

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INNOSCIENCE AMERICA, INC.,
Petitioner,

v.

INFINEON TECHNOLOGIES AMERICAS CORP.,
Patent Owner

IPR2025-00175
Patent 8,686,562 B2

Record of Oral Hearing
Held: April 9, 2026

BEFORE: JO-ANNE M. KOKOSKI, CHRISTOPHER M. KAISER,
and LISA A. MURRAY, Administrative Patent Judges.

APPEARANCES:

ON BEHALF OF THE PETITIONER:

LUKE H. MACDONALD, ESQ.
LIONEL M. LAVENUE, ESQ.
SHANNON YI, ESQ.
Finnegan, Henderson, Farabow, Garrett & Dunner, LLP
901 New York Ave NW
Washington, D.C. 20001
(202) 408-4000
luke.macdonald@finnegan.com
lionel.lavenue@finnegan.com
Shannon.yi@finnegan.com

ON BEHALF OF THE PATENT OWNER:

TURHAN F. SARWAR, ESQ.
RICHARD F. GIUNTA, ESQ.
GREGORY F. CORBETT, ESQ.
Wolf Greenfield & Sacks, P.C.
600 Atlantic Ave. Fl. 23
Boston, MA 02210
(617) 646-8000
tsarwar-ptab@wolfgreenfield.com
rguinta-ptab@wolfgreenfield.com
gcorbett ptab@wolfgreenfield.com

The above-entitled matter came on for hearing on April 9, 2026,
commencing at 12:59 p.m., at the U.S. Patent and Trademark Office, 600
Dulany Street, Alexandria, Virginia.

P R O C E E D I N G S

- - - - -

JUDGE KOKOSKI: Good afternoon. Today we will hear arguments in IPR2025-00175, concerning Patent Number 8,686,562. I am Judge Kokoski, and I'm joined today by Judge Kaiser and Judge Murray. Let's start with appearances, beginning with Petitioner.

MR. MACDONALD: Thank you, Your Honor. This is Luke MacDonald on behalf of Petitioners Innoscience. And with me today are my colleagues, Lionel Lavenue and Shannon Yi.

JUDGE KOKOSKI: Thank you. Patent Owner.

MR. SARWAR: Good afternoon, Your Honors. I'm Turhan Sarwar from Wolf Greenfield. I'm joined today by my colleagues Rich Giunta and Greg Corbett. We're here on behalf of Patent Owner Infineon.

JUDGE KOKOSKI: Okay. Thank you. As set forth in our hearing order, each party has 60 minutes to present their argument. Petitioner will argue first and may reserve time for rebuttal. Patent Owner will respond to Petitioner's argument and may reserve time for surrebuttal.

We have the demonstratives from each party, but please remember to identify the number of each demonstrative slide as you go through your presentation so that everyone can follow along, and to ensure accuracy and clarity of the transcript. Petitioner, how much time would you like to reserve for rebuttal?

MR. MACDONALD: Five minutes, Your Honor.

JUDGE KOKOSKI: Okay. You can proceed when you're ready.

MR. MACDONALD: Thank you. Okay. My slides are now

1 loaded. So again, this is Luke MacDonald on behalf of Petitioners
2 Innoscience, and today we're going to be talking about the '562 Patent.
3 We've included, Your Honors, a table of contents to our demonstratives
4 that's shown on Slide 2 here in case you have any questions or would like to
5 jump to any particular section.

6 Today's presentation will primarily cover two grounds, two sets of
7 grounds, Grounds 1 through 4 and 5 through 7. The first is based on the
8 prior art reference Usui, and the second is based on the prior art reference
9 Yu. And before we get into that, we'll give a brief overview of the patent
10 and claim construction.

11 Here on my screen, we see Slide 4 from our demonstratives. And
12 we just wanted to point out that their independent claim of the '562 Patent
13 has just four things in it, and all of these things are known. So the first thing
14 is the electrical contact. So this is a very short claim, and the electrical
15 contact is a very broad type of element, it's something that makes contact
16 electrically.

17 The patent requires it to be used on a semiconductor device. The
18 next limitation is the electrode stack. This one is disputed between the
19 parties in the terms of Patent Owner trying to assert a very narrow and
20 unsupported claim construction of the term to try to exclude the prior art
21 reference Usui.

22 But as we will see that claim construction is not supported by the
23 intrinsic or extrinsic record. The third thing in the claims is the refractory
24 metal nitride capping layer. So that's the pink layer shown here on the
25 screen. And it is made out of a refractory metal nitride that would be like
26 titanium nitride or tantalum nitride.

1 And the fourth element in the claims is just the relationship
2 between the thickness of the capping layer and the thickness of the
3 bottommost layer of the electrode stack. So the claim is for an electrode
4 stack that has a plurality of stacked metal layers. The top one is thicker than
5 the bottom. That's it.

6 Looking now at Slide 5, we see a summary of the disputes between
7 the parties. So today we'll talk a lot about the Usui reference. Patent
8 Owner's only defense is to try to construe the term electrode stack to be this
9 thing that is unsupported, namely, they think it can just be a source, a drain,
10 a Schottky gate, or an insulated gate electrode.

11 And they're doing that limitation, doing that construction as a
12 negative construction to exclude Usui's device. But that is not supported. If
13 the Board agrees that the plain meaning applies, then Usui discloses all
14 limitations of Claim 1. The Yu dispute for the other sets of grounds
15 primarily relies on -- or primarily involves Patent Owner's contention that
16 Yu does not disclose what it plainly says.

17 So Yu plainly discloses the refractory metal nitride cap that is
18 claimed in the patent, and tells us that it can be thicker than the bottommost
19 layer, which is also a metal layer in Yu's reference. So that's found in
20 paragraphs 36 and 29. And I've been looking at Slide 5.

21 Shown on Slide 6 is a diagram from each of the prior art references
22 we just discussed. Usui in the left, Yu in the middle, and the patent on the
23 right. And we see one, two, three, four, those four elements we just
24 discussed. And as anyone can see based on the color coding, each reference
25 has the capping layer, that's the pink layer, and that capping layer is thicker
26 than the bottommost layer. That's feature four.

1 The thickness of the pink layer is greater than the thickness of the
2 green layer in the patent. It's thicker in Usui, and it's thicker in Yu. And that
3 is the thing that the '562 Patent purports to invent. That's it, just that little
4 feature shown on Slide 6. Patent Owner's arguments are summarized here
5 on Slide 7.

6 Patent Owner alleges four primary attacks against the references,
7 but each one fails. Patent Owner tries to limit the electrode stack to a
8 source, a drain, a Schottky gate, or an insulated gate electrode because it's
9 trying to exclude Usui. But the patent does not support that construction.

10 Patent Owner also asserts that there's no motivation to combine
11 Usui with the other reference. But as we see, Patent Owner's contentions
12 against the asserted grounds gets our combination backwards. They invent
13 their own figures, these fictitious strawman figures that we never put into the
14 petition, and they present all of their arguments in that context.

15 So Patent Owner's arguments fail on those grounds as well.
16 Regarding the Yu reference, Patent Owner alleges that Yu doesn't disclose a
17 refractory metal nitride capping layer that is thicker than its bottommost
18 layer, but that's what Yu tells us in paragraph 36. It's right there, cited in the
19 petition, discussed further on reply.

20 And Patent Owner has no defense against that, other than to try to
21 get us to ignore that teaching. Finally, Patent Owner alleges there's no
22 motivation to combine Yu with the other references following their pattern
23 of inventing their own combinations that aren't found in the petition.

24 They're getting those combinations backwards, and all of their
25 arguments are just not responsive to the ones that we put into the petition as
26 summarized here on Slide 7. So very briefly, we'll discuss the claim

1 construction. I'm showing now on my screen Slide 9. And on Slide 9, we
2 see Patent Owner's very lengthy construction.

3 It's a simple term, electrode stack. It has two parts, an electrode,
4 which makes the electrical contact defined by the claims, and the stack,
5 which is a plurality of metal layers. And the stacking part means one layer
6 is on top of the other. And faced with that very simple term, in order to try
7 to get around Usui, Patent Owner presents this very long construction, which
8 has two parts. It's not just one construction, it's two.

9 First, they allege that the electrode stack must make contact with
10 the non-metal part of the circuit trying to point us to the source, the drain,
11 the Schottky gate electrodes, all this long list of things that Patent Owner
12 believes could be an electrode just to try to exclude Usui's metallization
13 structure.

14 Secondly, Patent Owner asserts that the electrode stack must
15 control the operation of the semiconductor device. And here Patent Owner
16 again, makes a list of things that Schottky gate electrodes that are -- or
17 insulated gate electrodes that are found in the patent, which the patent is not
18 limited to.

19 So as we will have briefed in our reply brief in response to their
20 construction, neither the intrinsic record nor the extrinsic record support that
21 in particular the --

22 JUDGE KOKOSKI: Counsel.

23 MR. MACDONALD: Yes.

24 JUDGE KOKOSKI: Excuse me. Can I just interrupt you there?
25 Can you go back to the last slide?

26 MR. MACDONALD: Yes, I'm on Slide 9.

1 JUDGE KOKOSKI: Yes. So I see that you say for Petitioner's
2 proposed construction, you say plain and ordinary meaning. And I know
3 that was throughout your briefing. I'm not 100 percent clear what you think
4 the plain and ordinary meaning is. Can you set that out for me please?

5 MR. MACDONALD: Certainly. I'd be happy to -- oops. Up here.
6 Oops. Okay. So the plain meaning of course needs no construction, it's
7 what a POSITA would have in mind when they talk about an electrode. And
8 you can contrast things that a POSITA would have understood by just
9 looking at the two parties' extrinsic definitions.

10 The patent does not set forth an express definition of electrode. So
11 there's no limitation to the plain meaning. There's no disavowal, there's
12 nothing like that. When you look at the technical dictionary on the right,
13 you see a broad definition. An electrode is something that delivers, receives,
14 collects, emits, deflects, or controls electric charge carriers.

15 And it also explains that an electrode does provide a path for
16 current entering or leaving a medium, and it provides some options here.
17 Now, contrast that with Patent Owner's lay dictionary. This is the Merriam-
18 Webster dictionary that they found where it simply says, well, an electrode
19 has to make non-metallic contact with a non-metallic part of a circuit.

20 But the technical dictionary doesn't agree, it's not so narrow. And
21 a POSITA would have this broader understanding of electrode in it, and
22 that's why the patent didn't bother to explain it, and that's why the patent
23 didn't bother to disavow this claim scope that anyone would understand.

24 JUDGE MURRAY: Counsel, you're on page 21, is that correct?

25 MR. MACDONALD: Yes, I'm on Slide 21. Thank you.

26 JUDGE KOKOSKI: So then your proposal then is consistent with

1 the technical dictionary definition. I just want to be clear because I know
2 you say the plain ordinary meaning we don't need to construe it, but I would
3 disagree. I think we would need to say how we are understanding electrode
4 stack in the course of rendering our decision on this case. So I'm just trying
5 to understand what you think the plain and ordinary meaning is, and if it's
6 that definition, that's fine, I just want to be clear.

7 MR. MACDONALD: Yeah. Thank you, Your Honor. So and
8 just to be clear, also, the disputed term is electrode stack, and I don't think
9 anyone disputes that stack needs some kind of construction. So that's just
10 layers stacked on top of one another. And the electrode part is the part that
11 the parties are arguing about.

12 And we would say this is an exemplary understanding of how a
13 POSITA would interpret the plain meaning that it requires -- that it just
14 provides a path for current entering and leaving a medium, that it's
15 something that could deliver, receive, collect, emit, deflect or control electric
16 charge carriers. Yes.

17 JUDGE KOKOSKI: Okay. Thank you.

18 MR. MACDONALD: Thank you. So moving on now to Slide 24,
19 if there are no further questions on claim construction. We'll get into the
20 invalidity grounds. And as we mentioned earlier, there are two big buckets,
21 those which derive from Usui as the primary reference, and those which
22 derive from Yu as the primary reference.

