you haven't pointed us to a place where you've made that

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 argument in the petition.

2 MR. MIZZO: I -- and un- -- understood, Your Honor,
3 and I'll look for it before rebuttal. But I just -- as I
4 said, I -- I don't have a cite off the top of my head and --
5 and I apologize for that.

6 JUDGE OBERMANN: Thank-- thank you.

7 MR. MIZZO: So it -- turning very quickly to slide
8 26, Herron and Farneth disclose MCCs. There's no dispute, and
9 it discloses MCCs that are useful for semiconductor films.

10 A person of ordinary skill in the art, turning to
11 slide 27, would've been motivated to replace the
12 AU101 cluster, and I think this -- and -- and I'll find this,
13 but this is quite clear, that somebody of skill in the art
14 would -- would be motivated to replace this particular single
15 formula AU101 cluster in Banin, with the CD32 inherent, or
16 the Zn10 cluster in Farneth.

17 And -- and that, Your Honor, I believe is the link
18 to show that, although I believe that single formula for the
19 reasons I've identified is an MCC, our expert, and the
20 evidence points that that is what a person of ordinary skill
21 in the art would replace with CD32 or -- or Zn10 clusters,
22 and -- and that further supports the obviousness of these
23 combinations.

24 If we turn to slide 28, the prior art taught the

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 benefits of using molecular cluster compounds, greater
2 synthetic control, lower reaction temperatures, improved
3 nanoparticle properties, better reaction scalability.

4 This is supported by the Cumberland and Khitrov
5 references. If we turn to slide 29, it's further and amply
6 supported by Dr. Cossairt's deposition testimony. On the
7 left-hand side of slide 29, on paragra- -- on page 79 of her
8 deposition testimony, she was asked methods of making
9 nanoparticles using molecular cluster compounds were known
10 prior to 2004. Is that correct?

11 Answer is yes. And, for example, it was known that
12 you could use a cadmium-based molecular cluster compound to
13 make nanoparticles, correct? Answer, yes. In the middle, I've
14 already talked about her testimony that it's important to use
15 molecular cluster compounds if you want more uniform
16 nanoparticles.

17 On the bottom in the middle, which is from pages 81
18 to 82 of her transcript, she admitted that a person of
19 ordinary skill in the art would understand that using a seed
20 in general, would be expected to allow you to use a lower
21 reaction temperature.

22 This is one of the benefits of -- of using an MCC.
23 And if we look on the right-hand side of slide 29, she was
24 asked, why would a person of ordinary skill in the art have

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 wanted to use a molecular cluster compound to make
2 nanoparticles?

3 And the answer is, I think there are many
4 possibilities, and it would be hard to, you know, come up
5 with all of them. In other words, before 2004, there were
6 many reasons why a person of ordinary skill in the art was
7 going to use molecular cluster compounds.

8 In fact, so many, she couldn't identify them all,
9 but at least one example she provided, is to produce more
10 uniform nanocrystals. On slide 30, one of the arguments that
11 Patent Owner raises is this metal versus semiconductor
12 argument.

13 It's inept, and it's not supported. The -- it lacks
14 support. If you look at paragraph 137, in Dr. Cossairt's
15 expert dec- -- declaration, the only support they cite is to
16 an excerpt from the green deposition transcript, which was a
17 cropped quote.

18 And omits the part that he was referring to those
19 materials in bulk when they are not nanomaterials, and patent
20 owner has not identified any relevant differences between
21 metals and semiconductors in that timeframe for these
22 proposed combinations when they are nanomaterials.

23 Further, Banin's express disclosure says that the
24 catalysts that can seed the growth of the nano-rods can

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 include zinc, cadmium, alloys of such metals, or particles
2 that contain them. On --

3 JUDGE FRANKLIN: On that point
4 counsel, just bear with me, because I want to understand
5 your point there. You're saying that Banin is helping us to
6 understand that Herron's semiconductor material can be used
7 because it includes cadmium. Is that it? Because I don't
8 see anything in Banin explaining that that cadmium can be in
9 any form.

10 MR. MIZZO: Ye- -- yes, Your Honor. I think a -- a
11 per- -- the evidence shows a person of ordinary skill in the
12 art reading this passage would understand that zinc and
13 cadmium-based compounds, including alloys thereof, could be
14 used in the Banin disclosure to seed nanoparticle growth.

15 Absolutely. That's -- that's what Banin teaches a
16 person of ordinary skill in the art, and that's what Dr.
17 Green stated in his expert declaration at paragraphs 127, 129
18 and 130. Okay.

19 JUDGE OBERMANN: I have a related question.
20 These express disclosures that you're citing us on page -- on
21 slide 30, you're -- you're citing these disclosures here at
22 the hearing as I think evidence that someone would've read
23 these disclosures, and been led to Herron's material.

24 Where did you argue this because I'm not seeing a

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 paper that's identified? Is there -- is -- is -- are these
2 two disclosures in Banin discussed in paper 33 or 32?

3 MR. MIZZO: Yeah. So, Your Honor, I -- these --
4 these disclosures in Banin are, for example, expressly
5 disclosed and discussed in Dr. Green's opening declaration.
6 As I said in paragraphs 127 --

7 JUDGE OBERMANN: Where in the petition? You can't
8 incorporate it from the declaration. I don't want to put you on the spot now,
9 but when you come
10 back in rebuttal, I want to make sure that what you're
11 arguing here about Banin's express disclosure for a reason to
12 turn to Herron was actually made in the petition, all right?

13 So when you come back, please let us know where --
14 where you did that with these two quotations from Banin and
15 with that, I'll let you continue, please.

16 MR. MIZZO: Okay. So quickly, for example, in the
17 365 patent IPR petition on pages 35 and 36, there's an
18 express reference to claim 30, and how -- and -- and how that
19 supports the combination that's being referenced here.

20 And again, that's pages 35 and 36 in the -- I think
21 it's 186 proceeding, if -- Your Honors, I believe I'm out of
22 time, but I -- if I can just address a few more points, and
23 obviously happy to answer any other questions that you may
24 have.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 But if I may continue for a little bit longer. Okay.
2 So then let me point to -- just one other point I'd like to
3 address in -- in the combinations of Banin and Herron
4 Farneth, is the fact that on slide 32, Patent Owner argues
5 that -- that there's a melting point.

6 The melting point of cadmium or zinc is too high.
7 This argument is unsupported. In -- in paragraph 137 in Dr.
8 Cossairt's expert declaration, she refers to the melting
9 point temperature of bulk cadmium sulfide, but we know from
10 her deposition -- testimony, and we know expressively from
11 Banin that nanomaterials have very different properties than
12 bulk materials, including drastically lower melting
13 temperatures.

14 And further it -- it's undisputed that a POSITA
15 would've -- well, let me step back. A person of ordinary
16 skill in the art would've reasonably expected these MCCs to
17 see growth, even if they didn't melt though Banin disclose
18 cadmium and zinc, and a person of ordinary skill in the art
19 would understand that they would melt, but even if they
20 didn't, they would still see growth under Banin's process.

21 As we know from you which uses the gold clusters to
22 seed growth, where the gold clusters remain solid and act as
23 seeds. And Dr. Cossairt admitted that you teach that to a
24 person of ordinary skill in the art as well.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Last, I would just like to briefly touch on --
2 unless someone has any -- unless you understand the questions
3 on the Banin grounds, I'd like to very quickly turn to the
4 Zaban grounds. Okay.

5 Zaban, the primary dispute is whether there's a
6 motivation to combine Zaban plus Ptatschek and Farneth.
7 Turning to slide 44, Zaban discloses the method of
8 manufacturing InP QDs, and it discloses three examples.

9 A p-type, an n-type, and an undoped version. The p-
10 type is made with zinc acetate and -- and the pro- --
11 proposed combination would take zinc acetate and replace it
12 with the Ptatschek or Farneth Zn10 clusters.

