

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICRON TECHNOLOGY, INC.,
Petitioner,

v.

YANGTZE MEMORY TECHNOLOGIES COMPANY, LTD.,
Patent Owner.

IPR2025-00189
Patent 11,145,666 B2

Record of Oral Hearing
Held: March 12, 2026

Before JO-ANNE M. KOKOSKI, KIMBERLY McGRAW, and
MICHAEL T. CYGAN, *Administrative Patent Judges*.

APPEARANCES:

ON BEHALF OF THE PETITIONER:

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The above-entitled matter came on for hearing on Thursday, March 12, 2026, commencing at 2:00 p.m. EDT, at the U.S. Patent and Trademark Office, 600 Dulany Street, Alexandria, Virginia.

P R O C E E D I N G S

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2:00 p.m.

THE BAILIFF: All rise.

JUDGE CYGAN: You may be seated.

Good afternoon. This is Judge Cygan. Judges McGraw and Kokoski are present by video. We will now hear argument in case number IPR2025-00189 between Petitioner Micron Technology and Patent Owner Yangtze Memory Technologies. This is concerning U.S. patent number 11,145,666.

Counsel for the parties, starting with Petitioner, please introduce yourself.

MR. HERMAN: Good afternoon, Your Honors. This is Patrick Herman from Orrick, Herrington & Sutcliffe here on behalf of Petitioner.

MR. MAKKER: Amit Makker on behalf of Patent Owner. With me is my colleague, Tom Watson, and our client representative, Daniel Chan.

JUDGE CYGAN: Thank you and welcome to the Board. Per our hearing order, each party is provided with 60 minutes for oral argument. Additionally, Patent Owner's request for additional 15 minutes for a LEAP practitioner has been granted, so Patent Owner has a total of 75 minutes. Parties need not use the entirety of that time. 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. Please try to identify the number of the demonstrative slide that you're on as you present your argument.

1 And Petitioner, how much time would you like to reserve for your
2 rebuttal?

3 MR. HERMAN: Fifteen minutes, Your Honor.

4 JUDGE CYGAN: Okay. And just to clarify, you submitted corrected
5 demonstratives?

6 MR. HERMAN: Yes, Your Honor. A few of the pages towards the
7 end of what I originally filed were unfortunately missing page numbers. So
8 --

9 JUDGE CYGAN: Okay.

10 MR. HERMAN: -- I prepared that yesterday. So the corrected
11 demonstratives have numbers on all the pages, but there's no other
12 difference.

13 JUDGE CYGAN: Okay. Is there any issue with that on Patent
14 Owner's side?

15 MR. MAKKER: No issue, we corresponded about it.

16 JUDGE CYGAN: Okay. Thank you.

17 Okay. Petitioner, you may begin when ready.

18 MR. HERMAN: Good afternoon, Your Honors. We're here today to
19 talk about the '666 patent. Petitioner submits that this is a straightforward
20 case. The claims of the '666 patent are unambiguous. They are directed to a
21 typical 3D memory staircase structure and require little more than the use of
22 landing pads with curved-side surfaces on that staircase.

23 As I'll discuss in greater detail today, this type of landing pad is
24 repeatedly taught by the prior art, and this art, as I'll explain, renders the
25 claims obvious. Patent Owner's arguments to the contrary invite error.
26 Patent Owner wrongly proposes narrow claim constructions that read

1 limitations into the claims from the '666 patent's figures and specification
2 example, but that's not how claims are construed. It's the language of the
3 claims, not a patent's figures or example, that control.

4 Patent Owner also ignores the comprehensive teachings of the prior
5 art. Here, the art makes clear that curved landing pads were known, were
6 readily manufacturable, and were considered more than suitable.

7 So turning to slide 2, before discussing the party's disputes in greater
8 detail, I'll provide a brief introduction to the patent for context.

9 So what is the '666 patent about? As shown by the excerpt on slide 2,
10 the patent is generally directed to a staircase structure for a memory device,
11 e.g. 3D memory device. The patent says that the memory provides various
12 improvements, but the patent never explains why. It also doesn't identify
13 which memory features result in these purported improvements. The '666
14 patent leaves it up to a person having ordinary skill of the art to figure that
15 out on his or her own.

16 Turning to slide 3, this slide reproduces Claims 17 and 19. The
17 petition originally challenged Claims 17, 19, and 20, but Patent Owner
18 statutorily disclaimed Claims 17 and 20, leaving only Claim 19. So I've
19 included both Claim 17, which is the independent claim, and Claim 19,
20 which is the remaining dependent claim on this slide. And as shown by the
21 slide's yellow highlighting, the claims are directed to a memory device. That
22 device includes typical 3D memory features like a substrate, a memory
23 string, and a staircase structure.

24 The -- now, the parties' dispute focuses on the final limitation of
25 Claim 17. That limitation requires that the memory staircase include
26 alternating insulating layers, that's the blue highlighting, and conductive

1 layers, that's the green highlighting. As shown by the orange, each
2 conductive layer must also have a second portion. Now, the second portion
3 is referred to throughout the '666 patent specification as a landing pad.

4 Next, as shown by the red underlining, Claim 17 specifies that the
5 landing pad, that's the second portion of the conductive layer, have a curved-
6 side surface in contact with the side surface of the insulating layer. So at its
7 heart, all Claim 17 and Claim 19, because of its dependency, requires is a 3D
8 memory staircase structure that uses a curved landing pad that's in contact
9 with an insulating layer. Now, Claims 19 includes some further limitations
10 regarding the extent of adjacent insulating layers, but those are not central to
11 the parties' disputes.

12 So slide 4 provides a graphical example of this. This slide reproduces
13 Figure 8 from the '666 patent, which provides a side view of a memory
14 staircase structure. The memory is formed from alternating insulating and
15 conductive layers. One example conductive layer is highlighted green, and
16 an associated example insulating layer is highlighted blue.