23 Now, Slide 25 summarizes the positions on Usui. Now, at
24 institution the Board did find that Usui discloses all limitations of the
25 claimed electrode stack, all limitations of Claim 1. And that's because Usui
26 shows an electrode stack right here, which anyone can see is a plurality of

1 metal layers.

2 And this fits that plain meaning that we were just talking about. If
3 the Board agrees with us on claim construction, then Claims 1, 2 and 4 to 7
4 are anticipated by Usui because Patent Owner provides no particular
5 arguments against it, only the claim construction dispute.

6 Regarding at a high level the Yu dispute, the main dispute between
7 the parties is whether or not Yu at paragraph 36 says what it plainly says,
8 which is that the capping layer can be made out of a titanium nitride or
9 tantalum nitride, which all agree are refractory metal nitrides.

10 And that that can be thicker than the bottommost layer. And so
11 paragraph 36 gives you exemplary thicknesses of the capping layer,
12 including 600 angstroms, including a range for metal layers from 50 to 1,000
13 that accords with the petition, and that also accords with its disclosure in
14 paragraph 29 where it describes the thickness of the bottommost layer.

15 So let's move now to Slide 30. And we'll get into the Usui
16 anticipation grounds first. So looking at Slide 31, we see here, again, the
17 only dispute is this claim construction dispute between the parties for the
18 Ground 1 that Usui anticipates the claims.

19 And we'll show you that Usui discloses an electrode stack under
20 that plain meaning that we just discussed, as well as under Patent Owner's
21 construction. So I'm looking now at Slide 32, and I'm moving to Slide 33.
22 And so, Slide 33 shows that Usui, of course, has an electrical contact.

23 The electrical contact that Usui describes is that its metallization
24 structure is suitable for forming electrical connections or wiring. And that
25 means it makes electrical contact. That limitation is not disputed. Moving
26 now to Slide 34, we see that Usui describes all of the layers that are claimed,

1 the capping layer, the plurality of metal layers underneath it, and the
2 bottommost layer.

3 And importantly that bottom layer 218 is a metal layer. Usui
4 describes it as -- yeah, Usui describes it as such, and therefore it has a
5 thickness, if you read the paragraphs of Usui where the capping layer is
6 thicker than the bottommost layer. That aspect of it is not in dispute. The
7 thing that Patent Owner says is inventive.

8 The only way for Patent Owner to try to get around this reference
9 is to try to narrowly construe the claim. That's it. So we'll show you that
10 Usui discloses an electrode stack under Patent Owner's construction first.
11 Looking here on Slide 35, we see the three primary arguments that Patent
12 Owner alleges.

13 We'll get into the first argument on Slide 36, where Patent Owner
14 contends an electrode stack must make contact with a non-metallic part of
15 the semiconductor device. If you look at the upper left of the Slide 36, you'll
16 see Figure 8.

17 And when you look at Figure 8, you can see right away that it
18 makes -- the metallization structure that is colored, makes two forms of
19 contact with the rest of Usui's device. Namely, it has physical contact with
20 the insulating layer 8, which would be satisfactory to Patent Owner's
21 construction.

22 And it makes electrical contact through the conductive via to the
23 semiconductor layer 6. So it meets this definition in two different ways. As
24 shown on Slide 37, the physical contact that Usui discloses is apparent just
25 from the figure. You can see that there is an overhang of the bottommost
26 metal layer on top of that dielectric layer. That's physical contact.

1 And the reason that this overhang exists is straightforward.
2 Structure number 10 is not a layer. As you can see, structure number 10 cuts
3 across two layers. It's something that's added after those layers are formed.
4 And so Usui describes that the metallization layer has to make electrical
5 contact with the layers underneath it, and it just creates a hole that is filled as
6 Dr. Zhao explained.

7 And because of that, it sits in physical contact with layer number 8.
8 So Usui has that first physical contact, which would meet Patent Owner's
9 construction, but it also makes electrical contact of course. The whole
10 purpose of the electrode stack is to provide a path for current entering Usui's
11 device consistent with its plain meaning.

12 And that electrical contact is through the conductive via to the
13 subsurface layer. That's why it's there. And Dr. Zhao and Dr. Piner agree
14 that the purpose of interconnects is to make electrical connections. That's
15 shown on Slide 38. Moving now to Slide 39, we can see again that Usui
16 describes making connection to a device substrate 6. This is the electrical
17 contact that we're talking about.

18 Usui makes electrical contact and satisfies Patent Owner's
19 definition as shown on Slide 39. Patent Owner now in defense tries to
20 construe its own construction. As shown on Slide 40, Patent Owner imposes
21 a further requirement on its very lengthy construction that needs to make
22 direct electrical contact.

23 Well, the word direct and direct electrical contact, you won't find
24 that in the reference, and you won't find that in anyone's definition of an
25 electrode that we presented here. Instead, what we see is that there is
26 electrical contact without imposing this additional requirement of direct

1 from the bottommost layer of the stack to the semiconductor device.

2 And there's no justification for trying to impose that limitation
3 shown on Slide 40. So we've shown now as summarized in Slide 41, that
4 Usui meets the first definition that Patent Owner offers. And we'll see,
5 moving to Slide 42, that it meets the second.

6 Looking here at Slide 43, Patent Owner incorrectly contends that
7 Usui's interconnect is somehow not an element of a semiconductor device,
8 and somehow doesn't control operation of the device. But you can see that
9 this is wrong. As shown on Slide 43, there are two reasons -- I'm sorry, 44,
10 there are two reasons it's wrong.

11 First, Usui's interconnect is formed as part of one device with
12 semiconductor wafer number 6. So Usui describes in great details from
13 Figures 1, 2, 3, 4, 5, 6, and 7 all the steps that you would need to go through
14 in order to make the device that we're looking at right here. Usui forms it as
15 one device.

16 So there's no distinction that Patent Owner is trying to draw
17 between the metallization structure and the other parts of the device which
18 are semiconductor materials. It is one semiconductor device. Secondly,
19 Patent Owner's construction is met because the purpose of this metallization
20 structure is to control current.

21 It enables the current, it also influences the current, which we'll get
22 into. So shown on Slide 45, we see a description of how to make the device,
23 and it is formed as one. So it is part of the semiconductor device. Usui
24 doesn't describe it as something separate as Patent Owner contends.

25 Shown on Slide 46, we see that even Dr. Piner agrees
26 interconnections provide electrical connections within and between devices.

1 Therefore, it is enabling current flow, it's controlling the operation of the
2 semiconductor device. It is one of the necessary parts, it might not be
3 sufficient, but it is necessary for the device to work. That's shown on Slide
4 46.

5 Looking now at Slide 47, Usui's interconnect metallization reduces
6 electromigration, and that is unquestioned. Usui repeatedly talks about the
7 fact that its devices, the purpose is to enhance electromigration. And by
8 enhanced by the way, it means less. So there'll be some discussion about
9 that in a moment.

10 But what Usui tells us is that you want to use this structure in order
11 to reduce electromigration, and this allows for greater performance. So
12 here's another way that Usui's device is influencing current flow and satisfies
13 Patent Owner's second construction as shown on Slide 47.

14 So moving on to Slide 48, as we just mentioned the metallization
15 structure is necessary for operation of the device. Dr. Zhao explained that
16 you cannot -- an integrated circuit cannot function without one. And so
17 therefore it satisfies Patent Owner's construction for that reason alone.

18 So as summarized on Slide 49, we've shown how both of Patent
19 Owner's formal constructions are met, these alternative very lengthy
20 constructions. And we're going to move to Slide 50 and talk about some of
21 the other constructions that Patent Owner raised in its briefing through its
22 arguments.

23 So first, as shown on Slide 51, Patent Owner is trying to construe
24 the word semiconductor device to exclude interconnects based on their
25 function. But this is unsupported. Semiconductors don't exclude
26 interconnects. Usui's interconnect is formed as one device.

1 So as summarized here on Slide 52, it's one device that includes
2 the metallurgy of the structure that's highlighted in color up here, as well as
3 the semiconductor wafer 6. Now looking at Slide 53, we note that other
4 prior art also describes the interconnect structures just as part of the overall
5 semiconductor device. We're setting here Yu, we're setting Exhibit 1044.

6 There is no justification to exclude interconnects from
7 semiconductors. They are not necessarily distinct things. Looking at Slide
8 54, we see further evidence from the prior art describing that same thing,
9 that interconnects are part of semiconductors, they're in semiconductors.

10 And the patent, of course, in the claims doesn't limit the meaning
11 of semiconductor device, just like it doesn't limit the meaning of electrical
12 contact or electrode in a way that would exclude interconnect. So looking at
13 Slide 56, Patent Owner nevertheless, implausibly tries to construe electrical
14 contact to require a very specific type of junction.

15 They think here, an electrical contact must have a metal
16 semiconductor junction. Patent Owner's construction here is not supported.
17 And as shown here on Slide 56, even Dr. Piner knows that metal-metal
18 electrical connections were known, they were conventional. And we all
19 know this.

20 We all know that when you plug something into an outlet, you
21 have metal making contact with metal, that is an electrical contact. So it's
22 simply unsupported to say that the claimed electrical contact excludes what
23 we all understand could be a type of electrical contact.

24 Moving to Slide 58, we see that there's nothing in the claims
25 themselves that would support this notion that electrical contacts require a
26 metal semiconductor junction. In fact, it is a broader term than the electrode

1 stack. The electrical contact comprises the electrical stack.

2 We just showed the electrical stack doesn't need to be a metal
3 semiconductor junction. And likewise, the broader term, electrical contact,
4 doesn't have that narrow limitation either. So as shown on Slide 59, Patent
5 Owner has yet another attack in which is, again, trying to breathe additional
6 limitations into the claims that aren't supported.

7 Patent Owner now contends that electrical contacts comprising
8 electrical stacks can't be interconnects because the claimed device doesn't
9 experience electromigration. So Patent Owner here is imposing yet even
10 more limitations on the claims that are just simply not there as summarized
11 on Slide 59.

12 Dr. Zhao explained as shown on Slide 60, that high electron
13 mobility transistors such as H-E-M-T or HEMT power transistors often have
14 high current flows and densities, including in ohmic contacts, which can
15 cause electromigration.

16 And this is something that he argued here in paragraph 61 of his
17 supplemental declaration addressing Patent Owner's construction. Now, I
18 just want to point something out. Patent Owner contends that the reply brief
19 doesn't support this position that electrodes can experience high current
20 flows when we make that point and we cite to Exhibit 1018 and we cite to
21 Dr. Zhao's paragraph right here.

22 But that is simply not true. So Dr. Zhao explains, as shown on the
23 next slide, that leakage can cause electromigration in gate electrodes. So we
24 see here that Dr. Zhao explains, quote, on Slide 61, "It was known that gate
25 leakage can cause electromigration in gate electrode."

26 He tells us that leakage turns the gate from a voltage only node

1 into a current carrying conductor, and he cites Exhibits 1018 at 937. So the
2 reply brief makes the same point and cites the same exhibit as well as
3 paragraph 62 here.

4 And what Dr. Zhao goes on to say is that once sufficiently high
5 current flows in the gate metal, current flows in the gate metal, the basic
6 conditions for electromigration are met. Now, you will note that neither
7 party disputes that high current flows can lead to electromigration.

8 We see that here on Slide 62, even Patent Owner's expert, Dr.
9 Piner, agrees that electromigration typically occurs at relatively high current
10 densities. He says it right here in his declaration, paragraph 100. So there's
11 simply no support for this argument that an electrical contact comprising an
12 electrode stack can't be something that experiences electromigration.

13 Now, Infineon should actually know this as shown on Slide 63,
14 we're looking at a patent publication assigned to Infineon, and paragraph 4
15 tells us that electrodes can experience electromigration. And there is some
16 disagreement between the parties about this reference.