13 These are undisputed molecular cluster compounds,
14 and the reason is at the end of Zaban, it says they found p-
15 type to provide greater stability during illumination, or --
16 and which is obviously a potential improvement in electrical
17 properties. But they said the reason for this behavior is not
18 understood.

19 So why -- what -- what factors zinc plays in, it --
20 it was unclear. And a person of ordinary skill in the art,
21 turning to slide 45, would've been motivated to combine an
22 MCC with Zaban's InP QDs, so it could provide two benefits.

23 The ben- -- the benefit provided by zinc acetate,
24 which is to include zinc in the core to -- to help

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 potentially improve electrical properties, and number two, to
2 provide the well-known, and well-established benefits of
3 MCCs.

4 And we see this on slide 45, on the left-hand side,
5 supported by Dr. Green's expert declaration, as well as the
6 lead reference Exhibit 10096 on the right, which showed in
7 1999, zinc oxide clusters, including Zn₁₀.

8 The Zn₁₀ on the top is the same cluster that's
9 disclosed by Ptatschek. And that cluster was shown to provide
10 an increased luminance by an order of magnitude. In other
11 words, it improved the optical properties of that
12 nanoparticle film in lead.

13 So a person ordinary skill would understand that
14 zinc in -- in the -- that has contributed to Zaban's InP QDs
15 could provide that sort of electrical benefit, and turning to
16 slide 46 would also know, understand and appreciate that as
17 an MCC, you could provide many more benefits, including
18 greater synthetic control, lower reaction temperatures, and
19 other points.

20 And again, we have Dr. Cossairt's admissions on that
21 point. I'll turn to slide 48 very quickly. Patent owner's
22 primary argument is that Zaban requires a specific amount of
23 zinc in the core of the nanoparticle, and that's incorrect.

24 And we see this in PO's sur-reply where they state,

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Zaban unequivocally stresses the importance of using a very
2 particular amount of zinc. That's from their sur-reply, but
3 Zaban does not say one zinc atoms required.

4 Doesn't say one zinc atom is optimal, doesn't say
5 more zinc would not work, and it doesn't say one zinc atom
6 was used for any particular reason. Rather, all we know from
7 Zaban, is that, at the end of the day, the InP QDs had on
8 average one zinc atom.

9 And if we turn to slide 49, in addition to zinc not
10 being required in any particular amount, and the
11 encouragement to further use zinc in other forms, because it
12 was -- not understood why this p-type provided a greater
13 electrical benefit, we know that adjusting concentration was
14 something that was well within the level of a person of
15 ordinary skill in the art.

16 Turning to slide 50, Patent Owner argues that the
17 amount of zinc in the MCCs would be 10 times the amount that
18 is in Zaban, and therefore this would re- -- reduce the QD
19 size, and be inconsistent with the purpose of Zaban.

20 First, that's an inaccurate characterization of the
21 law. The law does not require that Your Honors consider
22 obviousness from a preferred embodiment of a primary
23 reference, rather references have to be taken for all of
24 their teachings.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 And clearly, one of the teachings that Zaban teaches
2 is the formation of an InP QD with zinc acetate to pro- --
3 provide certain electrical benefits. And -- and with that in
4 mind, the size is irrelevant.

5 But in any event, size is unsupported because the
6 only reference that Patent Owner refers to is the Mortvinova
7 article. Mortvinova involves zinc concentrations of 500 to --
8 to 2000 times the amount that was in -- that are in these
9 MCCs.

10 And -- and so to extrapolate from 500 to 2000 to
11 say, that means that the combination that's proposing would
12 result in -- in different QD sizes is -- is -- is a leap
13 that's unsupported. But what Mortvinova, that -- that
14 article, even though it was published in 2015 shows is, a
15 person in -- in the field could easily adjust zinc
16 concentrations.

17 And there, they adjusted it by 1500 times, not 10
18 times, 1500. Big difference, but that was obviously in --
19 within the skill. On the right-hand side, Dr. Cossairt
20 admitted that none of the claims require nanoparticles to be
21 a specific size.

22 So even if it resulted in slightly smaller QDs, it's
23 not relevant to the obviousness analysis. With that, unless
24 Your Honors have any questions, then I'll reserve the rest of

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 my time for rebuttal. Thank you.

2 JUDGE KAISER: Okay. It looks like you've got about
3 12 minutes of your original 60 left for -- for your rebuttal.
4 So I guess we'll hear from Mr. Newman now to make his opening
5 presentation, and then when he's done, we'll -- we'll bring
6 you back for your -- for 12 minutes.

7 So Mr. Newman, let me ask you first, how much time
8 you'd like to reserve for rebuttal, first, your surrebuttal,
9 if any. I'm sorry. I think you may be muted.

10 MR. NEWMAN: Thank you, Your Honor. I'd like to
11 reserve 15 minutes if I may please.

12 JUDGE KAISER: Okay. All right. So you've got 45
13 minutes, and you can start whenever you're ready.

14 MR. NEWMAN: Thank you, Your Honor. Thank you, Your
15 Honors. Petitioner has the burden here, and they've failed to
16 -- to carry that burden in two key respects. First, they've
17 failed to show that Banin discloses a molecular cluster
18 compound.

19 Why is that? Because as Your Honors noted in the
20 institution decisions, Banin creates its gold particles,
21 which are the alleged molecular cluster compound, using the
22 Hutchison method.

23 And is undisputed that the Hutchison method creates
24 gold particles with varying sizes, that are averaged out to

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 come to an estimated formula. And that's -- that does not
2 satisfy as a sufficiently well-defined chemical structure so
3 that all the molecules have the same molecular formula.

4 JUDGE FRANKLIN: Right. Counsel, sorry to interrupt
5 you here, but we're having trouble hearing you. Is there
6 anything you can do to assist the audio for us?

7 MR. NEWMAN: I can -- I can lean in a little bit. Is
8 this -- is this better?

9 JUDGE FRANKLIN: That is better. Thank you.

10 MR. NEWMAN: So -- so I'll back up just in case you
11 didn't -- didn't hear my beginning. The -- it's Petitioners
12 working here, and they failed to meet their burden for two
13 important reasons. First, they fail to show that Banin
14 discloses a molecular cluster compound. And why is that?

15 It's because as you noted in your institution
16 decisions, that Banin makes its gold particles and that's the
17 alleged molecular cluster compound using the Hutchison
18 method. And it's undisputed that the Hutchison method creates
19 gold particles with a dispersity of sizes, average estimated
20 molecular formula.

21 And that doesn't satisfy the definition of molecular
22 cluster compound. The remaining grounds fail because they're
23 based on a combination of various different references, mixed
24 and matched together.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Many of the combination you have already properly
2 rejected in the institution decisions, but the remaining
3 combinations are -- are inappropriate because they rely on
4 exchanging one important reagent from Banin or from Zaban,
5 with another chemical, without taking into account, the role
6 of the reagent that they're replacing, or how possibly this
7 new chemical could satisfy that role.

8 JUDGE OBERMANN: Mr. Newman, can I just ask one
9 question? I wanted to know whether the Patent Owner disputes
10 that Herron discloses a molecular cluster compound within the
11 scope -- within the meaning assigned by the district court.

12 MR. NEWMAN: Herr- -- we agree that Herron does.
13 [Talking over each other].

14 JUDGE OBERMANN: Thank you. Please continue. Thank
15 you.

16 MR. NEWMAN: If we could turn to slide three, so
17 this is just a chart detailing Petitioner's grounds. And I'll
18 be referring back to this chart throughout the day today as
19 we move forward through the ground.