17 Note that the pad -- the landing pad is highlighted orange, and that's
18 the second portion of the conductive layer. The landing pad as depicted
19 appears to have a curved-side surface touching the adjacent insulating layers
20 Claim 17 requires. Well, this is what Figure 8 appears to show. The '666
21 patent does not even use the word curved in its specification. The
22 specification also does not attribute any significance to this particular
23 feature. The shape of the landing pad is simply not discussed at all. The
24 only place the word curved appears is in the claims.

1 So slide 6 provides a summary of the petition's grounds. The petition
2 included three obviousness grounds, relying on references to Kim, Nam, and
3 the combination of a reference to Lee and another reference to Park.

4 So slide 7 provides a brief overview of the Kim reference. As shown
5 by the yellow highlighting, Kim teaches a semiconductor memory device
6 having enhanced reliability. Next, like the '666 patent, Kim's memory
7 includes a staircase structure formed from alternating insulating and
8 conductive gate electrode layers. That's shown by the blue and the green
9 highlighting.

10 And Kim then goes on to explain that its staircase structure includes a
11 landing pad, which Kim calls "a protrusion pad P," at the end of each of its
12 gate electrodes. That's shown with the orange highlighting. And as shown
13 by the red underlining, Kim's landing pads can have various different
14 shapes. For instance, the pads can have a cylindrical shape, or can be
15 generally rectangular with a curved surface.

16 Slide 8 includes an annotated version of Figure 4B showing these
17 particular features that I've just discussed from Kim. Now, while the landing
18 pad in this particular figure is shown to be rectangular, as I just read from
19 Kim's specification, Kim contemplates other landing pad shapes, including
20 cylindrical landing pads and pads with curved surfaces.

21 Slide 9 provides an overview of Nam, which is the primary reference
22 at issue in ground 2, and Nam also relates to a memory device. As shown by
23 the yellow highlighting, Nam's memory device is meant to improve on prior
24 art devices by avoiding short circuits. How does it do this? By including a
25 thickened landing pad at the end of each of its electrodes to prevent contacts
26 from penetrating through.

1 And as shown by the passages of -- passages on the right, Nam, just
2 like the '666 patent, refers to its landing pad as a second portion. And also
3 like the '666 patent, Nam's staircase structure includes alternating insulating
4 and conductive gate electrode layers, and you can see that in the blue and
5 green highlighting. Moreover, Nam's landing pads don't have straight sides.
6 Instead, they are convex with a bull-nose shape, and that's shown by the red
7 underlining.

8 So slide 10 includes Figure 7 from Nam showing the features that I've
9 just discussed, and as can be seen, the landing pad in this particular figure
10 includes a curved-side surface.

11 Moving on to slide 11, Lee, the primary reference in the petition's
12 third ground, also teaches a 3D memory. This memory, as shown by the
13 blue and green highlighting on this slide, includes a staircase structure with
14 alternating insulating and conductive layers, like any other 3D memory.
15 And as shown by the orange, each conductive layer terminates with the
16 landing pad, which Lee calls "a pad portion pad."

17 So slide 12 shows this graphically. A pair of insulating and
18 conductive layers making up one staircase level are respectively highlighted
19 blue and green, and the landing pad at the end of one of those conductive
20 layers is highlighted orange. Now, while Lee does not state that it employs
21 curved landing pads, this was known in the art.

22 Turning onto slide 13, Park provides an example of this. Park relates
23 to the same type of 3D memory with vertically-stacked layers that lead does,
24 and rather than using landing pads with straight sides, Park teaches the use
25 of rounded landing pads. Why round the pads? According to Park, this
26 helps prevent a short circuit with adjacent conductive structure.

1 So turning onto slide 15, the parties have a number of disputes
2 spanning the petition's grounds. Some of these focus on claim construction,
3 others focus on whether the prior art is able to employ a rounded or curved
4 contact pad, and I'll address each of these in turn. So I'll start, as shown on
5 slide 16, with Patent Owner's arguments that Claim 19 requires a special
6 type of curved-side surface that purportedly excludes one of Kim's landing
7 pad types.

8 So turning to slide 17, before beginning that discussion, as a reminder,
9 Kim teaches a variety of different landing pad shapes. This is shown on
10 slide 17. As the passage on the left from Column 8 of Kim explains, Kim
11 contemplates both cylindrical landing pads and a rectangular landing pad
12 with what Kim calls "a curved surface."

13 The petition and Petitioner's expert declaration included
14 demonstratives showing what a person having ordinary skill in the art would
15 have understood these two different shapes to -- or pad shapes to look like.
16 You can see that in the orange on the right of the slide. As shown, the
17 cylindrical pad is generally cylindrical because of this it includes a curved
18 surface when viewed from above. That curve is in the Y-axis direction or
19 from the left to the right of the figure from viewed to the top -- when viewed
20 from the top. The rectangular pad with a curved -- with a curved surface
21 includes a curve when viewed from the side or in cross section, so that curve
22 is in the Z-axis direction of the figure.

23 So turning to slide 18, Patent Owner does not contest that Kim teaches
24 cylindrically shaped landing pads. Patent Owner also does not contest that a
25 person having ordinary skill in the art would have been able to use Kim's

1 existing manufacturing process as set forth in Kim's specification without
2 modification to make a cylindrical landing pad.

3 Instead, its only argument is that the claims do not embrace
4 cylindrical landing pads. So what does Patent Owner think the claims
5 require? Patent Owner believes that the claims are limited to a very specific
6 type of landing pad, one that is curved in the vertical Z-axis direction. It
7 also argues that the point of contact between the landing pad and the
8 insulating layer needs to be at the insulating layer's very end, and not what
9 Patent Owner characterizes as an inner or internal surface. The end result of
10 this is to graft a series of limitations into the claims that are simply not
11 there. It also effectively reads out of the claim scope any landing pad design
12 that isn't exactly what is shown in Figure 8 of the '666 patent.