17 And I just want to be clear that the reply brief cited the patent that
18 issued from this publication. But Patent Owner found this publication just
19 fine on their own because it was one of the exhibits, and they know about
20 the patent that issued from it. Moreover, they found the paragraph that we
21 were talking about on Slide 40.

22 It's shown on their slides, for example, where they're citing -- we
23 are citing paragraph 4 in our arguments. And on that first page of the patent
24 publication as well as on the first page of the issued patent, Infineon's patent
25 just tells us the simple thing that these electrodes it's talking about can be
26 gate electrodes.

1 So gate electrodes can experience the electromigration even though
2 Infineon is now telling us that it can't, before this patent office it has filed
3 applications which say that it can. That's on Slide 63. So we've now gone
4 through all the different ways in which Patent Owner's construction is met
5 by Usui and all the different ways in which Patent Owner's arguments are
6 defeated. And that's summarized on Slide 64.

7 And we've rejected the only defense that they have against Ground
8 1. And so with that, unless there are particular questions, I will jump ahead
9 to Ground 2. I'm looking now at Slide 71. We're beginning the discussion
10 on the combination of Usui and Yu.

11 And so here, the only thing the Board needs to agree to find this
12 obvious is that a POSITA would've been motivated to use Usui's electrode
13 stack in Yu's device. And Patent Owner following a pattern we're going to
14 see today a few times is alleging that the combination in the petition is
15 something different than what it was.

16 So they're inventing their own fictitious strawman combinations
17 that we didn't argue. And that's the only defense that they have is in the
18 context of this combination that Infineon invented, which isn't part of the
19 petition. So again, looking at Slide 72, we see that the main dispute is the
20 motivation to combine.

21 There are no particular disputes about Claims 3, 8, 12, 13, or 17.
22 Infineon can't dispute that the references have these disclosures. The only
23 thing it can try to argue is that a POSITA wouldn't have been motivated to
24 combine them. So regarding Claim 3, of course there is no particular
25 dispute.

26 Patent Owner doesn't even say it would've been obvious to

1 combine the references for this one to use the capping layers, tantalum
2 nitride from Yu in the Usui device. Now, shown on Slide 74, the petition
3 shows it would've been obvious to implement Usui's electrical contact in
4 Yu's device, and this is the combination that we should consider.

5 But instead, what we see on Slide 75 is Patent Owner's strawman
6 fictitious made-up combination. Looking at this slide, you see that Patent
7 Owner has decided to take an insulating layer from Usui -- I'm sorry, from
8 Yu, and plug it into Usui's device. And the petition never said anything like
9 that.

10 So Patent Owner's arguments on this point are completely made
11 up. It addresses the combination that we didn't include, and you can see that
12 very easily here on Slide 76. So Slide 76 gives us the headings from the
13 brief, and summarizes Petitioner's real combination.

14 So the combination simply is to implement Usui's metallurgy in
15 Yu's device as shown schematically on Slide 76. When we look at the
16 headings for this section, everything is very clear. Claims 8 and 13, a
17 POSITA would have been motivated to implement Usui's electrical contact
18 in a group III-IV semiconductor device as taught by Yu.

19 And so, this is taking Usui's electrical contact and using it in Yu's
20 device. But when we look at Patent Owner's made up combination, we see
21 we're still looking at some modified version of Usui's device. That is not
22 what this heading says, and that's not what the passages below the heading
23 say either.

24 We see the same thing for Claim 12. A POSITA would've been
25 motivated to implement Yu's device as a III-IV device with a gate insulator
26 as taught by Yu. So again, just like with Claims 8 and 13, we're using Yu's

1 electrical contact in Yu's device.

2 Now, looking at Slide 77, there are a lot of reasons why a person of
3 skill would've made this combination. It would've been obvious to improve
4 electromigration in Yu's device. This was one of the main motivations
5 discussed in the petition. So I'm going to move now to Slide 80.

6 And we're looking at another sort of side show that Patent Owner
7 has raised. So regarding this combination, we just discussed the idea that a
8 person of skill would've looked to solve the problem of electromigration
9 using Usui. And Patent Owner takes a puzzling position in which they're
10 criticizing the Petitioner for using the word, enhanced.

11 And just to be abundantly clear, when Usui talks about the problem
12 of electromigration, it repeatedly uses the term, enhanced electromigration.
13 It talks about improved electromigration. We see that on the screen on Slide
14 80. It talks about maximizing the electromigration performance.

15 And in all of these statements, what Usui is talking about is what
16 both parties agree is the goal. It's less electromigration. Not more, it means
17 less because electromigration is a problem and Usui addresses that problem
18 as shown on Slide 80.

19 Patent Owner will also say that the Petitioner somehow confused a
20 current flow with electromigration as if they're the same thing. But that's
21 nonsense. Dr. Zhao clearly explained in his declaration, and in his
22 deposition, his understanding of electromigration. The petition does so as
23 well.

24 And all parties agree that improved performance because of less
25 electromigration means better current flow. That's why electromigration is a
26 problem. So there's really nothing there. Patent Owner thinks they have a

1 got you, but they don't. Usui talks about solving this problem and so does
2 the petition.

3 As shown here on Slide 80, we see agreement between the experts
4 in terms of what electromigration refers to. It's the diffusion of atoms into
5 different layers, and it leads to reliability issues, it leads to problems with
6 current flow as summarized on Slide 81. Okay. So I'm going to jump now
7 to -- actually I don't want to jump.

8 I'm going to go back to Slide 81 and 82, and we'll move on now to
9 Patent Owners' second argument regarding electromigration saying that it
10 can't be found in electrodes, but of course it can. So as shown on Slide 84,
11 this is the Infineon patent publication we were just talking about.

12 It says right there in paragraph 4, and it says in the other passages
13 we've cited in the patent that issued from this publication, that electrodes
14 experience electromigration. This is the problem that that patent publication
15 addresses.

16 Looking now at Slide 86, we'll get to the third argument. And
17 moving to Slide 87, Patent Owner mistakenly contends that the function of
18 Usui's metal layers would be changed in Yu's device, but this is simply not
19 true. Usui and Yu have the same types of layers, the same capping
20 materials, the same metal layers.

21 So of course, Usui's layers would function just like Yu's layers
22 when making a combination. As shown on Slide 88, Yu's insulating layers
23 further reduce electromigration because it has the diffusion barrier layer.
24 And so this diffusion barrier layer is known for inhibiting unwanted metal
25 migration. So the two references are trying to solve the same problem.

26 And so we've seen that although Patent Owner launches a lot of

1 attacks involving this complicated electromigration argument, it's actually
2 quite simple. Both references address electromigration, both parties
3 understand what electromigration means, and none of this defeats the
4 motivation to combine the references.

5 So we've rejected the only defense that Patent Owner raises against
6 Ground 2. And with that, we see that all claims are invalid over the
7 references because there are no particular arguments other than the
8 motivation to combine. So I'm looking now on Ground 3 for the
9 combination of Usui, Yu and Adesida, and I'm at Slide 94.

10 So for this ground, the only thing the Board needs to agree to is
11 that it would've been obvious to take that Usui-Yu's contact, which we've
12 been talking about, and to implement it with Adesida's teachings. To
13 implement it as a Schottky contact in a HEMT device that's a high electron
14 mobility transistor using Adesida's teachings.

15 And of course, Schottky and HEMT were well known in the field
16 at the time. I'm looking at Slide 95, and noting that there are no particular
17 disputes about the claims in Ground 3, other than that motivation to
18 combine. And so, on the top of Slide 95, we see the real combination is the
19 Usui-Yu device we've been talking about for Ground 2, plus just Adesida's
20 teachings.

21 Let's use a HEMT device that was a well-known device to solve
22 particular problems. Let's use a Schottky device, also well known to make
23 Schottky contact. And the petition shows that this would have been obvious
24 as stated on Slide 96. But again, we see another one of Patent Owner's
25 tricks.

26 We see on Slide 97 that Patent Owner has doctored a figure from

1 the reference to try to make a combination that we did not make. So Figure
2 8 here on Slide 97 comes from the Patent Owner response in which they
3 have modified Usui's metallization structures in a way that shows several
4 things.

5 So first of all, this is of course as we said, not the combination
6 because the combination involves Yu's device with Usui's electrical contact.
7 But secondly, what Patent Owner has done here, is to take that green box
8 and change the figure in a way that shows that it understands that a
9 conductive via is not a layer.

10 So a conductive via which is shown in the real device cuts across
11 layers. But you'll notice that in this schematic, this fictitious strawman that
12 they have made up, they've made that box under the stack of metal layers
13 wider, and they've cut it off the bottom of it and redrawn something in the
14 semiconductor layer 6 to make it look as if Usui has a layer there where it
15 doesn't.

16 So I just wanted to go to Usui's actual figure. I'm on Slide 25 now.
17 And on Slide 25 we see the original representation of parts in Usui's Figure
18 8. And look at structure 10, that's the conductive via, it cuts across two
19 layers. And so Patent Owner knows that that isn't a layer.

20 So when it invents its own combination, it has to do something
21 about that, and it changes the reference in a way that is somewhat
22 misleading to say the least. And it has also widened that layer to try to
23 remove that physical contact that we were arguing about for the Usui
24 grounds.

25 So going back to Slide 95, we see that all of Patent Owner's
26 arguments are on this made-up combination. So they don't respond to the

1 petition, and any further argument about the real combination is forfeited.
2 They're trying to flip the script and say that we changed on reply, but the
3 problem is that they didn't understand the combination in the first place and
4 couldn't get around it so they made up their own.

5 So let's look at Slide 98. On Slide 98, we see the real combination,
6 which we've just been talking about, and we see the headings from the
7 sections in the brief. On the left, we're talking about Claims 9 and 8 -- I'm
8 sorry, 9 and 14. And it says here, a POSITA would've been motivated to
9 implement Usui's electrical contact on a group III-IV semiconductor device
10 as taught by Yu.

11 And that this would comprise -- this comprises a high electron
12 mobility transistor, HEMT, as taught by Adesida. So that's exactly what
13 we're looking at here on Slide 98 under the Petitioner's real combination.
14 You have the Usui-Yu device with Adesida's teachings.

15 Not this Frankenstein thing that Patent Owner invented on the left
16 where they've taken the conductive via and turned it into a layer, which it is
17 not, in order to try to attack a combination that they say wouldn't work, but
18 which isn't our combination.

19 So moving on to the next slide. This one is Slide 99. Actually, I'm
20 going to jump ahead, sorry, to Slide 105. And so, unless there are further
21 questions on the Adesida grounds, we'll move to the Sugimoto grounds
22 where we see some similar patterns.

23 So for Ground 4, this is the Sugimoto ground with Usui, the Board
24 only needs to agree that it would've been obvious to make one change to
25 Usui-Yu's power electrode. Just make ohmic contact following Sugimoto.
26 It's that simple. So here it is in Slide 106, we see Dr. Zhao's explanation.

1 The reason this would've been obvious to take the Usui-Yu contact
2 and implement it as an ohmic, is because Usui teaches these advantages of
3 enhanced electromigration. Ohmic contacts were known, they're critical for
4 device functionality, performance, long-term reliability.

5 It is, as we will shortly see, not disputed that ohmic is a solution to
6 many problems in transistors. And also ohmic contacts reduce power
7 consumption, they reduce problems with internal heating. So ohmic is
8 widely known to be better. And that's all we're saying with this
9 combination.

10 But again, and also as shown here on Slide 107, I apologize, there's
11 no Slide number on the bottom, but it's between 106 and 108. And it says
12 here, Patent Owner doesn't dispute the obviousness of Yu's device as an
13 ohmic contact. Here's a quote from the Patent Owner response on page 73.

14 It says, "Infineon does not dispute it would've been obvious to
15 implement Yu's device ... making ohmic contact." So it's not a dispute that
16 Yu's device is already an ohmic contact. And of course, that's because this
17 was the normal way of doing things at the time.