20 But for now, this just shows the three primary
21 references. There's the Zaban -- the Banin, the Zaban, and
22 the Lucy references, and I understand now the Lucy references
23 have been withdrawn. But the remaining reference is Banin and
24 Zaban, Banin does not disclose a molecular cluster compound,

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 and all claims require a molecular cluster compound.

2 It's a very important part of this invention, or
3 these inventions. And Zaban, Petitioners don't even allege
4 that Zaban discloses a molecular cluster compound. So if we
5 could turn to slide 12 real quick, so this is just to back
6 up.

7 So we focus on what a molecular cluster compound is
8 again. A molecular cluster compound, it's agreed, the parties
9 agree, they're clusters that have sufficiently well-defined
10 chemical structure, such that all the molecules of the
11 compound possess the same relative molecular formula.

12 These are identical chemicals that we're talking
13 about here. Slide 13. And so there are a number of these
14 grounds in which Petitioner relies solely on Banin for the
15 disclosure of the molecular cluster compound.

16 And on slide 14, I've highlighted in red, all of the
17 grounds that necessarily fail, if you find that Banin does
18 not disclose a molecular cluster compound. Slide 15. Now, in
19 the institution decision, Your Honors provided guidance to
20 the parties as to important issues that should be addressed
21 here at the hearing today, and in the papers.

22 In particular, you asked three questions, and these
23 questions really are right on point because they're
24 dispositive of the Banin grounds. Patent owner answered these

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 questions directly and supported his answers with expert
2 testimony that was corroborated by various references.

3 The petition -- the Petitioners sort of run away
4 from them, but ultimately have to concede that Patent Owner's
5 answers to these questions are correct. Petitioner now admits
6 to the first question.

7 Petitioner now admits that Hutchison pro- -- process
8 produces particles of various sizes with only an average
9 estimated molecular formula. And as we discussed -- as Mr.
10 Mizzo just discussed, that they even admit that they imp- --
11 they have impurities in these particular compounds.

12 With respect to the second question, are Hutchison's
13 narrowly dispersed gold particles, mono disperse gold
14 particles? The answer to that is they are not. Petitioner
15 admits that Hutchison's particles are poly dispersed.

16 They are -- they exist in a distribution of sizes.
17 And third, Petitioner now admits that the -- that Banin's
18 gold particles aggregate. Go to slide 17. These next slides
19 are just to detail the -- these admissions.

20 So here we have Petitioner admitting that the AU101
21 showing in Hutchison are consistent with a size distribution
22 of clusters. A size distribution of clusters that only have
23 an average sug- -- suggested formula, do not meet the
24 definition of a molecular cluster compound in this case.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Slide 18; here we have Petitioner labeling the TEM
2 image from Hutchison as being poly dispersed clusters. So
3 this image shows poly dispersed clusters, which can't meet
4 the definition of molecular cluster compound in this case.

5 On -- in slide 19, here we have Petitioner admitting
6 that Banin particles aggregate. Particles that are
7 aggregates, Dr. Bawendi, Petitioner's own expert, testified
8 that aggregates do not meet the definition of molecular
9 cluster compound.

10 It doesn't matter whether he was talking about the
11 Banin reference or not. We get the understanding from Dr.
12 Bawendi that aggregates do not meet the -- the meaning of
13 molecular cluster compounds, and so Banin does not disclose a
14 molecular cluster compound.

15 And so what does Petitioner do having conceded that
16 -- that Hutchison doesn't produce a molecular cluster
17 compound? Now they come up with a new argument, an argument
18 that wasn't in the petition, that Banin somehow does some
19 sort of further size selection.

20 And remember, they have the burden of proof to show
21 that Banin actually does some size selection to create
22 molecular clusters that are exactly 101 gold atoms, large.
23 And what do they do?

24 How do they -- what do they do to point -- what do

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 they point to here to meet this burden? They don't point to
2 the petition because it's not there, and it's not Banin
3 either. There's no statement in Banin even suggesting that
4 there was some sort of further size selection, and there was
5 no statement that there was a further purification in Banin
6 either.

7 And so, because there's no statements in Banin, what
8 do they point to? They point to images, and they say from --
9 if I go to slide 20, on slide 20 highlighted in this, is a
10 statement that from these images, you -- you'd be able to
11 understand that Banin's clusters are -- are -- are somehow
12 all identical from these images alone.

13 And what is it about these images? What is it about
14 the image on the left that tells us that it's a -- that all
15 these particles are identical? We don't know. We have no
16 expert testimony as to that.

17 The statement that this picture shows identical
18 molecules is completely uncorroborated. It's -- it -- it's
19 expert testimony with no corroboration, and it's entitled to
20 no weight. How exactly is the picture, the Banin picture
21 different from the Hutchison picture?

22 Well, there's a reason why these images look the
23 same. There's a reason why Banin doesn't mention that it does
24 further size selection, and that's because Banin itself, we

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 go to the next slide, slide 21, Banin itself, disproves this
2 new argument.

3 Banin discloses small gold clusters with a 1.4
4 nanometer mean diameter. That's an average diameter. That's
5 exactly the same as Hutchison. Banin also refers to the
6 AU101 formula as being only a suggested formula, and that's at
7 Exhibit 1005 at pages 20, lines 12 through 15.

8 Again, this is just like Hutchison's particles, in
9 which Hutchison calls just estimated formula. One imagines
10 that if -- if Banin had discovered a way to make perfectly
11 uniform molecular cluster compounds with exactly 101 gold
12 atoms, that he would've referenced the gold particles of
13 having an exact formula.

14 Not a suggested formula, or at least stated that
15 they were well defined, but he doesn't because they're not.
16 So -- so if we turn to slide 24, here are all the grounds
17 that fail because Banin does not disclose a molecular cluster
18 compound.

19 And I'll move on to the obviousness grounds, unless
20 there's any questions with respect to the -- the allegations
21 with respect to Banin alone.

22 JUDGE FRANKLIN: Counsel, I have one question. I'm
23 trying to figure out how to best relay it. But I think I
24 recall Petitioner's counsel pointing us to claim seven of the

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 423 patent. This is -- I'm looking at Petitioner slide 14, if
2 you have that available.

3 And they're pointing to the recitation of monitoring
4 an average size of nanoparticles in that claim, for the
5 assertion that Patent Owner's arguments regarding size of
6 nano-rods are irrelevant and incorrect. I wanted to know what
7 your response was to that.

8 MR. NEWMAN: Great. Thank you for that guidance. And
9 I think this gets to a question that Judge Obermann asked,
10 and that is, you know, if you use a molecular cluster
11 compound, are you going to get a mono dispersed population of
12 quantum dots?

13 And the answer is you are, because the molecular
14 cluster compound is an identically sized particle. And now,
15 what -- our statement, what we're trying to get across with
16 respect to the diameter differences in Banin's quantum rods,
17 is that it -- the diameters of the quantum rods, which are
18 the end products of the Banin process vary by 25 percent.

19 And that just so happens to be the exact same size
20 dispersity that the Hutchison gold particles have. And so if
21 you use a -- a -- a particle that has a 25 percent
22 dispersity, you're going to get an end product that has the
23 same 25 percent dispersity.

24 If you use a product that is identical in -- in your

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 -- an identical molecular cluster compound, you're going to
2 get nearly identical end products. And that's -- that's
3 really what was discovered in these patents.

4 And that's really what has revolutionized the
5 quantum dot field, and allowed mass production of these -- of
6 quantum dots, is that understanding you use a molecular
7 cluster compound while along with some of the other things
8 with like the multiple precursors, and the seeding reactions.
9 Did I -- did I answer your question?

10 JUDGE OBERMANN: Mr. Newman,
11 what is the best evidence that you've put into the record on
12 that point, and also cited in one of your briefs? What is the
13 best record evidence?

14 And do you have anything showing that the other
15 expert, Petitioner's expert agreed with that, or was unable
16 to address that? And if it's too much to ask right now, maybe
17 you could just do it when you have your rebuttal.