13 The claims, according to Patent Owner, only embrace curves like that
14 in Figure 8, other curved surfaces are somehow excluded. The claims,
15 according to Patent Owner, only embrace memories -- also only embrace
16 memories where the insulation ends where the landing pad begins. Other
17 memories, including memories that employ island shaped landing pads like
18 Kim, where the landing pad is completely surrounded by insulation are
19 somehow excluded, according to Patent Owner.

20 Petitioner submits that this isn't how claims are to be construed. The
21 figures don't limit neither do these specifications examples. Because of this,
22 Patent Owner's proposal finds no basis in the record. Moreover, before
23 discussing this claim construction dispute in greater detail, I'll note that it is
24 effectively meaningless. Patent Owner spends a specific -- a significant
25 portion of its briefing and its slides going over why a side needs to be
26 vertically oriented. While Petitioner disputes that it's appropriate to graft the

1 word vertical into the claims, doing so here has no bearing whatsoever on
2 the prior art. Every single reference at issue here teaches curved landing
3 pads with vertically oriented curved sides.

4 Thus, the real dispute and the one the Board needs to resolve is
5 whether the landing pad's curve must be in the Z-axis direction and whether
6 the side surface of the insulating layer must be the layer's very end. Once
7 again, the intrinsic record does not require either of those two things.

8 So turning to slide 19, I'll begin with the claim language itself. As
9 shown by the yellow highlighting. Claim 17 requires only that the second
10 portion of the conductive layer -- again, that's the landing pad -- comprise a
11 curved side surface. The claim does not require or specify any particular
12 type of curve. There is no mention of the Z-axis direction, as Patent Owner
13 would require. There is nothing that excludes other curves, like a curve in
14 the Y-axis direction from the claim -- from the claim scope.

15 Likewise, the claim requires only that the curved side surface of the
16 landing pad contact A-side surface of the insulating layer. Importantly, the
17 claim uses the Article A. So the insulating layer does not have just one side
18 surface at its very end, as Patent Owner would have the Board find. Instead,
19 contact with any of the various side surfaces of an insulating layer is
20 sufficient. There is no further requirement that this side be at any particular
21 place along the insulation layer's length, let alone that the side where contact
22 happens be at the end of the insulating layer.

23 So turning to slide 20, the Federal Circuit has repeatedly made clear
24 that the words of a claim are generally to be afforded their plain and
25 ordinary meaning. The Federal Circuit has also explained that it is improper
26 to interject narrowing modifiers into the claim in circumstances where the

1 claim language itself nor the specification require it. That, however, is what
2 Patent Owner seeks to do here. It interjects the word Z-axis into a claim that
3 just requires a curved side surface, and it seeks to exclude contact with inner
4 or internal sides, even though the claim makes clear that contact with any
5 side surface of an insulating layer is sufficient.

6 Turning to slide 21, the term side surface has a straightforward, plain,
7 and ordinary meaning. This slide includes an excerpt from Petitioner's
8 expert declaration, that's Exhibit 1027, as shown, the term "side surface"
9 would be understood to refer to any of the bounding surfaces of a three-
10 dimensional shape. So the curve side surface of a landing pad can be any of
11 the landing pads sides, and the side surface of the insulating layer can be any
12 side, including an inner or internal side.

13 Now, even though side surface has a straightforward, ordinary
14 meaning, Patent Owner argues that the claims require a specific type of
15 landing pad curve and a specific interface between the landing pad and the
16 insulating layer. What does Patent Owner's support for doing so? Its only
17 support is to point to the examples in the '666 patent specification.

18 Turning to slide 22, the specification does not support Patent Owner's
19 position. Yes, the '666 patent includes an example and a figure with a
20 landing pad that is curved in the Z-axis direction, or at least appears to be
21 curved that way. And the example landing pad does appear to contact the
22 end of an adjacent insulating layer, but the specification also says, time and
23 time again, that that example is not meant to be limiting. You can see that
24 on this slide. The patent states that it only describes specific embodiments,
25 but also intends to embrace adaptations and modifications. The patent states
26 that language used in the specification is not intended to limit. Indeed, the

1 patent even ambiguously says in the passage to the bottom right of the slide
2 that it should not be limited to its example embodiments. Patent Owner
3 seeks to do the opposite. It seeks to limit the claims to just an embodiment
4 or an example shown in Figure 8.

5 Turning to slide 23, not only does the '666 patent explain that it is not
6 to be limited to its embodiments, but it also defines the term layer broadly.
7 In particular, each layer not only has a top side and a bottom side, but can
8 also have a complicated structure extending in many different directions. It
9 can also be formed from multiple layers. Petitioner submits that this serves
10 to further confirm that Patent Owner's attempt to limit the claims lacks
11 merit. It is not the case that there is only a single side surface of the claimed
12 insulating layer. Instead, there can be many of these side surfaces in a given
13 insulating layer, and any of them may contact the curved side surface of the
14 landing pad for purposes of satisfying the claims.

15 Turning to slide 24 there are still further reasons why Patent Owner's
16 narrow claim constructions must be rejected. As shown here, much of the
17 language Patent Owner now tries to read into the claims is used in the
18 specification. The specification not only uses, but defines the term vertical.
19 The specification also uses the term Z-axis, but none of that language
20 appears in the claims. Why is that important? Because as the Federal
21 Circuit has held, where a patentee shows that it knows how to use limiting
22 language, as the Patent Owner does here by using the terms vertical and Z-
23 axis in its specification, then the claims must be interpreted broadly and
24 cannot be limited using the language that Patent Owner itself elected not to
25 put into the claims.

1 So unless there are further questions about that claim construction
2 issue, I'm going to move on to the party's next dispute. So --

3 JUDGE KOKOSKI: I do have a question, Counsel. Can you address
4 the difference between top and bottom versus the sides? Because I do see
5 that in some places we talk about -- the patent talks about a top and a bottom
6 and sides differently. So if I'm understanding what you're saying, even the
7 top and bottom would count as a side for purposes of the claim?