18 There's nothing revolutionary about the claims, and Sugimoto
19 teaches what POSITA would've already known, which is that ohmic contact
20 was the standard way to construct contacts in these devices. So looking at
21 Slide 108, we see again, Patent Owner's made-up combination.

22 It takes this modified version of Figure 8 in which they've doctored
23 the figure to change the layout of Usui, which was never the combination
24 and say, well, Ground 4 is not obvious because nobody would do this. Well,
25 they do agree that Usui already has ohmic contact, and they don't have any
26 argument against the real combination.

1 So any further argument is forfeited. And with this slide, I think
2 we'll keep going. We've already discussed that enhanced electromigration is
3 reduced electromigration and there are many reasons why one of skill would
4 use ohmic contact. So we'll go to Slide 114. Oops. Okay.

5 And so in summary, we've covered all the main arguments in the
6 Usui grounds, and showed that the claims are invalid over those various
7 combinations. All of Patent Owner's arguments involve claim construction
8 or motivations to combine, not the particular teachings of the references.

9 This very narrow Claim 1 has just four things in it. And Patent
10 Owner's alleged point of novelty is just that the top is thicker than the
11 bottom. And Usui has it, and all the other features which are not discussed
12 in great detail in the seven pages of the '562 Patent, like making ohmic
13 contact, like making HEMT, like making Schottky. These are all well-
14 known techniques.

15 The patent doesn't really claim anything that isn't found in all of
16 these prior art references alone. And in combination we have an anticipatory
17 ground, Ground 1. I'd like to move on now to Ground 5, which is the Yu
18 grounds. So for Ground 5, Yu already teaches what Patent Owner says is
19 inventive.

20 And the Board doesn't need to look any further than to agree that
21 Yu has that teaching, and the claims are obvious over Yu alone as well as
22 over the combination of Yu and Usui. So let's look at Slide 116. We see
23 that the dispute is going to focus on that same limitation we've been talking
24 about, that the top layer is thicker than the bottom layer in the claimed
25 electrode stack.

26 So as shown on Slide 117, Yu expressly discloses a refractory

1 metal nitride having a thickness greater than that of a bottommost layer of
2 said plurality of metal layers. So this is the main dispute regarding Ground
3 5. There is no dispute that Yu has an electrical contact.

4 As we'll see, Patent Owner pointed out a lot of the similarities
5 between the Yu reference and the '562 reference. Yu meets the preamble. It
6 tells POSITA that it makes electrical contacts through various types. And it
7 shows one right here in Figure 2E.

8 It's also not disputed that Yu has an electrode stack because Yu
9 describes its structure as having a capping layer with a plurality of metal
10 layers beneath it. And the petition hits each one of those. And Patent
11 Owner does not dispute any single one of them for Limitation 1A.

12 Regarding Limitation 1B, the Petitioner shows that Yu discloses
13 the capping layer consisting only of a refractory metal nitride. And that's
14 found in the bottom of pages 35 to 36. We talk about this aspect of Yu, and
15 we also discuss at that point that the capping layer would've been made out
16 of titanium nitride or tantalum nitride. Those are known refractory metal
17 nitrides as shown on Slide 120.

18 Moving to Slide 121, we see everything that's in the claims right
19 here in Yu. So Yu at paragraph 36 tells us that the thickness of its capping
20 layer can take a lot of values, including when it is a metal, such as a metal
21 nitride, titanium, titanium nitride, tantalum nitride. That thickness can be
22 between 50 and 1,000 angstroms.

23 The petition discussed the preferred thickness of 600. That is also
24 the preferred thickness mentioned in the patent. It's found right here in Usui
25 -- I'm sorry, it's found right here in Yu. And when it is in Yu, it's discussed
26 -- 600 is discussed in the context of the polysilicon capping layer.

1 But the petition reasoned that because Yu also discloses the metals,
2 which could be between 50 and 1,000 angstroms, this would've been
3 obvious over Yu's embodiments as well. That capping layer is thicker than
4 the bottommost layer. Yu at paragraph 29 describes that the bottommost
5 layer is a metal.

6 It could be titanium, it could be titanium nitride, and it could have
7 a thickness of approximately 20 angstroms. So you'll find all those
8 arguments there, the Yu alone or Yu alternatively with Usui at the bottom of
9 page 35 and wrapping to 36 where we discuss the combination.

10 So let's move to Slide 122. Yu expressly discloses the refractory
11 metal nitride even though Patent Owner tries to pretend that it does not. So
12 Patent Owner highlights the similarities between the Yu device and the '562
13 Patent. Patent Owner agrees that Yu discloses the same insulated gate
14 electrodes stacked above other layers as the '562 Patent.

15 So take a look at this. In Patent Owner's figure, it has highlighted
16 stacks of its electrode in blue, which are metal. And it has also highlighted
17 three layers shown in the right-hand side in yellow, the bottom two codes
18 that layer 218, which is the third layer moving from bottom to top in that
19 stack of three has yellow, even though layer 218 is unquestionably a metal.

20 And it's trying to do this to avoid the fact that the claim requires a
21 plurality of metal layers, that is one of them. And it's trying to make all
22 these arguments that, well, the patent when it talks about metal layers doesn't
23 mean that kind of metal layer, it means other kinds of metal layers, and none
24 of that is supported.

25 So here on Slide 124, we see that the petition shows that Yu
26 disclosed the claim electrode stack including the bottommost layer. Dr.

1 Zhao clarified this in his deposition on questioning by Infineon, but Patent
2 Owner launches a semantic critique against this. It says, well, Yu calls that
3 entire structure 230 as a metal gate stack.

4 And because it uses that term, it can't be the claimed relationship
5 that we see here in 1C. But that semantic critique fails because Patent
6 Owner acknowledges right here, as shown on Slide 123, the similarity
7 between the patents and Yu, that's the patent by the way, which I don't think
8 I mentioned before on Slide 123.

9 That middle figure is the patent and it's so -- and Patent Owner is
10 just emphasizing the similarity between the patent and Yu, it knows about
11 this similarity. So moving back to Slide 124, the fact that Yu conveniently
12 refers to structure 230, which is the whole stack, as a metal gate stack is of
13 no moment.

14 The bottom layers, everyone knows they're dielectrics. And that's
15 just what the patent has. Let's go on now to Slide 125. We see here that
16 Yu's metal gate stack 230 includes layers 216 and 214. The parties agree the
17 dielectric, so that's the point that I just made shown here on Slide 125.

18 And when Patent Owner tries to map the reference to the claims,
19 it's color coding this metal layer as if it were also a dielectric, when it is not.
20 That is not the mapping of the petition. Patent Owner justifies or attempts to
21 justify this arbitrary boundary drawing problem by saying that, well, this is
22 the bottom metal layer and it separates the other layers from the top.

23 Well, that's what the bottom always does. It's always below the
24 others. That's what makes it the bottom. Looking here at Slide 127, we see
25 something very important in the claims. Even if Patent Owner is right, that
26 the claimed electrode stack -- well, actually, let's put it this way.

1 Patent Owner cannot be right, that the claimed electrode stack
2 excludes the dielectric layers at the bottom of Yu because the patent tells us
3 the electrode stack only includes a plurality of metal layers. It uses the
4 open-ended language. There's nothing here that says that there's metal layers
5 and there's nothing else.

6 Yu has the same arrangement in the patent. It uses a different
7 label, a metal stack to describe the whole thing, but that doesn't mean that
8 Yu doesn't disclose what's in the patent. The semantic critique falls
9 completely flat. Looking at Slide 128, we see that Patent Owner even
10 contradicts itself by noting that Yu calls the entire stack a metal gate stack.

11 And then saying, well, the barrier layer isn't part of that stack
12 because it separates the layers above it from the bottom. So this is a
13 contradictory argument that doesn't make sense as shown on Slide 128. Yu,
14 just to be clear, expressly discloses that layer 218 is a metal layer.

15 Here's paragraph 29 from Yu. We see layer 218, it comprises
16 titanium, titanium nitride, tantalum, tantalum nitride. These are metals, this
17 is not a dielectric. So there's no ambiguity here in Yu and you will find none
18 in the petition either. Okay. So I'm going to move now to Slide 132. And I
19 just wanted to point out one thing about paragraph 36, which we've been
20 talking about.

21 So here, Yu discloses a metal capping layer with a thickness
22 between 50 and 1,000 angstroms. And you can see that it says that sort of
23 towards the bottom, we've highlighted it in pink, it's the last thing in the
24 bottom of Slide 132 highlighted in pink where it says a thickness of between
25 about 50 and 1,000 angstroms.

26 And I just wanted to point out how Patent Owner has presented

1 this same passage. So we look at Slide 68, you'll see that Patent Owner
2 shows the top half of paragraph 36 and they've grayed out "In sum," that's
3 the sentence that tells us the thickness of the metal layers.

4 And on reply -- in Patent Owner response rather, when Patent
5 Owner is responding to our arguments, they tell us that Yu never discloses
6 the thickness of its metal layers. And so here they're trying to get us to
7 avoid looking at that part of Yu that discloses the thickness of metal layers,
8 the things they're trying to tell us Yu never says.

9 And when you look at Petitioner's arguments, you'll see here on
10 Slide 132, we're looking at the entirety of Yu. And one important thing that
11 we wanted to mention is that the -- I don't have the site in front of me,
12 Shannon, but it came to our attention, there's a recent Federal Circuit
13 decision, Guardant Health, in which the Federal Circuit has explained that
14 when -- this came out in January after briefing closed -- that when a
15 reference discloses a feature by itself, the Board doesn't need to look any
16 further to find a motivation to combine.

17 And you'll see, for example, page 12 of that decision which issued
18 in the slip opinion that the Federal Circuit discussed a very similar situation
19 that we find here, that the Petitioner presented alternative grounds in which
20 you'll see on our petition page 35 to 36, where the Petitioner said, okay, it
21 could be this reference alone, and here's a second reference that confirms the
22 obviousness, and that's what we've done here.

23 Yu alone discloses it, and Usui confirms the obviousness of this
24 thickness relationship. It's a very simple relationship that the top is thicker
25 than the bottom. And so, thank you, Shannon. The Slide here, the cite here
26 is case number 2024-1129, and the Westlaw number is 2026 WL 184334.

1 So that's Federal Circuit, January 23rd, 2026.

2 And so that just points out what we've been saying all along is that
3 Yu has this reference, that Yu reference has this element in it by itself, and
4 Usui just confirms the obviousness of Yu's embodiment. So let's move on
5 now to Slide 135. We're looking at now Ground 5 still.

6 Usui confirms the refractory metal nitride capping layer thickness
7 relationship that Yu already discloses. So on Slide 135, I'm going to jump
8 again to Patent Owner's slides. And you'll see here on Patent Owner Slide
9 83, that they've outlined a few critiques of this position that Yu's bottom
10 layer, that diffusion barrier layer somehow doesn't meet the claims
11 according to some alleged inconsistency between the petition and the reply.

12 And that's shown right here on their slide. You can see that there's
13 no inconsistency. So the petition says, Yu discloses because diffusion
14 barriers of -- made of titanium are well known by August of 2009 and
15 constituted a simple design choice depending on the application of the
16 device.

17 So here we are, POSITA would've been motivated to use titanium
18 in layer 218. It's in Yu already in paragraph 29. Now the Petitioner's reply
19 says, layer 218 comprises metals. That's consistent. Including titanium
20 nitride. That's also consistent. Which may have a thickness of 20
21 angstroms. That's fully consistent.

22 So Patent Owner thinks it has this got you that somehow the
23 positions are changing. But this is just a sideshow. There's nothing here.
24 Yu at paragraph 29 talks about titanium, and it talks about titanium nitride,
25 and it talks about 20 angstroms thickness. You'll find all of those things
26 discussed in the petition in pages 35 to 36.

1 Okay. So moving on now, we can jump ahead just in the interest
2 of time to Slide 143. We will quickly address the Adesida grounds in
3 combination with Yu and Usui, where we see the same pattern that we've
4 seen with respect to the other grounds. There's only a dispute on the
5 motivation.