18 MR. NEWMAN: Right. Thank you, Your Honor. I will
19 give you the exact cites for that, but I -- I can tell you
20 that Banin itself says that the -- that the diameter is --
21 relates to the size of the particle, or the 25 percent
22 matches up.

23 I've got another reference for you. I don't know off
24 the top of my head that absolutely shows that the -- that the

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 size of the particle, controls the size of the -- of the
2 result in semiconductor. So Judge Franklin, I just want to
3 make sure that I answered your question before I move on.

4 JUDGE FRANKLIN: Thank you for your answer. Thank
5 you.

6 MR. NEWMAN: Thank you. All right. So if we move to
7 slide 25, we'll talk a little bit about the obviousness
8 grounds.

9 The Petitioner's obviousness grounds are -- are
10 based on mixing and matching an assortment of different types
11 of -- of methods, and different types of reagents to create
12 different kinds of nanoparticles, and -- and they mix and
13 match them like they're -- like they're Legos.

14 Patent owner provided o- -- about 10 pages worth of
15 factual background, describing all the different
16 considerations that a chemist would need to take into
17 consideration when choosing reagents for these different
18 techniques.

19 All of this background -- all these background facts
20 was well supported. We had expert testimony. We had
21 corroboration of that expert testimony. In the entirety of
22 Petitioner's response to that background section is on -- is
23 depicted on slide 34.

24 That's it. Their response? Ignore the facts, Your

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Honors. They tell you to ignore the facts for a reason. They
2 tell you to ignore the facts because the Patent Owner's facts
3 are -- are correct. They're right.

4 And there's no scientific justification to support
5 the combinations that they're putting forth here. As the
6 board already properly noted, and on the side here with
7 respect to a mix between an SLS method and a hot injection
8 method, based on the current record, these are disparate
9 methods that involve markedly diff- -- different experimental
10 conditions, reactance, and synthetic goals.

11 But they still mix and match them, even after that
12 guidance from the board. We turn to slide 33; this one gets a
13 little bit colorful because I've color coded all of the
14 different types of references together.

15 And I'll refer to these references with these colors
16 for the rest of the presentation, but you'll see that they
17 mix here, solid liquid solid methods depicted in red, with
18 hot injection methods depicted in blue.

19 Those are not necessarily compatible. They mix heat
20 up methods depicted in green with aqueous methods in -- in
21 pink, which are not necessarily compatible, which are
22 actually incompatible.

23 They swap reagents from one type of reaction with
24 reagents to the other, with- -- without giving any

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 justification, or even consideration as to why -- what role
2 the particular reagent they're switching out plays, or how
3 the new chemical would perform that role.

4 But if we jump way ahead to slide 74, I know that's
5 -- I'm jumping around a bit here, but I just want to give you
6 a visualization here. These are the Lucy grounds. These have
7 been abandoned, but -- but this just shows, look at all the
8 different me- -- different types of methods that they're --
9 that they're mixing here.

10 The board already correctly dismissed these in -- in
11 the institution decision, and rejected these combinations. If
12 you go to slide 58, now we have the Zaban references. This is
13 even worse. We've got Zaban mixed with -- with semiconductor
14 crystals with non-semiconductor metals, with heat up method
15 with aqueous.

16 [Inaudible] suggest there, they mix everything
17 together. And if you go to slide 35, here you see the Banin
18 references. Now there's a new argument that -- that wasn't
19 presented in -- in the petition, which includes Yu.

20 And with that, we have every single different type
21 of reaction being brought to bear on the Banin reference. And
22 -- and this is -- is the worst and -- and why do I say it's
23 the worst? It's because Petitioner tries to combine an SLS
24 reaction here with semiconductor cluster compounds that are

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 the Herron and Farneth depicted in yellow here.

2 And this is a -- a particularly incompatible
3 combination, so much that it's never been attempted. There's
4 no evidence that it ever could work. And so if we go back to
5 slide 33, we'll just show you what we're doing here.

6 This is the solution liquid solid Banin reference,
7 combined with a recrystallization cluster compound in a
8 chemical vapor reaction cluster compound. Recrystallization
9 and chemical vapor reactions are extraordinarily high
10 temperature events, whereas solution liquid solid is a -- a
11 much lower temperature in which the solvents would boil off
12 at 300 to 360 degrees.

13 Go to slide 40, and -- and -- and I think Judge
14 Obermann, you're exactly right. There's -- once if you
15 determine that there's no molecular cluster compound in
16 Banin, I -- I don't see any argument that -- for combining
17 this reference in the first instance in the petition.

18 It wasn't until Patent Owner alerted the Petitioner
19 to the fact that Banin was an SLS reaction, and that it
20 relied on Hutchison that we even saw this argument. But there
21 are very particular reasons why, even if this argument was
22 preserved, that it fails.

23 And -- and let me just back up and -- and talk a
24 little bit about what SLS reactions require so that -- so

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 that we have -- so we're on the same page here.

2 SLS reactions use melted metal catalysts to dissolve
3 precursors into the catalyst, into a super saturated solution
4 that then precipitates out to form these elongated
5 semiconductor rods. They -- when choosing a metal catalyst,
6 there's a number of considerations. First of all, it has to
7 be a metal.

8 JUDGE OBERMANN: Mr. Newman, can I just ask one
9 question, because I heard your friend argue that that
10 represents seeded growth. What's your position on that?

11 MR. NEWMAN: SLS as a seed?

12 JUDGE OBERMANN: Well, the Banin reference, and I
13 apologize I have been mispronouncing it as Banin. I heard
14 your friend argue that Banin discloses seeded growth, and I
15 know Banin is an SLS process.

16 And what you just described with the precursors
17 being dissolved in a melted metal, and then getting saturated
18 to the point where they, you know, have the growth, is that
19 really seeded growth?

20 MR. NEWMAN: No. It's not seeded growth. And -- and
21 you may have noticed that the slide that Mr. Mizzo referred
22 to, to say that it was seeded growth, called the metal a
23 catalyst. It's catalyzed growth.

24 Seeded growth is -- is -- is expressly discouraged

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 by the Banin reference. What happens in Banin is the gold at
2 -- at high gold concentrations, the gold aggregates into some
3 larger particle, and -- and that caused a seed.

4 And Banin was like, yikes. We don't want that to
5 happen. We have to use a lowered gold concentration, so that
6 we don't get any seeding in this reaction. SLS reactions are
7 catalyzed reactions, and they need a metal catalyst.

8 And so in order -- and -- and to Judge Franklin's
9 question about, does the -- does Banin require a specific
10 form or -- or a specific type of cadmium when it discloses
11 that you can use cadmium as a -- as a metal catalyst?

12 And it does, if -- if you look at the slide that Mr.
13 Mizzo was referring to, I think it's slide 30. The form that
14 the -- the catalyst has to take, when you're combining
15 cadmium or, zinc, or whatever it says here, the metal -- the
16 method, according to claim 24, wherein they said metal
17 catalyst, is selected from a group of metals that are like
18 the quintessential metals in the world, or alloys in layered
19 particles thereof.

20 It still says right above that, layered metal
21 particles, metal particles. It never goes -- it never says
22 that you can use anything but metal. When you're combining
23 gold and -- and zinc, those are still going to be metals,
24 even though there are alloys of gold and zinc.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 They're not going to be semiconductors. There's
2 nothing in Banin that suggests a semiconductor could ever
3 work in an SLS reaction, and then they can't apparently. So
4 anyway, regardless of whether semiconductors can or cannot
5 work in an SLS reaction, one thing that peti- -- Petitioner
6 had the burden to tell you that this novel combination was
7 not only obvious, but would have an expectation of success.