8 MR. HERMAN: Yes.

9 JUDGE KOKOSKI: And -- so, how do you square that with the other
10 discussions where the patent differentiates between the top and bottom and
11 the sides?

12 MR. HERMAN: So there are claims in this patent, including Claim 1,
13 where the patentee separately claims those various different parts of the
14 landingpad. So Claim 1 separately claims a landingpad with a top surface,
15 a bottom surface, and a side surface, making clear that the side surface is
16 something different than the top surface and the bottom surface, since all
17 three of those things were claimed separately. But when we get to Claim 17,
18 the claim simply references a landing pad having a side surface. It does not
19 discuss the top surface and the bottom surface of the landing pad. And the
20 evidence of record here shows that the plain and ordinary meaning of the
21 term side by itself means any of the sides of a three-dimensional shape. So
22 the left, the right, the top, the bottom, the sides bounding a hole through the
23 middle of an object. That's the plain and ordinary meaning of the term
24 "side" and that's how Claim 17 is using that particular word.

25 But again, from a claim construction perspective, whether or not the
26 term side embraces the top and the bottom does not matter with respect to

1 the prior art here, because every single one of the prior art references that
2 we've identified in the petition has a curved side surface that goes up and
3 down. So it's not the top, it's not the bottom, it's a surface that is, in fact,
4 vertical. That's the case in Kim, that's the case in Nam, and that's the case in
5 the combination of Lee and Park.

6 JUDGE KOKOSKI: Well, I still want to just have one more follow
7 up on that. Now, I know Claim 1 is not at issue in this case, but why would
8 we construe side surface differently in claims -- in Claim 17 than it would be
9 construed possibly in a different claim? Wouldn't we need to construe those
10 consistently? So if we have evidence that Claim 1 differentiates between the
11 side and the tops and the bottom, why wouldn't that affect our construction
12 of Claim 17?

13 MR. HERMAN: Because those two claims are claiming different
14 things. They're claiming different structures. So Claim 1, for instance, does
15 not even require a curved side surface, where -- whereas that is a limitation
16 that is in Claim 17.

17 Another point I'll make here is that grafting the word "vertical" into a
18 claim that requires a curved surface does not make any sense from a logical
19 perspective. And the reason for that is that a curved surface necessarily
20 changes direction. So even if the curved surface starts vertical, it can end
21 horizontal. So by adding the word "vertical" into the claim, you interject
22 ambiguity that's unnecessary for purposes of resolving the issue with the
23 prior art that we have here.

24 JUDGE KOKOSKI: Okay, thank you.

25 MR. HERMAN: So turning onto slide 26, I'll move on to the parties'
26 next dispute. So even if the Board agrees with Patent Owner and finds that

1 Kim's cylindrical pads are not curved, and again, there's no reason to arrive
2 at such a conclusion, Kim would still render the claims obvious. Why?
3 Because Kim also teaches another type of curved pad, a pad that includes a
4 traditional curved surface when viewed from the side. This type of pad is
5 curved in the Z-axis direction, thus Kim satisfies the claims even under
6 Patent Owner's narrow interpretation.

7 So Patent Owner responds to this by arguing that Kim doesn't -- does
8 not allow for manufacturer of that type of pad. It also argues that a person
9 having ordinary skill in the art would not have been motivated to use such a
10 pad, and Petitioner submits that Patent Owner is wrong on both counts.

11 So turning to slide 27, to begin, as I've explained, Kim already
12 references the use of rectangular pads with what Kim calls "a curved
13 surface." So Kim does not need to be modified to include this type of pad.
14 It already discloses it.

15 Confirming that this is exactly what Kim already contemplates, this
16 type of curved pad, which is curved when viewed from the side, was
17 routinely taught and regularly taught in the prior art. There are three
18 examples of that on this slide, including the Park, Yun, and Nam references.
19 All three include a surface that is curved in the z-axis direction. This shows
20 that this type of pad was known and considered acceptable for use in a 3D
21 memory device. It also shows that there were multiple known methods to
22 achieve such a pad taught in the art that would have been available to a
23 person having ordinary skill in the art.

24 To be clear, the petition did not suggest bodily grafting Park, Nam, or
25 Yun into Kim. These references were cited to show what a person having

1 ordinary skill in the art would have understood Kim to mean when it
2 referenced a rectangular landing pad with a "curved surface."

3 So turning onto slide 28, despite the routine availability of rounded
4 pads and the many different ways to achieve such a pad taught in the prior
5 art, Patent Owner argues that Kim cannot use a pad that's curved in this
6 particular way. Petitioner submits that that argument cannot be squared with
7 the prior art. It also does not address obviousness in the right way.

8 Patent Owner spends pages in its briefing walking through Kim's
9 example manufacturing process. It then argues that a person having
10 ordinary skill in the art reviewing Kim would consider use of that process
11 only and nothing else. This according to Patent Owner prevents the
12 formation of a curved pad. But Kim's example manufacturing process is just
13 that. It is an example. It is not the extent of Kim's teaching. Kim says so
14 explicitly at, for instance, Column 12, Lines 12 to 15, and Column 12, Lines
15 38 to 42.

16 That is also not how obviousness is addressed. A person having
17 ordinary skill in the art is a person having ordinary creativity. They do not
18 limit themselves to just one specific example manufacturing process in one
19 prior art reference and then close their eyes to everything else that was
20 known. And here, the art is replete, with straightforward examples of how
21 rounded pads can be achieved. A person having ordinary skill in the art
22 would have immediately recognized that any of these methods are readily
23 applicable to Kim to achieve pads with the very type of curve -- curves that
24 Kim itself already references and deems acceptable.

25 So slide 28 provides an example. This slide shows that Park, that's
26 Exhibit 1008, employs a two-step oxidation process to form rounded pads.

1 First, it thermally oxidizes the surfaces of its sacrificial layers to form an
2 additional insulating layer, 40. Then second, as shown by the red
3 underlining, it performs a second oxidation process on the already existing
4 additional insulation layer to round it.