6 Patent Owner can't deny that the things that are in these dependent
7 claims were well known and that they are found in the references, so they
8 manufacture again their own combination. So Petitioner's real combination
9 is shown on Slide 146.

10 It's the Yu-Usui device that we've been talking about just with
11 Adesida's teachings. Just like in the Usui-Yu device, we're following
12 Adesida teachings to use a HEMT device or a Schottky contact. These are
13 well known, that is the petition combination and Dr. Zhao confirmed it in his
14 deposition.

15 The reason a POSITA might have done this as shown here on Slide
16 148, is to make them suitable for high frequency application. This was a
17 well-known application for HEMT and Schottky. There's really nothing
18 here. So Patent Owner has alleged that we made a combination that we
19 didn't, which is to use as they say, different combination, as you'll find in
20 their Patent Owner response at page 71.

21 Okay. So I'd like to now move to Slide 153. And we'll quickly
22 touch on Ground 7 before we get into our rebuttal time. So for Ground 7,
23 we see the same pattern. Again, no defense against the particular teachings,
24 only an argument regarding the motivation to combine.

25 This is all a sideshow because as we already stated and as shown
26 here on Slide 156, Infineon doesn't dispute it would've been obvious to

1 implement Yu's device with ohmic contacts. It's right there in their Patent
2 Owner response at page 73.

3 And the petition took a very well thought out and well laid out
4 combination. Ground five, you have Yu which is a group III-IV device in
5 combination with Usui just to confirm that thickness relationship and then
6 make ohmic contact following Sugimoto's teachings.

7 There's nothing revolutionary here. This is what everybody knows
8 to do, is to use ohmic source and ohmic drain. Dr. Zhao confirmed the
9 combination as summarized on Slide 157 during his deposition, and yet
10 Patent Owner still gets it wrong. It's still trying to respond to a different
11 combination, and that's not the one from the petition.

12 So with that, I think we've shown you that we've addressed the
13 main arguments against Yu. We would be happy to take questions even if it
14 does cut into our rebuttal time, we want to make sure that we're here to
15 answer whatever questions Your Honors might have. So thank you.

16 JUDGE KOKOSKI: No questions here.

17 MR. MACDONALD: Okay. Thank you. Okay. So I need to
18 unhook this cable and give it to you.

19 MR. SARWAR: We need to connect it on whatever --

20 MR. MACDONALD: So this will go to the cable that you have
21 here, wherever the end of that is. And I'll move my things out of your way.

22 JUDGE KOKOSKI: Patent Owner, you can begin when you're
23 ready, just let us know how much time you'd like to reserve for surrebuttal
24 before you start.

25 MR. SARWAR: Your Honors, I'd like to reserve 15 minutes for
26 rebuttal, please.

1 JUDGE KOKOSKI: Okay.

2 MR. SARWAR: All right. I'm going to start with Ground 1 on
3 Slide 6. Slide 6 shows the entirety of the petition's argument alleging that
4 Usui's interconnect layers comprise an electrode stack. The Petition added
5 an orange box to Figure 8 to identify what they allege is an electrical contact
6 comprising an electrode stack.

7 And in their argument, they equate the claimed electrical contact
8 with layers 13 through 15, and 18 through 19 in that box. Turning to Slide
9 107, let's take a look at what Usui says about the structure. Usui is directed
10 to a metallization structure for forming electrical contacts or wires between
11 devices of an integrated circuit.

12 And on Slide 108, Usui calls its metallization structure an
13 interconnect. And it says, the interconnect is connected to a device contact
14 metallization 10, which Usui also calls stud connection 10. As shown at
15 upper left, Usui says that it is device contact 10 that's used to, quote, make
16 connection to, end quote, the semiconductor device substrate 6.

17 And as shown at lower right, Usui says the interconnect structure
18 that Petitioner relies on, layers 13 through 15 and 18 through 19, is just a
19 single interconnect layer. There may be other interconnect layers to
20 complete an interconnect circuit for the devices. That's devices, plural.

21 You heard today that Usui interconnect and semiconductor are one
22 device, but Usui itself explains that the interconnect structure interconnects
23 multiple devices. So Usui says it is device contact 10 that makes connection
24 to semiconductor device substrate 6.

25 And the interconnect Petitioner relies on is part of an interconnect
26 circuit that interconnects the device contact to some other device not shown

1 in Figure 8. The petition said that it applied plain meaning of all terms, but
2 returning to Slide 6, the petition never explained what Petitioner alleged to
3 be the plain meaning of electrode stack, cited no evidence to establish that
4 the alleged plain meaning of electrode stack, and made no argument
5 explaining how or why the identified Usui structure was allegedly an
6 electrode stack. As explained in our Papers, we believe that should be fatal
7 to the Usui base grounds, Grounds 1 through 4.

8 Because this showing needed to be in the petition and the reply is
9 too late. We recognize that Your Honors did not agree in the institution
10 decision, so we will rest on our Papers on that point for today. We plan to
11 spend our time explaining why Petitioner still hasn't met its burden to
12 establish that Usui's interconnect is an electrode stack, even if you
13 considered the reply arguments.

14 And even if you adopt the construction of electrode stack that
15 Petitioner itself offered you. As we'll discuss, if there's an electrode stack, if
16 there's an electrode in Usui's Figure 8, it is the device contact 10, or at least
17 must include device contact 10.

18 And if you agree with us on that, that is fatal to Grounds 1 through
19 4 because Petitioner does not even allege that Usui meets any challenged
20 claims if device contact 10 is part of the alleged electrode stack. On Slide 9,
21 we show how electrode stack should be construed. It is a stack of
22 conductive layers that form an electrode.

23 In the claims, an electrode is part of a semiconductor device that
24 either establishes electrical contact with a non-metallic part of the
25 semiconductor device, or is used to control the semiconductor device's
26 operation, for example, by turning it on or off.

1 On Slide 10, we show that this is consistent with the specification,
2 which Phillips says is the best guide to the disputed term's meaning. The
3 specification discloses various electrodes. It discusses source and drain
4 electrodes in a transistor which physically contact a semiconductor layer so
5 that current can enter or leave the semiconductor through those electrodes.

6 Think of those as being like external electrodes on a larger device
7 like a battery, which you can connect wires to so that current can enter or
8 leave. Specification also discusses a gate electrode, which controls the
9 operation of the transistor by turning it on or off.

10 Patent Owner's construction back on Slide 9 encompasses every
11 electrode disclosed in the specification. Your Honor should note here,
12 despite what you've heard from Petitioner, we are not saying that an
13 electrode needs to be one of the transistor electrodes from the specification.

14 There may be other electrodes out there that aren't part of a
15 transistor. I'm thinking of other semiconductor devices like diodes or
16 photoresistors. Patent Owner's construction does not exclude electrodes on
17 those devices because this construction reflects the plain meaning of
18 electrode.

19 Slide 11 shows a dictionary confirming the plain meaning,
20 Merriam-Webster's. We saw a Webster's dictionary out in the lobby earlier.
21 Webster's first dictionary definition here covers electrodes that establish
22 electrical contact with a non-metal part of a circuit, just like the source and
23 drain electrodes in the specification.

24 Specification also discusses insulated gate electrodes that don't
25 establish electrical contact with a non-metal. The dictionary's second
26 definition covers those. It covers electrodes in a semiconductor device, and

1 it says an electrode is an element in that device that, one, emits or collects
2 electrons, again, covering the source and drain electrodes in the
3 specification.

4 And two, controls movements of electrons, which covers the
5 specification's gate electrodes. These definitions are consistent with how
6 the specification uses the term electrode, and supports Patent Owner's
7 construction. Petitioner's reply shown on Slide 12 asks you to ignore both
8 the specification and Merriam-Webster's.

9 There's no way to refute that Usui's interconnect isn't like any
10 electrode that's in this specification. So Petitioner says, ignore the
11 specification, it does not limit the claims. That violates Phillips. And
12 because the dictionary supports Patent Owner's construction too, they say
13 ignore that too.

14 They say a dictionary cannot override the patent. They don't even
15 try to tell you what the patent says about electrodes, and they don't explain
16 how a dictionary supposedly overrides what the patent says. Let's go to
17 Petitioner Slide 21.

18 Here they provided their own dictionary definition. I'm using
19 Petitioner Slide 21 because the party's two dictionary definitions are
20 presented here side by side. You can see here that they criticized Patent
21 Owner's definition for a few reasons. They say it's a lay dictionary. We
22 don't understand that.

23 It's a highly technical definition, it discusses non-metallic
24 substances, electrical contacts, the collection and emission and control of
25 electrons, and holes in their movements. How is that not technical? They
26 also say our definition is incomplete. We don't know what it's missing.

1 What is supposed to be in this definition that isn't there? And then
2 they say you should use their dictionary instead. But why? There's not a lot
3 of daylight between the definitions. And even if you accept theirs, Your
4 Honors, Usui's interconnect is not an electrode. Look at the two definitions.
5 Yes, they use different words, but they track each other.

6 Definition one at left describes a conductor used to establish
7 electrical contact with a non-metallic part of a circuit. Petitioner's definition
8 at right requires the conductor to provide the path for current entering or
9 leaving a medium such as a semiconductor. Your Honors, this is describing
10 the same thing.

11 A conductor that establishes contact with a non-metallic
12 semiconductor part of a circuit is also the conductor that provides the path
13 for current entering or leaving a semiconductor medium. Think again of the
14 external electrodes on a device like a battery. Those conductors are the
15 conductors that establish electrical contact with the outside world, and they
16 provide the path for current going in and out.

17 Now, despite this lack of daylight, Petitioner touts the fact that
18 their definition does not expressly name all the electrode examples in the
19 specifications. Source contacts, drain contacts, insulated and Schottky gates,
20 they say this is an advantage. But what is their point?

21 Are they trying to say that those are not electrodes? A construction
22 like that would be inconsistent with the intrinsic evidence and is wrong as a
23 matter of law. Also, if you accept their logic, this is fatal to them. You
24 know what else their dictionary definition doesn't mention? An
25 interconnect. It's not there.

26 Now, going back to Patent Owner's demonstratives Slide 13, I

1 want to highlight something here in Petitioner's reply that illustrates the
2 sleight of hand that they're trying to pull with this definition. Under their
3 block quote, Petitioner rephrases the definition but tries to change what it
4 says.

5 They quote in the first sentence, listing functions that an electrode
6 might serve in addition to just being a conductor. Then they paraphrase the
7 second sentence omitting most of it. That is telling. They claim that an
8 electrode only needs to provide a current path. So basically, any conductor
9 in any current path.

10 If an electrode were just a conductor in a current path, that second
11 sentence would be a lot shorter. But that's not what Petitioner's dictionary
12 says. Their definition says, an electrode provides a current path for current
13 entering or leaving a medium like a semiconductor. It's not optional.

14 All right. Unless Your Honors have any questions about the
15 party's evidence regarding construction, I'll turn now to what Petitioner
16 identified is not -- I'll turn now to what Petitioner identified, and describe
17 why that is not an electrode under either party's construction.

18 JUDGE MURRAY: Counsel, one question before you continue. I
19 see that Petitioner's proposed dictionary definition says that the electrode
20 may consist for instance of a wire. How is that consistent or inconsistent
21 with your position that an interconnect cannot be an electrode or an
22 electrode stack?

23 MR. SARWAR: That's a great question, Your Honor. So isn't
24 device contact 10 or doesn't include device contact 10. So if the wire that
25 we were talking about on the previous page, Slide 13, were something that
26 actually literally touched the semiconductor device and established electrical

1 contact with it and provided the path entering and leaving it, then sure, that
2 would be an electrode.

3 But that's not what Usui is showing, not without device contact 10.
4 All right. Slide 17 shows that device contact 10 is the conductor that
5 establishes electrical contact with a non-metal semiconductor substrate
6 under Patent Owner's definition. At upper right you can see that Usui is
7 explicit.