8 And in order to do that, they would have at very
9 least needed to consider these properties of the metal
10 catalyst. You would need to consider the melting points. You
11 can't have a catalyst that doesn't melt in your reaction, or
12 you're not going to be able to solvate anything.

13 You have to check the solvating ability, because you
14 need to have a catalyst that not only can melt at the
15 precursors, but can melt them and -- and create a super
16 saturated solution. And then when the -- the semiconductor
17 precipitates out, that metal catalyst can't have any
18 reactivity with the semiconductor, or you're going to have a
19 whole host of problems.

20 And so what -- in making this alleged combination,
21 Petitioner doesn't -- doesn't consider any one of these.
22 Petitioner in the petition and expert -- first declaration,
23 doesn't even mention that Banin is a -- a SLS reaction in --
24 in with effect to the name Banin.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 We called it Banin for a long time too, but my
2 expert knows Banin, and she corrected us, and now I'm going
3 to call it Banin, so I apologize if everyone else calls it
4 Banin. But anyway, they don't -- they -- they don't consider
5 the relevant characteristics of a -- of a metal catalyst in
6 an SLS reaction.

7 And all the evidence suggests that Herron and
8 Farneth semiconductor crystals do not have the required
9 properties, as no one has ever used a semiconductor as a
10 catalyst before. So slide 47.

11 Slide 47, I've highlighted the grounds that fail
12 because there -- the combination of Banin and Herron fail.
13 And if you look at slide 52, I've highlighted here in yellow,
14 the -- the ground that fails because you would not combine
15 Banin with the Farneth semiconductor crystal.

16 Back to slide 35, please. The -- the -- I just want
17 to mention the Treadway, Bawendi, and Braun references are
18 all -- they have their own problems and -- and reasons why
19 you wouldn't combine them, but none of them are even alleged
20 to disclose a molecular cluster compound.

21 So because the Banin and Herron, and the Banin and
22 Farneth grounds fail, those grounds all fail as well. So
23 moving on to slide 58, if we could talk a little bit about
24 the Zaban grounds. Now here, you can see just by the color is

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 that we've got a mix and match again, of a lot of different
2 types of technologies.

3 And -- and Petitioner takes a similar approach to
4 Zaban as it took with Banin. They ta- -- they say, take one
5 reagent, and replace it with another reagent. You know, the -
6 - the reagent that has the properties that they want to meet
7 a claim limitation.

8 But they fail to consider the role of the first
9 reagent that they're taking out of the system, and they fail
10 to -- to consider how the new chemical could ever satisfy the
11 role that they're replacing. So slide 33, please.

12 Well, back -- back here again. Here we've got heat
13 up method that's the Zaban, and we're combining it with the
14 recrystallization, Herron, and the chemical vapor reactions
15 in the cal- -- chalcogenolysis, sorry, if I butchered
16 that word, in condensation methods with Ptatschek.

17 So if you go to slide 63, here are the grounds that
18 fail if you find that Zaban in Farneth should not be
19 combined. And I'll -- I'll note that in the institution
20 decisions, this combination was already considered and
21 rejected.

22 If you go to slide 64, pe- -- Petitioner had -- had
23 previously contended that a cadmium-based, or a zinc-based
24 molecular cluster compound could be somehow combined with

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Zaban, and the board already correctly rejected this
2 combination.

3 I'm just going to read this in the record, because
4 these are -- these are just as exactly right. Petitioner does
5 not show sufficiently that either the Farneth -- either of
6 the Farneth compounds, cadmium-based one, or the zinc-based
7 one, would've been recognized as a known interchangeable
8 alternative with any function in common of the zinc acetate
9 and Zaban's process.

10 And then further, the board found the Petitioner
11 articulates no clear reason why an ordinary skilled artisan
12 would've viewed Farneth zinc-based cluster, which contributes
13 many times the amount of zinc compared to the zinc acetate,
14 as interchangeable with the zinc acetate dopant, and Zaban's
15 process.

16 Petitioner's arguments pertaining to Farneth's non-
17 zinc-based cluster, that is the cadmium-based cluster, are
18 even less clear. And that's exactly right. The -- the -- the
19 -- the thing is, in the petition, the Petitioner did not
20 understand, or at least did not let on that the zinc acetate
21 was being used in the lu- -- in the Zaban method to -- with a
22 very specific purpose of being a dopant.

23 They just didn't get it. They didn't address it. The
24 word dopant is not in the petition. The word dopant is not in

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Dr. Green's first declaration. There's no discussion in the
2 petition about how Farneth, or Ptatschek could possibly
3 perform the function that zinc acetate performs in this
4 reaction.

5 No discussion about how cadmium could -- could --
6 could fill that role or -- or what effect putting sulfur into
7 the quantum dots would have, which both of these compounds
8 have.

9 There's just utter -- an utter lack of proof in the
10 -- in the -- in the petition and you're -- you correctly
11 rejected this, and there's nothing that they have done to
12 point to the petition to support this ground.

13 Now, I just heard Mr. Mizzo talk a little bit about
14 a -- a reference called Leeb. Now, the first time I saw
15 the Leeb reference was in -- when I received the slide
16 presentation on Friday. I'd never seen that chart.

17 I had never seen any argument about the Leeb
18 reference, except for, as I went back and looked at their
19 reply, a see also quote in a -- in their reply that
20 referenced Leeb. Leeb was not produced to us until after our
21 Patent Owner response.

22 It's improper to be relying on it now. It -- they --
23 they have the burden under section 312A3 under sections 42,
24 104B5, to support their positions with all the arguments that

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 they are to bring in their petition.

2 And I will note that the Leeb reference is cadmium
3 sulfide reference, or a cadmium-based quantum dot reference,
4 and in Zaban is an indium phosphide-based reference. And we
5 still don't have any analysis as to what -- what the
6 difference between those two would do -- would be, but we
7 know that they're different.

8 We know that indium phosphide has different
9 properties than the cadmium sulfide. And honestly, I mean, we
10 just shouldn't be talking about the Leeb reference at all. So
11 if we can turn to slide 67, these are all the grounds that
12 failed because as you already properly found, the Zaban and
13 Farneth combinations are -- are improper and not supported in
14 the petition.

15 And if it's -- turn to the -- the next slide, 68,
16 here are the remaining grounds that fail. For the same
17 reasons as the Farneth combination, there's just no support
18 in the petition for these particular combinations.

19 And they've already been properly rejected, and
20 should continue to be rejected. I'm -- I'm -- I'll reserve
21 the remainder of my time. Unless you have questions about any
22 of this, I'll -- I'll reserve the remainder of my time for
23 rebuttal.

24 JUDGE KAISER: Okay. Thank you, Mr. Newman. You took

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 up about 35 minutes, so we've got about 25 minutes left for
2 you on surrebuttal, if you'd like to take that long. So Mr.
3 Mizzo, I think it's back over to you. As I recall, you have
4 about 12 minutes left for rebuttal.

5 MR. MIZZO: Thank you, Your Honor. May -- may I
6 begin?

7 JUDGE KAISER: Yes, please.

8 MR. MIZZO: Okay. Patent owner's counsel raised a
9 number of characterizations of our arguments, and
10 characterizations of the references. I won't have time in 12
11 minutes to address them all, but I'll try and address the
12 core parts.

13 One of the things that Patent Owner's counsel argued
14 is that, somehow, we changed arguments in -- from our
15 petition to our respo- -- or replies. And the answer is
16 that's absolutely not the case.

17 For example, we identified Banin's AU101 cluster, as
18 the molecular cluster compound in Banin. They disputed that.
19 We provided further confirmation as to why that's the case.
20 This is an appropriate response.

21 And -- and similarly with regard to the Leeb, I think
22 it's Exhibit 1096, we had argued in the petition that a
23 person of ordinary skill in the art would be motivated to
24 replace Zaban zinc acetate, with the zinc-based MCCs in

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Ptatschek and Farneth.