5 Petitioner's expert explained how to perform an analogous type of
6 second oxidation process on Kim's deposited oxide layers and how this
7 would result in a rounded landing pad in Kim, just like it does in Park. An
8 example of that is shown on the right of the slide.

9 Turning to slide 29, Nam provides another example of how pad
10 rounding is achieved in the prior art. Nam, like Kim, forms its landing pads
11 by creating a doped area and an insulating layer, and then etching that doped
12 area out, forming an opening that could be filled with the pad's conducted
13 material.

14 As shown on this slide, Nam teaches that a rounded pad is achieved
15 by performing a heated step -- a heating step after applying the dopant.
16 Petitioner's expert explained that this process would also produce a rounded
17 or curved pad in Kim, just like it does in Nam. Kim's implanted dopant
18 would be heated to form pads with curves, as Kim itself already
19 contemplates.

20 So what does the art show here? It shows that curved pads were
21 known and readily achievable. It also shows exactly how Kim's existing
22 manufacturing process would be tailored to produce such a pad. This of
23 course is not the only way to form such a pad, but it does show that there is
24 no fundamental incompatibility between Kim and curved pads. That should
25 have been apparent because Kim itself deems pads with curved surfaces
26 acceptable for use and references them as "pad options" in its specification.

1 Also, none of these manufacturing details that I've included on slides
2 28 and 29 are new. The petition at Pages 50 to 51 pointed to both the Park
3 and Nam reference as providing example manufacturing methods that could
4 be applied to result in curved landing pads in Kim.

5 Turning to slide 30, Patent Owner's motivation to combine arguments
6 also lack merit. According to Patent Owner, because Kim already teaches
7 methods to address short circuit in a 3D memory device, a person having
8 ordinary skill in the art would have done only that and nothing else.
9 Respectfully, that is not how a person having ordinary skill in the art thinks
10 and that is not the law. If it were, it would never be obvious to modify and
11 improve on a prior art reference. A person having ordinary skill in the art
12 would consider every reference standing by itself to be good enough already.

13 Moreover, as the petition explained, use of a curved pad serves to
14 further Kim's goals. It makes Kim better. As shown by the passages on the
15 right side of the slide, Kim's memory is designed to ensure, number one, that
16 there is adequate insulation around its landing pad, and number two, that
17 there is sufficient distance between the pad and adjacent conductive
18 structure to prevent short circuit. So use of a curved pad would plainly help
19 Kim achieve those two goals.

20 As shown by Petitioner's expert testimony to the right, which is not
21 disputed, use of a curved pad increases the amount of insulation surrounding
22 the pad. It also increases the distance between the pad and the adjacent
23 conductive structure.

24 Petitioner's expert also explained that use of a curved pad provides
25 other benefits. For instance, it reduces material stress and improves the
26 electrical conductivity of the pad itself. You can see that in Paragraph 201

1 of Exhibit 1003. So this is why it would have been obvious to use a curved
2 pad by -- with Kim. So not only --

3 JUDGE CYGAN: Counsel, can I ask a question?

4 MR. HERMAN: Yeah.

5 JUDGE CYGAN: So you have sort of one theory, which is that Kim
6 already teaches the claimed curve, correct?

7 MR. HERMAN: Yes.

8 JUDGE CYGAN: And you have a second theory in which Kim
9 doesn't teach the exact type of claimed curve under Patent Owner's
10 construction, but in view of the teachings of the art, it would be obvious; is
11 that correct?

12 MR. HERMAN: Almost. So the positions that we presented are thus,
13 right? So Kim provides various different options for the design of its
14 landing pad, one of which is cylindrical, and there's no dispute about what
15 that is and how it would be formed.

16 The other type of pad that's taught in Kim, and is Petitioner's position
17 that this is already disclosed by Kim, is a landing pad that has a curved
18 surface. A rectangular landing pad that has a curved surface.

19 And the testimony of record from our expert and the other prior art of
20 record indicates that one of ordinary skill in the art reading those words in
21 Kim would understand that rectangular landing pad with a curved-side
22 surface to look like what's in Park, Nam, and Yun, right? So we're pointing
23 to Park, Nam, and Yun not to modify or graft something on to Kim, but
24 basically to elaborate what Kim already teaches to one ordinary skill in the
25 art.

1 JUDGE CYGAN: And this is because of the process? That you're
2 looking to Park's process and Nam's process to say, this gives you this type
3 of a curve; is that correct?

4 MR. HERMAN: So we're looking to Park and Nam's process to
5 provide examples of how the pad that's already referenced in the Kim
6 reference would be manufactured while making as little change to Kim's
7 manufacturing process as possible.

8 There are, of course, other ways to manufacture a curved pad, as
9 evinced by the fact that there are numerous curve pads in the prior art. But
10 the reason we're pointing to Park and Nam in particular is because Park and
11 Nam are very analogous and include processes that are directly applicable to
12 what Kim is already doing.

13 JUDGE CYGAN: Thank you.

14 MR. HERMAN: So this is why it would have been obvious to use a
15 curved pad with Kim. Not only were such pads known and in routine use,
16 and in fact are even referenced in Kim itself, but using a curved pad like that
17 contemplated by Kim enhances Kim's ability to avoid short circuits while
18 improving Kim's structure.

19 So with that, I'm going to move on to the dispute regarding the Nam
20 reference. As shown on slide 32, here Patent Owner argues that the petition
21 somehow arbitrarily and inconsistently identified Nam's insulating layers.
22 Patent Owner also argues that the contact between Nam's landing pad and
23 the insulating layer is not at a side surface. It -- it's what Patent Owner calls
24 the bottom of Nam's insulating layer. Once again, Petitioner submits that
25 both of these arguments lack merit.