8 Stud connection 10 is what makes the connection to substrate 6.
9 And that makes sense. Stud 10 is a device contact metallization; it
10 establishes electrical contact with substrate 6. Device contact 10 is also the
11 conductor that provides the path for current entering and leaving
12 semiconductor substrate 6 under Petitioner's dictionary definition.

13 Substrate 6 is the semiconductor medium in Usui. Layers 13
14 through 15 and 18 through 19 without device contact 10 do not establish
15 electrical contact with the non-metal semiconductor substrate 6. Those
16 layers also do not provide the path for current entering or leaving substrate
17 6.

18 So those layers without device contact 10 don't meet either party's
19 definitions. I want to pause here to see if Your Honors have any other
20 questions on this. We don't think anyone can dispute that under our
21 dictionary definition, if there's something establishing electrical contact with
22 a non-metal in Usui, its device contact 10.

23 And we don't think anyone can dispute that under their dictionary
24 definition, device contact 10 is the conductor that provides the path for
25 current entering and leaving Usui's semiconductor medium, substrate 6,
26 Your Honor, whether what I just said was true.

1 JUDGE MURRAY: Can you give a reason why the current path
2 would not include both item 10 and the colored section that's identified as
3 the electrode stack? The current passes through both, doesn't it?

4 MR. SARWAR: The current does pass through both. I'm not sure
5 I understand your question, Your Honor. Are we talking about the mapping
6 that Petitioner provided? So their orange box does not include 10.

7 JUDGE MURRAY: Understood. Are you arguing that the fact
8 that the current passes through 10 means that the part in the orange box
9 cannot be an electrode stack?

10 MR. SARWAR: Yes. I'm saying that at minimum, 10 needs to be
11 there, 10 needs to be included as part of that box, right? If you just have that
12 orange box and layers 13 through 15 and 18 through 19, that is certainly not
13 an electrode. And it will not be forming an electrode stack. If the mapping
14 were expanded beyond what the petition said to include 10, as long as 10 is
15 in there, maybe. But 10 certainly needs to be included in whatever mapping
16 this is.

17 JUDGE MURRAY: I see. Thank you.

18 MR. SARWAR: Okay. So under both parties' definitions, if
19 there's an electrode in Usui, it has to be device contact 10 or at minimum it
20 has to include device contact 10. The interconnect that they rely on, layers
21 13 through 15 and 18 through 19, those don't meet our definition and
22 importantly those don't meet Petitioner's definition.

23 Your Honors told Petitioner to take a position, and this is the
24 position they took. And Usui interconnect doesn't meet their definition.
25 That is fatal to their argument. That should end it. I will discuss shortly that
26 if device contact 10 is included as part of their mapping, that the mapping

1 still doesn't work. I'll explain that shortly.

2 I just want to quickly sort of circle back and touch base on why
3 Usui doesn't meet the second part of the Merriam-Webster definition. So
4 Slide 11. The reference to their control and -- the reference to control there
5 encompasses insulated gate electrodes.

6 Gate electrodes control electron movement by turning a transistor
7 on or off. Turning to Slide 18, there's no dispute that Usui's interconnect in
8 the orange box at left does not do that. Usui doesn't even describe a
9 semiconductor device like a transistor that could be controlled.

10 Usui's disclosure doesn't concern itself at all with the
11 semiconductor devices this interconnect might be interconnecting together.
12 The focus is entirely on the wires between those devices. As shown in upper
13 right, Petitioner tries to get around this by reading the term control to mean
14 just sort of generally enabling or influencing current flow, but there's no
15 basis for that reading.

16 Merriam-Webster's was discussing controlling electron movement
17 in a semiconductor device during its operation. It wasn't about current flow
18 between the semiconductor devices. And there's absolutely no evidence that
19 there's any current flowing through that interconnect without stud
20 connection 10.

21 They admitted this during argument. They recognize that Usui's
22 interconnect layers may not be sufficient. It's not sufficient without stud
23 connection 10. How could it be? There wouldn't be a circuit without stud
24 connection 10. Previewed earlier, why is it that Petitioner ignored stud
25 connection 10? Let's go to Slide 19.

26 Slide 19 shows Petitioner's mapping next to the claim language. If

1 the petition had argued that stud connection 10 is Usui's electrode, they can't
2 meet the requirement of a plurality of metal layers. Stud connection 10
3 doesn't have that. If the petition had tried to say that stud connection 10 is
4 part of Usui's electrode along with Usui's interconnect, those two together
5 are the electrode stack, then they can't meet the thickness requirements.

6 Usui doesn't disclose the thickness of stud connection 10 as
7 compared to the capping layer. Slide 20 shows Petitioner's only response to
8 the Patent Owner response's arguments regarding stud connection 10. They
9 say, oh, contact stud 10 is not a layer. Your Honors, this argument is non-
10 responsive.

11 First, why does it matter whether contact stud 10 is a layer?
12 Petitioner has never argued that an electrode needs to be a layer. No
13 evidence supports that the plain meaning of electrode requires being a layer.
14 If what they're trying to show is -- if what they're trying to do now is argue
15 that stud connection 10 is actually part of the alleged electrode but that Usui
16 still meets the claim because stud connection 10 is not the claimed
17 bottommost layer, that argument should be rejected for several reasons.

18 First Slide 21, that's new. You can see the petition's identification,
19 which clearly omits stud 10 from the electrical contact comprising an
20 electrode stack. Any attempt now to change petition's argument to say that,
21 oh, on second thought, stud connection 10 is part of the electrode but not the
22 bottommost layer because it's not a layer, that's trying to establish prima
23 facie obviousness with a new theory.

24 That's changing the orange box from the petition. And as shown
25 on Slide 21, offering new theories like this is improper under both the Trial
26 Practice Guide and the Federal Circuit's Wasica case. Second, even if Your

1 Honors considered this new argument, their assertion that stud connection 10
2 is not a layer, that's just wrong.

3 Usui's Figure 8 shows that stud connection 10 is as much a layer as
4 layers 13 through 15 and 18 through 19. Slide 22 shows a portion of our
5 surreply that quotes Dr. Piner's analysis from paragraph 153 of his
6 declaration explaining that nothing in Usui suggests that contact metal 10 is
7 not itself comprising a metal layer or layers.

8 POSITAs instead understood that structures like contact metal 10
9 are formed from metal layers, a metal layer or layers. At the right, you can
10 see the rest of his analysis from paragraph 153 showing quotations from the
11 supporting references that Patent Owner cited, Gambino and Chen 653,
12 Exhibits 2032 and 2033.

13 We've collected disclosures from those references on Slide 23.
14 This is all unrebutted. Petitioner has no response to Dr. Piner's testimony or
15 his evidence. They filed a reply declaration and their expert couldn't
16 respond to it, so they ignored it. Instead, as shown on Slide 24, Petitioners
17 reply simply asserted an interplanar conductive via is not a layer without
18 explaining why.

19 They seem to imply that you can't fill a hole or via with a metal
20 layer, but you can. Chen 653 on Slide 23 teaches that. As shown on Slide
21 24, they also suggest that layers can't be smaller than the surrounding layers
22 and structures. But they can, Gambino again on Slide 23 discloses layers of
23 varying sizes next to each other, including narrow stud layers 25.

24 Petitioner's argument that contact stud is not a layer is likewise
25 unsupported by Petitioner's supplemental expert declaration. Slide 25 shows
26 everything the reply declaration says on this point. It's (INDISCERNIBLE)

1 and these assertions don't acknowledge let alone rebut the testimony from
2 our expert or the evidence he cited.

3 Petitioner thus cannot carry its burden to prove that Usui's stud
4 connection 10 does not comprise a metal layer. I'm going to recap.
5 Petitioner failed to establish that Usui's interconnect layers 13 through 15
6 and 18 through 19 without stud connection 10 is an electrode. If you agree
7 with that it's fatal to all the Usui based Grounds 1 through 4. Do Your
8 Honors have any other questions on that?

9 All right. I'm going to move on to Grounds 2 and 4 now -- 2
10 through 4 now. We explained in our Patent Owner response that Grounds 2
11 through 4 fall with Ground 1 because those grounds relied on Petitioner's
12 failed identification of an electrode in Usui.

13 We also established other reasons those grounds failed at pages 21
14 through 43 of our Patent Owner response. If I have time, I may circle back
15 to try walking through some of those. But for now, I'm planning to rely on
16 our briefing for those grounds that attack the dependent claims and turn
17 directly to Ground 5 based on the Yu reference.

18 Slide 65 shows on the pre-institution record that the Board found
19 that the Grounds 5 through 7 failed. Your Honors should reach that same
20 conclusion on the fully developed record. Slide 66 shows Claim 1, which
21 requires an electrode stack with a capping layer formed from a refractory
22 metal nitride with a thickness that is greater than the bottommost metal layer
23 of the electrode stack.

24 Petitioner called this Limitation 1C. Your Honors heard many
25 times today that the Yu reference expressly discloses Limitation 1C. And
26 that assertion appears on, I'm not going to pull them up, but Petitioner's

1 Demonstrative Slides 5, 117, 121 through 122, 130, 134, probably a lot of
2 others.

3 As shown on Patent Owner's Slide 67, this is an about face from
4 Petitioner's admissions during the trial. Petitioner admitted against their
5 interests that Yu does not expressly disclose Limitation 1C. They admitted
6 in the petition, they admitted in the reply. Now at the oral hearing, they're
7 arguing the opposite.

8 They're presenting new argument that is inconsistent with the
9 admissions they made against their interest in the trial Papers. We object to
10 that Your Honors. Your Honors shouldn't consider it. What they actually
11 argued is on Slide 71. Your Honors know what they actually argued. They
12 said Yu changed the capping layer to be a metal nitride and it was obvious to
13 use the same thickness that Yu would use -- that Yu would've used for
14 polysilicon.

15 Your Honors correctly recognized that they didn't meet their
16 burden to show that that was true. The arguments that they have in reply, as
17 you can see on Slide 74, try to change the prima facie case using a sort of
18 suitable choice theory that here would apply specifically to a metal nitride
19 layer. But they didn't do that.

20 They should be foreclosed from changing their argument. They've
21 cited to case law now to try arguing that this is somehow proper from I guess
22 January of 2026. The case has been out for months. They didn't tell us
23 about the case, they didn't make this argument before. If Your Honors want
24 to consider it, we would ask that we have a chance to brief it.

25 They're not allowed to make arguments at the oral hearing that
26 aren't in their Papers. All right. And we are objecting this on the record.

1 We're objecting to this as being improper argument. Okay. Even if they had
2 managed to support their original argument, it wouldn't have mattered.

3 I want to focus today on a fundamental problem with their
4 argument related to what they call the bottommost layer of the electrode
5 stack in Yu, diffusion barrier layer 218, Slide 84. Slide 84 shows the
6 petition's identification of Yu's alleged electrode stack and its layers
7 outright.

8 According to the petition, the entirety of Yu's metal gate stacks
9 230 and 231 are electrode stacks. The petition concluded that diffusion
10 barrier layer 218 is the bottommost metal layer because the layers below it
11 216 and 214, those are dielectrics. To meet Limitation 1C, the petition
12 always compares the capping layer thickness regardless of how they arrive at
13 it, to the thickness of diffusion barrier layer 218.

14 This is a problem for Petitioner because, as we discussed in our
15 Patent Owner response at pages 45 through 55, they were not able to
16 establish that diffusion barrier layer 218 is part of Yu's electrode stack in the
17 first place. And they provided no argument or evidence whatsoever of the
18 thickness of the actual bottommost layers in Yu's electrode stack layers 220
19 and 222. Those were fatal mistakes.

20 Slide 84 shows the entirety of the petition's analysis regarding
21 what's included in Yu's electrode stacks. As you can see, the only basis for
22 concluding that 218 is part of the stack, the electrode stack, is that layer 218
23 is part of the metal stack that Yu discloses. Which Petitioner says, okay,
24 those are electrode stacks.