2 And then, in response, we further illustrated why it
3 would -- zinc-based clusters would be expected to provide
4 electrical benefits, and would support that motivation to
5 combine. The fact that Patent Owner doesn't want to talk
6 about Leeb, I think illustrates how Leeb is damaging to their
7 arguments, not that it wasn't further confirmation of
8 arguments that were originally raised. Speaking of arguments
9 that were --

10 JUDGE OBERMANN: Mr. Mizzo? Mr. Mizzo, I just want
11 to make sure I understand. Are you saying that you submitted
12 Leeb with the petition?

13 MR. MIZZO: No, Your Honor. That was submitted in
14 response to arguments that were made by Patent Owner's
15 counsel in their response. But --

16 JUDGE OBERMANN: I see.

17 MR. MIZZO: But to support points that are
18 consistent with and were made in the petition, including the
19 motivation to combine, and why you would be motivated to add
20 the zinc based MCCs from Ptatschek and Farneth to Zaban.

21 One thing, Judge Obermann, that you had asked me was
22 about the Banin, and Herron combination, and where in the
23 petition was it articulated. And as an example, I'll -- I'll
24 point to the 183 proceeding which concerns the 828 patent.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 And I believe the pages 21 through 26 support our
2 position that whether or not you view Banin's AU101 cluster
3 as an MCC or not, and as I said, we believe it is, I believe
4 we fairly and appropriately identified, and explained why
5 using that as the example, a person of ordinary skill in the
6 art would replace Herron's CD32 or use Herron 's 30- -- CD32
7 cluster in lieu of that AU101 cluster.

8 And we see this beginning on page 21, where we said,
9 Banin discloses the MCC AU101. And then we refer to that, we
10 shorthand that reference as the AU based MCC, as in which is
11 a metal catalyst, and we continue.

12 And then what we do is, we illustrate why a person
13 of ordinary skill in the art, say on page 22, would've been
14 motivated to release Banin's AU based MCC. That's the
15 AU101 cluster that we pointed to, would've replaced that with
16 Herron's CD based MCC.

17 So I think a fair reading of the arguments that we
18 made in our petition is that, regardless of whether you view
19 Banin as disclosing an MCC, that the combination of Banin
20 plus Herron continues to survive and supports the obviousness
21 of these challenged claims.

22 JUDGE FRANKLIN: Counsel, were you just pointing to
23 the 184 case, the petition in the 184 case?

24 MR. MIZZO: No. I was pointing to the petition in

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 the 183, the 828 --

2 JUDGE FRANKLIN: [Inaudible]. Okay. I -- I want to
3 go there real quick. I don't want to take up much of your
4 time, but okay, you're looking at the 183 case, and you're
5 looking at slide 21, you said?

6 MR. MIZZO: That's right, Your Honor. Do you see the
7 section, if I'm on the right page, that -- that has section
8 eight [inaudible] challenge claims are unpatentable, and then
9 A1, which is motivation and combined Banin and Herron?

10 JUDGE FRANKLIN: Right. That's 21. Okay. So, I was
11 looking at that originally too. And that's where, on slide 22,
12 I was having the issue because when you talk about your
13 motivation to combine, there's where Judge Obermann and I
14 were addressing that the argument looks as though it's
15 relying on Banin as disclosing the MCC, and then substituting
16 that MCC with one from Herron. But you're saying that it's
17 giving you some rationale just to use Herron's MCC without a
18 substitution?

19 MR. MIZZO: Well, yes. I -- I think what happened is
20 we labeled it as an MCC here beginning on slide 21, and then
21 continued to refer to that in shorthand as the gold-based
22 MCC, and provided ample motivation to combine Herron's MCC
23 with Banin, replacing that AU101 cluster.

24 And I think it's -- it's clear here, when we

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 subsequently refer to AU based MCC, we are referring to the
2 MCC. This is on that first line of the section,
3 AU101(PPH)321CL5, which is that single formula on page 20 of
4 the Banin reference.

5 And I believe that the subsequent reasons of the
6 motivation to combine, why a person of ordinary skill in the
7 art would've understand a matter of routine process,
8 optimization all stand, even if you were to find that Banin
9 doesn't disclose an MCC, contrary to the arguments that I've
10 made.

11 JUDGE OBERMANN: Mr. Mizzo, tthe problem I'm
12 having is that, when I read that part of your brief, and I
13 believe it's the same across at least several of the other
14 cases, you if Banin is disclosing an agglomerate
15 that is not an MCC, why on earth would someone turn?

16 Where have you told us why someone would turn to
17 Herron's MCC, if it's not because we're substituting one MCC
18 for another? I think that's what we really are trying to
19 get at here.

20 Because let -- let's just assume hypothetically that
21 Banin discloses a catalyst that does not meet the definition
22 of an MCC because it does not have a uniform molecular mass,
23 and that it's an agglomerate.

24 Why then would -- where in the petition have you

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 argued that we don't need that in Banin because we would
2 start with, you know, taking -- why would we -- why would we
3 incorporate an MCC into Banin, if Banin does not include one?
4 That's the question, I think.

5 MR. MIZZO: So -- so first, I don't believe there's
6 any evidence that there's a different molecular mass, and
7 I've already addressed the agglomeration point. But to your
8 point, Your Honor, I think this whole section establishes
9 why, and for -- for purpose of this discussion, I'll refer to
10 Banin's AU101 as a cluster.

11 Why a person of ordinary skill in the art would
12 replace that cluster with the undisputed MCC from Herron, and
13 the benefits of using Herron. And I've touched on some of
14 those which is generating more consistent nanoparticles,
15 using lower reaction temperatures, and -- and so forth so on.

16 These are undisputed motives. It was a big goal at
17 the time to use Dr. Cossairt's admission at the time to want
18 more uniform nanoparticles. And if Your Honors were to find
19 that Banin's clusters are not MCCs, then that would provide
20 an even stronger motivation, if you will, to -- to include C-
21 -- the CD32 cluster from Herron, because it is an MCC.

22 It's undisputed, and one of skill in the art would
23 expect it to provide even more uniform resulting
24 nanoparticles, and this is on pages 22 and 23 of the 183

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 petition. So unless Your Honors have any further questions
2 about that, then I will just quickly touch on several other
3 issues.

4 One is, I -- I think an argument was made that
5 Hutchison doesn't disclose MCCs, and I think that's a
6 mischaracterization of both Hutchison, and what we've argued.
7 The tested sample is not -- doesn't disclose an MCC because
8 there's an impurity. However, as I noted above that, it talks
9 about purification, removal of that.

10 And if you have your -- if you have a purified form
11 of that cluster, it is an MCC. It's a single formula. It's an
12 MCC. We -- let me see. There -- there was a discussion about
13 the TEMs by Patent Owner's counsel and -- and pointing to, I
14 think it was their slide 21.

15 And what I will say is there's undisputed expert
16 testimony about -- about Banin's TEM. And the reason is,
17 despite the fact that Dr. Cossairt apparently knows, and this
18 is unsupported in the record, and just attorney argument,
19 apparently knows Dr. Banin, but there's no discussion by Dr.
20 Cossairt of what the TEM in Banin shows.

21 And there's no discussion by her whatsoever of the
22 reference to without further size selection. In fact, when
23 you look at what she does disclose, it's clear that she
24 apparently purposefully omitted any reference to it because

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 in paragraph 113 of her declaration, she discusses
2 Hutchison's TEM, and offers opinions using the naked eye.

3 And in paragraph 106, she includes an image of it,
4 but she does not include an image of Banin's TEM. And she
5 knew about the TEM because she quotes a discussion about
6 figure 10b in Banin, in paragraph 103 of her declaration.