1 So turning to slide 33, there's nothing that was ambiguous about the
2 petition. The petition repeatedly and clearly identified what constitutes the
3 insulating layer in Nam. As shown here, the petition explained in words that
4 both insulating layer 240 and the adjacent insulating 271 are the claimed
5 insulating layer. Why were those structures identified as the insulating layer
6 together? Because they together cooperate to surround a particular
7 conductive layer and landing pad in Nam's staircase.

8 So Patent Owner ignores this description of Nam's insulating layer in
9 the petition, and instead fixates on how the figures were drawn and colored
10 in the petition. But the coloring of the figures in the petition was only meant
11 to highlight the features relevant to the claim limitation the figure relates to.

12 So in Figure 8A on the slide here, the insulation around the point of
13 contact with the landing pad is highlighted because the point of contact is
14 what was being discussed in connection with this figure. So the figure was
15 not meant to imply that the highlighted area is the total extent of the
16 insulating layer. That's why the blue in the figure gradually fades away,
17 because the insulating layer continues. Once again, the petition explained in
18 words what constitutes the insulating layer. That's layer 248 in Nam and the
19 adjacent portion of layer 271.

20 So turning to slide 34, the petition's identification of Nam's insulating
21 layer simply follows the '666 patent's own definition of the word layer. As
22 shown on the slide, the '666 patent explains in Column 4 that a layer can be
23 the material that is located between any set of horizontal planes. So this is
24 exactly what the petition identified as the insulating layer in Nam, the
25 insulation between the planes formed by two adjacent conductive layers.
26 This includes not only the insulation 248, but also the adjacent portion of

1 layer 271. Moreover, none of this is new. The petition pointed to both the
2 '666 patent's definition of layer, and identified layers 248 and 271 as the
3 claimed insulating layer.

4 So turning to slide 35, Patent Owner also wrongly argues that the
5 point of contact between Nam's landing pad and the insulating layer is not a
6 side surface, as the claims require. According to Patent Owner, only the
7 bottom of the insulating layer contacts the landing pad. That is not the case.
8 There is in fact contact with the side surface. As shown here, the contacting
9 surface includes dimension in the z-axis direction. In other words, the
10 contacted surface proceeds up and down in the plane of the figure. This
11 makes it a side.

12 Yes, this is not at the very end of the insulating layer, but the claims
13 don't require that. Contact with any side surface, of which there may be
14 many, in a given insulating layer, is sufficient.

15 So moving on to slide 37, the parties' final dispute relates to the Lee
16 and the Park references. So here, Patent Owner once again argues that a
17 person having ordinary skill in the art wouldn't have been motivated to use a
18 curved landing pad with Lee. It also argues that Lee can't be modified to use
19 this type of pad.

20 So turning to slide 38, Patent Owner's motivation to combine
21 arguments once again lack merit. Not only were rounded landing pads
22 known, suitable, and then routine use, but as shown on the right of the slide,
23 Lee expressly states that its landing pad should be designed such that there
24 is, quote, "sufficient distance," end quote, between the pad and adjacent
25 conductive structure to prevent electrical problems. The use of curved pads
26 furthers this very goal. There is no dispute about that. Indeed, Patent Owner

1 concedes that this was a known benefit provided by curved landing pads on
2 slide 8 of its own demonstratives.

3 Now, turning onto slide 40, a person having ordinary skill in the art
4 would also have been more than able to form a rounded pad with Lee. Park
5 provides an example of how this could be achieved by performing a second
6 oxidation process on an already existing oxide layer. So turning back to
7 slide 39, Patent Owner argues that that type of process cannot be done with
8 Lee because Lee, in Patent Owner's view uses the completely stable and
9 unoxidizable silicon dioxide in its insulating layers. But as shown on slide
10 39, that is not the case. Lee does not reference unoxidizable silicon dioxide.
11 Instead, it simply notes that its insulating layers are formed from an oxide.

12 So turning to slide 41, why is that characterization of Lee's insulating
13 layers important? As shown on this slide, there is no dispute here that a non-
14 stoichiometric oxide like a silicon oxide that has some amount of excess
15 silicon is in fact oxidizable and allows for the production of a rounded
16 contact pad. So this slide includes the testimony of Petitioner's expert
17 discussing this type of material and explaining how it would be further
18 oxidized to produce rounded contact pads in Lee.

19 Again, this is not a new change theory presented in reply. It has
20 always been Petitioner's position that Lee's pads are and can be rounded by
21 performing an additional oxidation step following Park's teachings. That
22 position was explained in the petition and that same position, just with some
23 additional detail, replying to Patent Owner's erroneous technical
24 characterizations were set forth in its reply. The reply does nothing more
25 than clarify. The positions, as it explains, are exactly the same. Lee's
26 landing pads are rounded via oxidation.

1 Turning to slide 42, a person having ordinary skill in the art would
2 have been well aware that Lee's oxide layers can in fact be non-
3 stoichiometric such that they are able to be further oxidized. Indeed, Patent
4 Owner's own exhibits show this. This flatly contradicts Patent Owner's
5 entirely unsupported expert testimony that this material does not exist and is
6 unstable. So this slide includes an excerpt from a textbook relied on by
7 Patent Owner and its expert to show how a person having ordinary skill in
8 the art would understand 3D memory to be structured and the type of
9 materials that 3D memory employs. And as shown, the text explains that the
10 insulating layers employed can be non-stoichiometric. Once again, this type
11 of oxide includes excess silicon that is further oxidizable to produce a
12 rounded contact pad like that taught by Park.

13 And slide 43 includes two more examples of the use of this material in
14 the context of microelectronic devices and in -- and memory devices
15 specifically. So far from being unstable and unusable, the very evidence in
16 which Patent Owner itself relies, and other evidence of record, shows that
17 non-stoichiometric oxides are known and were considered acceptable for use
18 in memory devices.