25 Slide 85 shows that this is inconsistent with what the specification
26 says. Slide 85 has all of the stuff about electrode stacks or a lot of the stuff

1 about electrode stacks and specification. The specification discloses an
2 insulated gate electrode like Yu's, and it is crystal clear that the electrode
3 stack in those gate electrodes include only the metal layers forming the
4 electrode.

5 The electrode stack does not include other layers in the gate stack
6 like insulating layer 134. As shown on Slide 86, the Patent Owner response
7 explained that Yu's gate electrode was stacked with additional layers 218,
8 216 and 214. The electrode is colored blue, the other layers are yellow.

9 Petitioner today tries to say that we're suggesting those layers are
10 colored yellow because they're dielectrics, but that's not true. Look at the
11 text above. It's just the other layers, it's the layers that are not the electrode.
12 Okay, looking again at Slide 84, Petitioner's only basis for concluding that
13 the diffusion barrier layer was part of the electrode stack was to allege that
14 the entire metal gate stack, including dielectric layer 216 and 214 is the
15 electrode stack.

16 But that is plainly wrong as a matter of claim construction, because
17 the specification Slide 85 shows the same type of structure and is explicit
18 that the insulating layer is not part of the gate electrode. That should on its
19 own be fatal to the Yu-based grounds as shown on Slide 88,

20 because Petitioner's only reason for concluding that diffusion
21 barrier 218 is part of Yu's electrode stack fails. And Your Honors,
22 respectfully since we don't carry any burden here, the petition's failure to
23 establish that diffusion barrier 218 is part of Yu's electrode should end the
24 matter.

25 But on Slide 87, we show evidence in Patent Owner's response
26 establishing that diffusion barrier layers like Yu's layer 218 are actually not

1 considered by POSITAs as part of a gate electrode, and thus cannot be part
2 of the claimed electrode stack in Yu.

3 First, Yu itself at paragraph 29 says layer 218 is optional. The gate
4 electrode of course is not optional. So optional layer 218 is not part of the
5 gate electrode. Is not part of the electrode. Second, the Meng reference at
6 right discloses an insulated gate electrode and diffusion barriers just like Yu.
7 Let's look at Meng. Meng says that the gate electrode is element 629, which
8 we've highlighted blue.

9 The insulating gate oxide layer, that's element 627 highlighted
10 yellow. Meng also has a diffusion barrier layer 626, which we've
11 highlighted green. That diffusion barrier layer 626 separates the gate
12 electrodes 629 from the insulating gate oxide layer 627, just like in Yu.

13 Critically, Meng does not characterize the barrier layer as being
14 part of the gate electrode. It's not. And that makes sense. It's a distinct
15 component, a barrier that separates the gate electrode from the insulating
16 gate oxide layer.

17 This refutes Petitioner's conclusion that the barrier layer 218 in Yu
18 is part of Yu's gate electrode just because it's metal. Now, Slide 89 shows
19 that in reply, Petitioner tries to change its argument to correct their inclusion
20 of gate oxide layers in their original identification of Yu's electrode stack.

21 According to their expert, that orange box, which is labeled
22 electrode stacks in the petition, wasn't intended to identify the electrode
23 stacks. It's just there to highlight something in Yu that's important. That is
24 just not credible, Your Honors. Under rule 104(b)(4), the petition must
25 specify where each element in the claim is found in the prior art.

26 You can read the petition as easily as we can. That box drawn by

1 Petitioner on Figure 2E is unambiguous, it includes the insulating layers.
2 And the petition at page 42 unambiguously said, use metal gate stacks 230,
3 231 or electrode stacks as claimed.

4 We ask Your Honors to hold the Petitioner to the petition's
5 argument about what they said Yu's electrode stack was. That was clearly
6 wrong and it fails as a matter of claim construction. Petitioner doesn't even
7 try to defend it. Now, if Your Honors consider their new reply argument
8 that Yu's electrode stack includes everything other than the insulating oxide
9 layers, their argument still fails because there's no evidence whatsoever that
10 layer 218 actually belongs in the electrode stack.

11 As shown on Slide 90, the reply could not refute our evidence,
12 including the Meng reference, that POSITAs would not have considered
13 Yu's diffusion barrier layer to be part of the gate electrode, and thus part of
14 an electrode stack. They ignored that evidence because they could not refute
15 it.

16 On Slide 91, you can see what Petitioner does instead of refuting it.
17 They obfuscate. They say, look, there's some contradiction about our
18 argument because Yu calls the entire stack -- Yu calls the entire stack a
19 metal gate stack, but there's no contradiction there.

20 Yu does not call the entire stack an electrode stack, which is what
21 is claimed. And Petitioner's assertion on Slide 91 that our argument is
22 inconsistent with the intrinsic evidence is plainly wrong. We already
23 explained why the petition's argument conflicts with the specification with
24 reference to Slide 85.

25 The specification makes clear that the entire gate stack is not the
26 electrode stack. For an insulated gate electrode like Yu's, a gate stack can

1 include an electrode stack in other layers. Moreover, Petitioner's assertion
2 that the intrinsic record somehow supports including a diffusion barrier layer
3 in the electrode stack is false.

4 The specification doesn't even discuss diffusion barrier layers.
5 Nothing in the specification suggests that a diffusion barrier layer that
6 separates the gate electrode from an insulating gate oxide layer is part of the
7 gate electrode.

8 And the evidence shown on Slide 87 shows that a POSITA would
9 not have thought that. Slide 87 confirms that a POSITA would not have
10 considered the diffusion barrier layer as being part of the electrode. It's a
11 different layer separating the electrode stack from the other layers.

12 Petitioner offers no contrary evidence, so they cannot carry their
13 burden on this issue. Back again to Slide 84 to do a bit of a recap.
14 Petitioner's failure to show that diffusion barrier layer 218 is part of the
15 electrode stack in the first place is fatal to Yu-based Grounds 5 through 7.

16 Because they were not able to establish that diffusion barrier layer
17 218 is part of the electrode stack, it is not the bottommost metal layer of the
18 electrode stack. As noted earlier, this means that metal layers 220 and 222
19 would've been the right layers to compare against for Limitation 1C.

20 And the Petitioner never alleged, let alone established with any
21 evidence that the capping layer is thicker than these layers as would be
22 required for Limitation 1C. All right. Do Your Honors have any questions
23 on whether the Petitioner was able to establish that diffusion barrier layer
24 218 is part of Yu's electrode stack?

25 There's a fundamental reason that Grounds 5 through 7 fail. Okay.
26 I'm going to touch briefly on Grounds 6 through 7 and then see what time I

1 have left. All right. We explained in our Patent Owner response that
2 Grounds 6 through 7 failed with Ground 5 because those grounds relied on
3 Ground 5's showing to meet independent Claims 1 and 13.

4 This includes the problems Petitioner had justifying using the same
5 thickness for the capping layer after they changed the material from
6 polysilicon to a metal nitride, and the misidentification of the diffusion
7 barrier layer 218 as the bottommost layer of Yu's electrode stack.

8 We also established other reasons those grounds failed at pages 69
9 through 76 of our Patent Owner response. Since I was talking fast and
10 seemed to have a little bit more time than I expected, I'm going to take a
11 little time to tackle the grounds that challenge dependent claims of the '562
12 Patent.

13 And I want to explain a pattern that you'll see when you're
14 reviewing Grounds 2 through 4 and 6 through 7. Let's start with Slide 26.
15 Slide 26 shows authority that the petition failed to comply with. At left you
16 can see 35 U.S.C § 312 showing that the patent statute requires the petition
17 to state grounds with particularity.

18 At upper right, rule 42.22 explains what this means. There needs
19 to be a detailed explanation of the significance of the evidence relied upon in
20 the petition, including material facts. And at the lower right, the Federal
21 Circuit explains in PersonalWeb that you need to explain in obviousness
22 grounds, like Grounds 2 through 4 and 6 through 7, which combine Usui or
23 Yu with other references like Adesida or Sugimoto.

24 That a prerequisite to demonstrating obviousness over such
25 combinations is a clear explanation of the contemplated workings of each
26 combination. The Federal Circuit called that a prerequisite, because without

1 an explanation of what exactly each combination is or how it works, the
2 Board cannot determine if the evidence supports a motivation to combine,
3 and a reasonable expectation of success.

4 For the combinations in Grounds 2 through 4 and 5 through 7, the
5 petition failed to explain the contemplated workings. For this reason alone,
6 they fail under PersonalWeb. Now, after we pointed out the flaws in what
7 we could glean from their combinations, Petitioner's reply repeatedly
8 claimed that Patent Owner just misunderstood the combinations.

9 For example, Petitioner changed Usui in view of Yu, the
10 combination for Ground 2 into the Yu in view of Usui combination, but still
11 in Ground 2 somehow. Then they accused Patent Owner of doctoring
12 images and making up combinations, which were honest attempts to
13 understand the petition's combinations.

14 All because Petitioner failed to describe what their combination
15 was in the first place. Here's where Petitioner's specificity obligations
16 matter. The statute and rules require the Petitioner to be very clear about
17 their basis for grounds. The petition was not clear.

18 This is confirmed by the fact, as you heard today, whenever they
19 say Patent Owner misunderstood the combination, Petitioner always cites
20 deposition testimony of its expert, taken after the petition is filed to explain
21 what he meant. You can see an example of this on Slide 50 at right.

22 The deposition and reply are too late. That explanation needs to be
23 in the petition. Moreover, when you are comparing the petition against
24 reply, it becomes clear that they're altering the combinations as they go.
25 Respectfully, that should not be permitted, Your Honors.

26 The petition needed to state its grounds with particularity and

1 provide a detailed explanation. It didn't. Then Petitioner tried to change
2 things for the reply. They can't. Your Honors heard a lot about these new
3 arguments at the hearing today, and frankly, they tried to develop them even
4 further through their demonstratives.

5 And I would ask Your Honors to treat the demonstratives about
6 Petitioner's "real combinations" -- for example, on Petitioners Slide 76, 98,
7 104, I would encourage Your Honors to treat those with skepticism and to
8 check their assertions against what they actually argued in the petition.

9 And I would also ask Your Honors to look closely at whether the
10 modifications actually make sense. They often don't. For example, on Slide
11 36, you can see that the Yu reference describes a specific CMOS metal gate
12 electrode structure that uses a specific high-k gate insulator with metal
13 stacks that are designed to work with that insulator.

14 And then two specific doped conducting metal oxides that are
15 selected for specific work function values and thermal stability. Yu's
16 disclosure is entirely focused on this special CMOS transistor. As we've
17 discussed, and as shown on Slide 38, Usui by contrast describes a specific
18 interconnect structure for wiring between devices in an integrated circuit.

19 Usui's structure is designed to reduce electromigration, which
20 occurs when you have high current density running through a wire. As
21 noted on Slide 39, this high current density is something that you don't see in
22 insulated gate electrodes like Yu's CMOS gate electrodes.

23 So these are two very different references teaching very specific
24 things in different contexts. To make out an obviousness argument using
25 those references and the other references used in Grounds 3 through 4, it was
26 very important for a Petitioner to explain specifically what was going on in

1 the combination so Your Honors could evaluate whether there was a
2 motivation to combine and a reasonable expectation of success.

3 They didn't do that. They hand waved their way through all sorts
4 of modifications, the change from the petition to the reply using undefined
5 stacks, unspecified layers in undisclosed locations of unknown thicknesses
6 all mashed up together.

7 They seem to think that any metal or insulator is interchangeable
8 for any purpose regardless of the circumstance, even if the functions change.
9 And then they cite KSR as a get out of jail free card. We captured numerous
10 specific problems with the arguments against the dependent claims in Slides
11 27 through 63 and Slides 92 through 102 with citations to the briefing and
12 the evidentiary record. Unless Your Honors have any other questions, I'll
13 reserve the rest for rebuttal.