7 In figure 10b, is right next to Ba- -- Banin's
8 figure 10a, the TEM, same page. You can't miss it. And yet
9 she did not offer any opinions regarding Banin's TEM. The
10 only person to offer opinions regarding Banin's TEM is Dr.
11 Green, who looked at both and said, Banin's TEM supports
12 there's a more uniform cluster.

13 It shows an improvement over Hutchison. It's
14 consistent with there being size selection. And as I said,
15 Dr. Green doesn't comment whatsoever on the fact that Banin
16 has an express reference to there being size selection.

17 She never also said that size selection could not
18 produce MCCs, or that purification could remove the impurity.
19 She never says that Hutchison discloses a size selected
20 tested sample, rather as it's undisputed the -- the tested
21 sample that they like to look at includes the impurity.

22 There's a -- there's a -- a discussion in slide 33,
23 in Patent Owner's slide deck, that shows different methods of
24 making nanoparticles, and a lot went into it. And patent

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 owner's counsel referred to it numerous times.

2 I -- I think the slide's great because it
3 illustrates that this -- this argument is largely irrelevant,
4 and beside the point, and it illustrates a fundamental
5 misunderstanding of Petitioner's combinations.

6 And what I mean by that is first, under the law, for
7 example, the Uber case that we cite, there -- it -- it
8 expressly states, it is not necessary that two pieces of
9 prior be physically combinable to render obvious the
10 assertive patent.

11 And we're not trying to combine these two methods
12 from any different particular things, for example, Banin plus
13 Herron or Farneth. We're not trying to combine two different
14 methods. We're saying, using the resulting MCC in Herron or
15 Farneth, you would then use that in Banin's process.

16 For Bawendi, that's a size monitoring technique that
17 we're saying you can use in Banin. For Treadway, this refers
18 to additional elements being in the shell. We're not saying
19 you have to use Treadway's process.

20 We're saying using Banin, which discloses rod shell,
21 that you could add another shell. That this would be obvious
22 to a person of ordinary skill to tailor the properties. Banin
23 plus Braun, Braun discloses, multi shell structures.

24 Well, Banin already says rod plus shell, you would

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 understand two or more shells could increase or improve
2 optical properties. Again, this has nothing to do with
3 combining the methods of making them, and the same pertains
4 to Zaban plus Farneth or Ptatschek.

5 We're not trying to combine the methods, we're
6 saying you take the MCC, and you use it to improve the InP
7 QDs in Zaban using Zaban's process.

8 JUDGE KAISER: Mr. Mizzo, I -- I'm sorry. Your --
9 your time has expired. If -- if you'd like a minute to -- to
10 sum up, I'm happy to let you do that.

11 MR. MIZZO: I would, Your Honor. Thank you very
12 much. I -- what I will last touch on is Banin expressly
13 discloses that you can use a metal catalyst as -- as a seed
14 to grow nanoparticles. It says on six, that it's -- it's --
15 it's from which the nano-rods grow.

16 The figure shows a seed, and the nano-rod grows from
17 it. It's seeded growth. And what is undisputed is that the
18 Herron and Farneth MCCs include cadmium and zinc.

19 They fall within Banin, and -- and I -- I haven't
20 seen, or Patent Owner hasn't made any argument that they're
21 not, other than this metal semiconductor argument, or that
22 somehow they're not included in alloys.

23 But what I will refer you to, Your Honors, is, other
24 than Banin expressly disclosing it, other than Green

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 expressly stating that it falls within Banin, in paragraphs
2 127, 129 and 130 in his declaration, Exhibit 1053, which is
3 the US patent filed in December 2002, discusses alloy -- an
4 alloy of zinc and cadmium specifically a zinc cadmium
5 selenide nano-crystal.

6 It refers to it as an alloy nano-crystal. It says
7 it's alloying or melting temperature is 270 degrees which
8 would work well within Banin's SLS process. And it also,
9 interestingly, in that colony team lines 22 -- 42 very
10 clearly distinguishes the melting point of nanomaterials
11 versus bulk materials.

12 And it -- and it shows that the difference is
13 something like over 800 degrees lower. So again, this just
14 further confirms that the combinations that we've identified,
15 there's the motive to combine them, reasonable expectation of
16 success, and they fall squarely within Banin's disclosure.

17 Thank you, Your Honors.

18 JUDGE KAISER: All right. Thank you. All right. So I
19 think we gave you a couple of extra minutes there, so I --
20 only fair to give that to -- to you, Mr. Newman, if -- if
21 you'd like it. So I guess you've got about 27 minutes if you
22 care to go on that long, and we'll hear from you now.

23 MR. NEWMAN: I appreciate that. Thank you, Your
24 Honor. I -- I don't expect I'll use the extra minutes, but I

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 do appreciate that. If we could put up slide 36. I just want
2 to make sure it's clear that the -- this is a disclosure from
3 Ba- -- Banin.

4 And -- and it is a disclosure that you've probably
5 seen a lot of times in -- in -- but what it shows here,
6 unequivocally, is that the -- there's a metal catalyst on the
7 end of this semiconductor rod. It has a big letter M.

8 This is a metal. It has to perform a very specific
9 function. First of all, it has to be a metal. Banin calls it
10 a metal like 30 times throughout it's -- it's disclosure. You
11 need to have a metal that dis- -- that dissolves the
12 precursors, and then -- and then precipitates a semiconductor
13 nano-rod.

14 They're -- they're -- they're trying -- Petitioner
15 who I think almost get the claim limitations. They're --
16 they're trying to replace this metal with a very specific
17 role, with very specific requirements with a semiconductor.

18 There is no -- there's nothing in Banin that
19 suggests that you would replace its metal with a
20 semiconductor. There's nothing inherent that suggests that
21 you would use Herron in an SLS reaction.

22 And to just back up, you know, they -- they're --
23 they're trying to make this, you know, I see a lot of -- of
24 oh, this is -- you know, Dr. Green says this. Dr. -- Dr.

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 Green says -- Dr. Cossairt says this.

2 If they -- if they're trying to make this into a
3 battle of the experts, I just want to note that in their
4 petition and in their initial expert declaration, they didn't
5 even notice that Banin was an SLS reaction.

6 They didn't even tell us what an SLS reaction
7 required. They didn't consider anything about what you need
8 for an SLS. They cherry pick the -- the -- what they want to
9 find, and they try to -- and they say that you would
10 substitute it with no real good reason.

11 Not only did they not know that Banin was an SLS,
12 they didn't realize that Banin used the Hutchison process to
13 create its gold clusters. And now there -- there can be no
14 dispute that Hutchison makes a -- a -- a vast diversity of
15 different sized gold particles that can't satisfy the
16 definition of molecular cluster compound.

17 And I don't think that I've seen anything from the
18 other side to suggest that Hutchison can meet the definition
19 of molecular cluster compound. So they missed that Banin was
20 SLS. They missed that Hutchinson was -- was used to create
21 the gold particles.

22 They missed that Zaban was disclosing a -- a dopant,
23 and they missed that that was going to have some sort of
24 electrical property. It was going to have an effect on

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 electrical properties. Now they come in, and they try to tell
2 you that, oh, the electrical properties, maybe, you know, it
3 -- it would -- it could be good electrical properties.

4 It's too late for that. They missed that in their
5 petition. And the Lucy grounds, which are now withdrawn
6 because they're so weak, they -- they neglected to notice
7 that Lucy expressly said, don't use chlorine in your
8 precursors. And what did they do?

9 They saw a reference with two precursors, and SLS
10 reference no less, and they told you to use those two
11 precursors in the Lucy hot injection method without noticing.
12 So their expert has not noticed a lot of very important
13 information here, to the extent that they're going to rely on
14 their expert, to tell you that two images, that to the naked
15 eye look identical, or indistinguishable.