19 And with that, unless there are further questions, I'll reserve my
20 additional two minutes for rebuttal.

21 JUDGE CYGAN: Okay. Thank you.

22 Counsel, how much time did you want to reserve for surrebuttal?

23 MR. MAKKER: If I could, I think we'll reserve ten and we might get
24 into that a little bit, but --

25 JUDGE CYGAN: Okay.

26 MR. MAKKER: -- I think we'll start with that.

1 JUDGE CYGAN: So 65?

2 MR. MAKKER: Yeah. I'm trying to keep the math simple rather
3 than a little bit less.

4 JUDGE CYGAN: Okay. You may start whenever you're ready.

5 MR. MAKKER: Thank you.

6 Your Honors, the petition here in this proceeding relied on unsound
7 theories. It was supported by an expert declaration that largely parroted
8 what the petition said. We know that's the case because once we deposed
9 the expert, he started recanting some of the theories in his declaration and in
10 the petition. We pointed out technical flaws in our Patent Owner's response,
11 and what we got in reply, notwithstanding what you heard, was
12 impermissibly trying to shift those theories to new theories. Ground 1, Kim
13 was single reference obviousness in the petition. What we saw in reply were
14 combinations of Kim with Nam and Kim with Park, including new
15 explanatory figures to go with the new theories. Ground 2, the petition was
16 unclear. It did not specify exactly what it meant for the insulating layer.
17 Now that we have an answer here in reply, we see it does not match the
18 claim language and ground 2 fails as well.

19 For ground 3, Petitioner's expert readily recanted the figures in the
20 petition and in his declaration that were submitted to try and explain this
21 theory. The theory did not make sense, so he recanted. What we have in
22 response in the reply as the new theory, it fares no better. Now, the Board
23 should not accept these new theories. They're beyond simply responding to
24 what was in the Patent Owner's response. They're not responsive to claim
25 construction issues. Instead, they're trying to cover up the technical flaws of
26 the petition. But that highlights something. That Petitioner is trying to

1 change those theories now in reply, is good evidence for this Board that the
2 theories that are in the petition, which control, do not demonstrate
3 obviousness.

4 If I could have slide 2 for a moment, just going to proceed in this
5 order. My colleague, Mr. Watson, will handle the ground 3 arguments.

6 If I could have slide 4. So I just want to briefly touch on Claim 19
7 and the patent. What we have on the left is the claim and the staircase
8 structure that's shown and a blow up of some of that. And what I want to do
9 with this is point out that the claim structure has a number of distinctive
10 features. You heard Petitioner's counsel try to reduce these claims to really
11 nothing, but I want to point out the important features here.

12 So first on slide 5, there is an insulating layer that's part of this
13 staircase structure. It's recited that way in the claim that it's part of the
14 staircase structure, and the insulating layer is over only a portion of the
15 conductive layer below.

16 On slide 6, we see the curved side surface of the second portion of the
17 conductive layer that is in contact with that side surface of the insulating
18 layer.

19 And slide 7, please. Then there is the insulating layer of the step
20 below that extends beyond the conductive layer, such that the conductive
21 layer is on a portion of the insulating layer, and there's a second portion that
22 is laterally displaced. Now, all of these are specifically claim structures.
23 I've highlighted the claim language showing where each one is in Claim 19.

24 And if we go to slide 8, we see that all of these claim structures work
25 together to provide benefits of the claim device. So Dr. Giapis used the --
26 Dr. Giapis is Patent Owner's expert. He used these figures here on the left to

1 explain this. And what we see is the insulating layer pushes the conductive
2 structure horizontally to the left, and the vertically curved side surface
3 increases the diagonal. And so the figure furthest to the left, the arrows are
4 larger. What that means is the minimum distance has been increased, and
5 you heard Petitioner's counsel say it, his expert has said it as well, as I put on
6 the slide. A person of skill recognizes the benefits that come from this kind
7 of structure. And that's coming from all of those claim features I talked
8 about on the previous slides, including a curved side surface that is curved in
9 the vertical direction. That's how you get the diagonal larger distance as
10 compared to other structures that don't have it curved in that direction. If it
11 were curved in the X-Y, you don't get that increase. And so all of these
12 work together, and there's no real dispute that these are benefits that are seen
13 from this claim structure.

14 I'm going to move to claim construction now with that background. If
15 I could have slide 10. So this is Patent Owner's construction, a vertical
16 surface curved in -- along a direction perpendicular to the top surface of the
17 structure. As the Federal Circuit instructs, we need to do claim construction
18 consistent with the intrinsic evidence. And I'm going to walk through how
19 the intrinsic evidence supports this construction and how Petitioner's
20 approach disregards all of that intrinsic evidence.

21 So starting with the claim language on slide 11, the claim itself
22 includes top surface contrasted with side surface. And what's key here is
23 that the word "surface" does not appear on its own. There is always a
24 modifier used in each instance of surface. So we know not all surfaces are
25 the same, and the modifiers tell us which surface is which. I think
26 Petitioner's expert or Petitioner's counsel here said that, you know, we don't

1 add modifiers. We're not adding the modifiers. The modifiers are in the
2 claim language already, but let's understand what those modifiers mean.

3 So slide 12, please. Now, there's no dispute that the top surface in this
4 claim is a horizontal surface. Petitioner's expert agrees, and just so we're all
5 on the same page, using the figure, a lot of what we see are these X-Z cross
6 sections. The horizontal X-Y is in and out of the page. And so we know
7 that top surface is horizontal. We're also going to see that side surface is
8 vertical.

9 So let's go to slide 13. I believe, Judge, you brought this up. Well,
10 the Federal Circuit says we should look to other claims to help us inform
11 claim interpretation. So Claims 1 and 2 likewise, use top surface and bottom
12 surface in contrast to the side surface.

13 And if I could have slide 15, there's no dispute that in Claims 1 and 2,
14 side surface does not include the top and bottom surface. So it's -- there are
15 no horizontal surfaces in Claims 1 and 2. That's what Petitioner's expert
16 agrees, but he seems, and Counsel today too, seem to say, well, that doesn't
17 hold in Claim 17. And in slide 16, we see that Petitioner and it -- its expert
18 in its declaration tried to say, yes, I agree that in Claims 1 and 2, it's just
19 vertical, but you have to construe it differently in Claim 19.