14 JUDGE KOKOSKI: None here.

15 MR. SARWAR: Excellent. Thank you so much, Your Honors.

16 JUDGE KOKOSKI: Thank you.

17 MR. SARWAR: Okay.

18 JUDGE KOKOSKI: Petitioner, you have five minutes remaining
19 and you can begin when you're ready.

20 MR. MACDONALD: Thank you. So I think I'll do this the old-
21 fashioned way, unless Your Honor wants me to hook up and show any slides
22 in your questions. But I just want to address a couple of things. So first of
23 all, we heard a lot of discussion on claim construction, and we heard the
24 Patent Owner try to distance itself from the construction they presented in
25 their Patent Owner response at 8. And just to be clear, that's -- the Patent
26 Owner said, the proper construction in view of the specification is, and then

1 it provided what it thinks is the construction. And so all this discussion
2 today about, well, it's not limited to those things we listed there, is
3 contradicted by the Patent Owner response.

4 I also wanted to point out just some legal arguments that were
5 confusing to me based on it seems like Patent Owner doesn't understand
6 Phillips, and I wanted to make sure that we were talking today in a very
7 clear way. So the reply cites Thorner and Phillips, and somehow Patent
8 Owner thinks we're violating it, but we're setting it for a very simple
9 proposition.

10 Phillips gives us a hierarchy of evidence. It starts with the claims,
11 and then the specification, and then the extrinsic evidence. And Phillips tells
12 us that the specification can't override the claims, nor can the extrinsic
13 evidence. You can't take a preferred embodiment and say the claims are
14 limited to that embodiment.

15 I mean, this is not a controversial point of patent law. So we just,
16 we don't understand their argument there. Now, they also mentioned on
17 their presentation that they don't understand the difference between a regular
18 dictionary, a lay dictionary, and a technical dictionary.

19 And again, this is found in Phillips. So I'm reading now from pin
20 cite 318 in 415 F.3d. This is from Phillips. It says, quote, we have
21 especially noted the help that technical dictionaries may provide to a Court,
22 quote, to better understand the underlying technology, end quote, and the
23 way in which one of skill in the art might use the claim terms. End quote.

24 So Phillips is recognizing the value of technical dictionaries. And
25 it goes on, it says, quote, because dictionaries and especially technical
26 dictionaries endeavor to collect the accepted meanings of terms used in

1 various fields of science and technology, those resources have been properly
2 recognized as among the many tools that can assist the Court in determining
3 the meaning of a particular terminology to those of skill in the art and the
4 invention.

5 So they presented a lay dictionary, but we have presented the
6 technical dictionary. It is broader, and the claims can't be limited by what
7 Merriam-Webster thinks an electrode is when we have a dictionary from the
8 field that shows something broader. We also heard there's some kind of lack
9 of daylight between the terms. That's not true.

10 The definitions are very different, which I think everyone can
11 understand. Patent Owner is trying to limit the claims. They're trying to say
12 that particular structures are not electrodes. It is not Petitioner who's trying
13 to do that. And so we presented a plain and ordinary meaning.

14 We were accused of a slight of hand in the reply brief, but I found
15 that kind of funny because the part that was on our screen of the reply brief
16 shows the entire definition that we're relying on. And then we talk about it
17 in our arguments below. So there's nothing being hidden here. It's all right
18 there in the brief, and as well as submitted in the exhibit.

19 The second point I wanted to address in the remaining time is
20 about this stud connection 10. And so, our response to all of Patent Owner's
21 noise about this stud connection 10, is that 10 is not a layer. And so, Dr.
22 Zhao pointed out it is an inter planar structure.

23 They criticized him for not citing additional evidence, but that's
24 apparent from Figure 8. It cuts across the layers. All of this evidence that
25 Dr. Piner brought up, you'll note that none of those conduct -- those things
26 that he's calling conduct -- I'm sorry. The things that he's calling a via, they

1 do not cut across other layers.

2 And so that's our response in the reply, is we say, hey, this is not a
3 layer. And the reason this is important is because the claims are for a
4 plurality of metal layers. It's very simple. The claim requires it, that's what
5 Usui has, the metal layers and that's what Yu has. That's always been our
6 position.

7 With respect to the discussion on whether or not there's a current
8 path through there, we just note that the metallization structure provides a
9 path, okay? The path might extend to other features of the devices, it might
10 extend to the external world, but the metallization structure absolutely
11 provides the current path that we've been talking about all along.

12 Looking at the last point of contention, just on paragraph 36, I
13 want to point Your Honors to the petition. The petition in pages 35 through
14 37 talks about the prior reference Yu. There we say, Yu prefers 600
15 angstrom thickness for the capping layer for polysilicon.

16 We say that Yu also discloses this titanium nitride and tantalum
17 nitride. We're always citing here paragraph 36, we say a particular value
18 600 would've been obvious because that's the preferred for polysilicon. And
19 then we just simply look to Usui to confirm that.

20 And Yu at paragraph 36 has all of that disclosure. It has the
21 claimed thickness that would beat the claimed dimension. And regarding
22 the barrier layer, all those gymnastics to try to say that this metal layer is not
23 a plurality of metal layers, it's just noise. The claim is simple. It requires a
24 plurality of metal layers. With that, I'll rest. Unless Your Honors have
25 questions.

26 JUDGE KOKOSKI: I think we're all set. Thank you so much.

1 MR. MACDONALD: Yeah, thank you very much.

2 JUDGE KOKOSKI: Patent Owner, you have 19 minutes left, and
3 you can start when you're ready.

4 MR. SARWAR: Thank you, Your Honors. All right. I have a
5 handful of things I want to discuss in surrebuttal. Hopefully it won't take 19
6 minutes. Okay. Petitioner is trying to shift burdens here. They're still
7 criticizing our construction. They needed to meet their own construction.

8 They're trying to suggest -- let's go to Slide 13 to see what their
9 dictionary says. They're trying to suggest that they're -- that this dictionary
10 is a lot better than our dictionary, and that's why our construction fails. And
11 they offer new argument that's not in their Papers to try to bolster this
12 technical dictionary.

13 But fundamentally, Your Honors, look at the dictionary, Slide 13.
14 They think this definition is broader. It's not. The second sentence requires
15 something. It requires an electrode providing the path for the current
16 entering or leaving a medium such as a dielectric, electrolytic solution,
17 semiconductor, gas, or vacuum.

18 They don't want you to think the path needs to be entering or
19 leaving a medium. They keep saying that it provides a path. They said it
20 again in rebuttal. This is just ignoring their own construction. We
21 established that Usui's interconnect layers 13 through 15 and 18 through 19
22 without stud connection 10 cannot provide that path.

23 Nothing they said today helps them overcome the failures in
24 Grounds 1 through 7, which we highlighted at today's hearing. Slide 17.
25 Grounds 1 through 4 based on Usui fail at least because they can't meet the
26 plain meaning of electrode without Usui's stud connection 10.

1 The evidence that the parties submitted regarding the plain
2 meaning of electrode do not support Petitioner's position that an interconnect
3 is an electrode. Petitioner's suggestion that an electrode is essentially any
4 conductor through which current passes, any piece of wire sitting in the
5 middle of a circuit somewhere, that simply has no intrinsic or credible
6 extrinsic evidence supporting it. Their dictionary doesn't support it.

7 When you look at the evidence of the plain meaning of electrode
8 stack that the parties provided, it's clear that the mapping of Usui's
9 interconnect to the claimed electrode stack needed to include stud
10 connection 10. Petitioner's only response is that device contact 10 is not a
11 layer.

12 But again, nothing requires that an electrode stack be a layer. And
13 to the extent that Petitioner is now trying to improperly change their
14 mapping from the petition to now include device contact 10, even if they
15 were allowed to change their petition argument to do that, there's no credible
16 evidence that device contact 10 is not formed from a layer or layers.

17 It wasn't our burden to do this. We provided expert testimony and
18 corroborating evidence. Again, Exhibits 2032 and 2033, Gambino and Chen
19 shown on Slide 23, which confirm that Usui's device contact 10 would have
20 been formed from a layer or layers of metal.

21 That's true, even if Usui's device is a contact – Yu's device contact
22 where he filled via that cuts across multiple planes. Petitioner was unable to
23 come up with a reason for rebuttal, so they ignored this evidence entirely.
24 Their expert parroted their argument and provided no corroborating
25 evidence.

26 So Petitioner's Grounds 1 through 4 fail for at least those reasons.

1 Along with the other reasons we covered in depth in our briefing. Grounds 5
2 through 7 based on the Yu reference, likewise fail. Slide 84. Petitioner
3 identified using iron metal gate stacks, including the insulator layers, as an
4 electrode stack.

5 Even though the patent says that in an insulated gate the electrode
6 stack is stacked with insulating layers that are not part of the electrode stack.
7 Calling the entire metal gate stack in Yu an electrode stack was Petitioner's
8 only basis for concluding that diffusion barrier layer is part of the electrode
9 stack.

10 Because that entire metal gate stack is not an electrode stack in
11 view of the specification, in view of the intrinsic evidence, Grounds 5
12 through 7 fails as a matter of claim construction. In reply they tried to fix it.
13 They tried to change the orange box in Yu to identify a different electrode
14 stack, this time excluding dielectrics.

15 That shouldn't be allowed. That's new argument. And Grounds 5
16 through 7 still fail. Yu discloses an insulated gate electrode that includes
17 three components: an electrode stack, three metal layers, insulating layers
18 214 and 216. And then in between them, diffusion barrier layer 218.

19 The barrier layer prevents diffusion between the electrode stack
20 and the insulation. And even though it wasn't our burden to do this, we
21 provided expert testimony and corroborating evidence, Meng Exhibit 2002,
22 shown on Slide 87, confirming the diffusion barrier layers like layer 218 in
23 Yu were not considered part of an electrode stack by a POSITA.

24 Petitioner again, was unable to come up with a rebuttal. So the
25 reply ignored that evidence entirely. To succeed in establishing that Yu
26 discloses an electrode stack, Slide 68, that it meets the claims of the '562

1 Patent, Petitioner needed to establish that the actual bottommost layer of
2 Yu's electrode stacks were less thick than the capping layers of the electrode
3 stack when it was formed from a refractory metal nitride.

4 It looks like layers 220 and 222, they didn't do that. There's no
5 argument or evidence of the thickness of layers 220 and 222 anywhere.
6 Petitioner's Grounds 5 through 7 thus fail for at least that reason, along with
7 the other reasons we covered in our trial Papers. Unless Your Honors have
8 any other questions for me, we'll rest.

9 JUDGE KOKOSKI: I think we're all set. Thank you very much.

10 MR. SARWAR: Thank you, Your Honors.

11 JUDGE KOKOSKI: So we'd like to thank Counsel for both parties
12 for your attendance and your presentations today. We appreciate your level
13 of preparedness and in particular, your command of the record, which is
14 very helpful to us. We'd also like to compliment your colleagues who did an
15 excellent job of helping you get these demonstratives together. Final written
16 decision will be issued in due course, and with that, we're off the record.

17 (Whereupon, the above-entitled matter went off the record at 2:51
18 p.m.)

IPR2025-00175
Patent 8,686,562 B2

PETITIONER:

Lionel Lavenue
Kara Specht
Cory Bell
Shannon Yi
Sarah Rodriguez
Carlos Duarte-Guevara
Umber Aggarwal
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, LLP
lionel.lavenue@finnegan.com
kara.specht@finnegan.com
cory.bell@finnegan.com
shannon.yi@finnegan.com
sarah.rodriguez@finnegan.com
carlos.duarte-guevara@finnegan.com
umber.aggarwal@finnegan.com

PATENT OWNER:

Richard Giunta
Scott McKeown
Jie Xiang
WOLF GREENFIELD & SACKS, P.C.
rgiunta-ptab@WolfGreenfield.com
smckeown-ptab@wolfgreenfield.com
jxiang-ptab@wolfgreenfield.com