16 And that you should trust Dr. Green's testimony on
17 that ground is -- is, you know, I think we should treat Dr.
18 Green's testimony with a certain amount of skepticism in this
19 proceeding, because he just doesn't seem to get it.

20 I mean -- and that's -- and that's why as -- as --
21 as we discussed Judge O- -- Obermann and Franklin, we
22 discussed that is why we don't have an -- an argument in the
23 petition that one would, you know, even if there wasn't a
24 molecular cluster compound in Banin, you would still combine

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 it with Herron.

2 That argument's never made because they didn't
3 understand what Banin was disclosing. They saw something that
4 they wanted to see, and then they didn't look any further.

5 And -- and -- and that's why we don't have in the
6 petition, any suggestion that -- that, you know, in the
7 absence of a molecular cluster compound, you would still have
8 some motivation to combine Herron. You wouldn't.

9 They were going to tell -- they told you to replace
10 -- to replace the metal catalyst in Banin with some
11 semiconductor. And -- and -- and that's improper, and it
12 wouldn't work, and there's certainly no motivation to -- to
13 do -- to do that.

14 But -- and -- and I heard, you know, they -- there's
15 -- I heard Mr. Mizzo mention some law about how, you know,
16 you -- you don't have to combine the reference, you know,
17 there's law that the references don't have to be compatible,
18 or whatever.

19 That's -- that law is irrelevant to their arguments
20 with respect to the molecular cluster compounds in both
21 Zaban, and in Banin. In Zaban and Banin, they expressly tell
22 you over and over again, that the motivation would be to
23 replace one reagent with a different reagent.

24 In the Samsung versus Elm 3DS case is clear, that if

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 the way that you frame the argument is that you're going to -
2 - that the motivation comes from a -- a motivation to
3 replace, then you're -- you -- you sleep in the bed you made.

4 And they made the argument that you would replace
5 these reagents. And there's nothing -- there's nothing to
6 suggest that you -- that you would be motivated to replace
7 these reagents. You would be motivated to replace a metal in
8 an SLS reaction with a semiconductor in a -- a -- with a
9 semiconductor device at all, or that you would replace a
10 dopant in Zaban with -- with any of the reagents that they're
11 trying to replace it with.

12 They made that argument. That argument fails, and
13 their petition fails. I don't have a lot more to say, but if
14 you have any questions, I'm happy to answer them.

15 JUDGE KAISER: Let me just check with the rest of
16 the panel here. It looks like neither of the other members of
17 the panel has any questions at this point, and I don't
18 either. So I think it sounds like we're -- we're concluded
19 with this portion of the hearing.

20 Let me, just on behalf of the entire panel here,
21 express my thanks to, and my admiration for the all four of
22 the counsel who have argued today. This is some -- this is
23 not the easiest subject matter in the world.

24 And despite that the arguments on both sides were

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 very clear and helpful, and I think it's not an exaggeration
2 to say that all four of you represented your clients well,
3 and with great skill, and we appreciate that.

4 It will be a great help as we go back to deliberate
5 on all five of these proceedings, and to write up a decision
6 in -- in each of them. I will ask the parties, I think, to
7 stay on the line, along with the court reporter, just to make
8 sure that she doesn't need any more spellings, or other
9 clarifications.

10 But before we do that, and before we adjourn, and
11 the -- the panel departs, let me just make sure there's
12 nothing else that we need to discuss. Petitioner, anything
13 from you.

14 MR. MIZZO: No. I can say on -- on behalf of myself
15 and -- and Mr. Arovas, thank you for your time. We appreciate
16 it.

17 JUDGE KAISER: Thank you. And from Patent Owner?

18 MR. NEWMAN: Yeah. Just one thing I -- I neglected
19 to address Judge Obermann's questions, and I have somewhere
20 an answer. Just bear with me for one moment. It got lost in
21 my yellow pad. Sorry.

22 I just -- I -- I believe the question that I was
23 asked was what the best support was for the idea that the
24 diameters of an SLS nano-rod, were somehow dependent on the -

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 - the cat- -- the size of the metal catalyst.

2 And in Exhibit 2008, that states, the diameters of
3 the wires should depend on the diameters of the catalyst
4 particles from which they grew. And Exhibit 1098, which is
5 Petitioner's own exhibit, it states metal catalyzed nano-wire
6 growth, in which the diameter of the nano-wires is mainly
7 determined by the size of the catalyst particles. And that's
8 all I had, and I apologize for being late on answering that.

9 JUDGE OBERMANN: Thank you very much, Mr. Newman. I
10 guess I'll ask Mr. Mizzo if he had anything to respond to
11 that particular point, since we let that in now.

12 MR. NEWMAN: Yes, Your Honor. I -- I believe in our
13 briefs, we addressed that, and I believe, for example, on our
14 slide 14, we explain why if -- even if an MCC is used,
15 because it's not in -- in Banin, because the MCC is not
16 perfectly spherical, you're not going to have uniform nano-
17 rods growing from it, because depending on what orientation
18 it grows on the MCC, it won't be uniform.

19 Further, we know, and it's undisputed based on
20 Banin's own reference, and Cossairt's testimony, Dr.
21 Cossairt's testimony on page 64 of her transcript, that there
22 are many other factors that influence the -- the sizes of
23 resulting nanoparticles.

24 And in fact, if you look at page 64, starting at

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 line six, she acknowledges that she's never made
2 nanoparticles that are exactly the same size. And last is the
3 claims don't require that resulting nanoparticles be the same
4 size.

5 They expressly reference determining an average size
6 which illustrates that focusing on the size of resulting
7 nano-rods misses the point of the claimed inventions, and of
8 the proposed combinations here. Thank you very much for the
9 opportunity to respond.

10 JUDGE OBERMANN: Mr. Newman. I see you'd like to
11 have a little surrebuttal.

12 MR. NEWMAN: Just shortly. I -- I just want to point
13 out that this idea that the molec- -- that -- that the -- the
14 gold clusters in Banin are not spherical, is absolutely
15 unsupported expert testimony entitled to no weight.

16 If you look at Banin, it has a sphere. It -- it
17 actually has a picture. The picture of the metal particle is
18 -- is precisely round. There's nothing that suggests that the
19 -- the -- the particle is anything but round, and I just
20 wanted to bring that to your attention.

21 JUDGE OBERMANN: Thank you.

22 JUDGE KAISER: All right. Well, thank you again to -
23 - to both of you, and as well as to Mr. Galica, and Mr.
24 Arovas. We -- we really appreciate the -- the arguments

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

1 today. And I think again, with the provisor that you all
2 stick around to answer any questions that the court reporter
3 has, we are adjourned. Thank you.

4 MR. NEWMAN: Thank you.

5 MR. MIZZO: Thank you.

6 MR. AROVAS: Thank you.

7 MR. MEUNIER: Thank you.

8 COURT REPORTER: This is the court reporter. I don't
9 have any questions for spellings at this time. Thank you.

10 MR. NEWMAN: All right. Thank you very much.

11 MR. MIZZO: Thank you.

12 (Off the record at 4:16 p.m.)

IPR2021-00182 (Patent 9,680,068 B2)
IPR2021-00183 (Patent 7,588,828 B2)
IPR2021-00184 (Patent 7,803,423 B2)
IPR2021-00185 (Patent 7,867,557 B2)
IPR2021-00186 (Patent 8,524,365 B2)

PETITIONER:

F. Christopher Mizzo
Gregory Arovas
Stefan Miller
Todd Baker
KIRKLAND & ELLIS LLP
chris.mizzo@kirkland.com
greg.arovas@kirkland.com
stefan.miller@kirkland.com
todd.baker@kirkland.com

PATENT OWNER:

William A. Meunier
Peter J. Cuomo
MINTZ, LEVIN, COHN, FERRIS,
GLOVSKY AND POPEO, P.C.
WAMeunier@mintz.com
PJCuomo@mintz.com