20 The problem with that, on slide 17, is that it's contrary to law. The
21 Federal Circuit says in in re Varma that there is a strong presumption that
22 the same phrase in different claims of the same patent mean the same thing.
23 So here, side surface, which doesn't include any horizontals is just vertical in
24 Claim 2 means the same thing in Claim 19. That presumption is only
25 overcome if it is clear that it has a different meaning. There's nothing here
26 that makes that clear. They haven't presented anything that says it's clear. In

1 fact, the use of top surface in both claims, giving that different orientation
2 and different modifiers, those modifiers being used consistently, that shows
3 that the meaning is meant to be the same. And so the claim language alone,
4 before we've even looked at any other intrinsic evidence, shows us that the
5 curve side surface is a vertical one, and it's going to be curved along that
6 direction.

7 JUDGE CYGAN: Counsel, isn't there a slight difference between
8 Claims 1 and 17 in their use of the top surface? Because the top surface in
9 Claim 17 is talking about the substrate, whereas the top surface in Claim 1 is
10 talking about the landing pad; isn't that correct?

11 MR. MAKKER: That is correct in terms of how it is claimed. I'm
12 going to point out to you when I get to the spec why that doesn't matter for
13 what we're talking about. But the point here is, what is a surface in these
14 claims? It doesn't stand alone. It has a modifier, and that modifier is really
15 what sets the orientation of the structure. And so even if it's a top surface of
16 the landing pad in Claim 1 and a top surface of the substrate, they are both
17 referring to horizontal surfaces. And so the orientation is set in both claims
18 as to top and bottom being horizontal and side being vertical. And in a
19 moment, I'm going to show you that's 100 percent consistent with the
20 specification as well. And so you get it from the claims, you get it from the
21 specification as well.

22 Now before I do that, I'm just going to note that Petitioner makes the
23 exact same mistake that its expert does, right? Petitioner has no response for
24 Varma. No response for Phillips. The only case they cited on this was the
25 Karlin case, predates Phillips, and is a claim differentiation case. The point t
26 here was different words are being used across claims. Well, this isn't a

1 claim differentiation issue, and we're talking about identical words being
2 used across claims. And without any other case, there's no answer for
3 Varma. So Varma holds, strong presumption holds, side surfaces are
4 vertical. But now let's look at the rest of the intrinsic evidence.

5 Slide 18, please.

6 So we don't read the claims in isolation. The claim is directed to a
7 staircase structure. The spec tells us what is a staircase structure. It tells us
8 in the present disclosure what it is. It's got horizontal surfaces and it's got
9 vertical surfaces. And the horizontal -- this is directly to your question,
10 Judge, the horizontal surfaces are parallel with the top surface of the
11 substrate. I've highlighted them both in blue. So we know the orientation of
12 the horizontal in Claim 17 and 19 as well, leaving the side surfaces of the
13 staircase structure as the vertical, as highlighted in purple, and, you know,
14 that's essentially where Patent Owner's construction comes from, is straight
15 out of the intrinsic evidence is this is a vertical side surface. We're just
16 trying to match what a person of skill would understand it to mean using the
17 intrinsic evidence itself.

18 JUDGE CYGAN: And, Counsel, if I understand correctly, your
19 argument here is that top and side are two different things?

20 MR. MAKKER: Correct. It's -- right. Surface is always applied with
21 a modifier. Top surfaces, bottom surfaces, different from side surfaces.
22 And we know from the intrinsic evidence which is which.

23 JUDGE CYGAN: So just, sort of, to pull you a little forward to slide
24 20, what are we to make of this -- the specification discussing a top side and
25 a bottom side?

1 MR. MAKKER: Yeah. So -- right. So Petitioner was up here and
2 really only highlighted the bottom part of this. I wanted to make sure you
3 saw the top part as well. So when top side and bottom side are introduced,
4 they're introduced along in the same sentence as top surface and bottom
5 surface. And then when it talks about top side and bottom side later, we're
6 talking about a thickness. And so if we're talking about how far away these
7 are from the substrate, we're still talking about horizontal surfaces. And
8 especially with the context of top side and top surface being put together,
9 when you see that later in the claims as a person of skill, you know that, oh,
10 you're still talking about those kinds of things.

11 Outside of this, there is no different usage of side. And certainly no
12 usage of side surface, which is what's actually claimed, that changes what
13 that meaning is. And if we just go back to slide 19 for a moment, right. The
14 consistent usage throughout the specification of top being a horizontal and
15 side -- in those few instances where it doesn't have top, and bottom, right,
16 outside of those ones we just talked about, side is consistently over 50 times
17 used for the vertical. And we've provided numerous examples in our papers
18 how step after step after step of this process, top is used to talk about
19 horizontal, side is used to talk about a vertical. And so claim language,
20 specification, all of it is saying, yes, Patent Owner's construction is correct.

21 Let's take a look at how Petitioner has handled this intrinsic evidence.
22 Slide 23 first. You heard it time and time again today, right, just the plain
23 and ordinary meaning. Let's just look at the plain and ordinary meaning.
24 Well, the Federal Circuit instructs we don't look at the plain and ordinary
25 meaning in a vacuum. That's the EON case that we cited, but we also know
26 it from Petitioner's reply. The first two sentences of their brief tries to quote

1 Thorner, but it leaves a little bit out. Let's look at slide 24. What does it
2 leave out? Well, yeah, the ordinary meaning as understood by a person of
3 ordinary skill in the art in the context of the specification and prosecution
4 history, I mean, that they leave that out is very telling because that's the
5 approach they want you to take, is to ignore the context of the intrinsic
6 evidence.

7 Slide 25, it continues. When they want to tell you what a side is, did
8 they look at the patent? No. They have their expert make up a figure that
9 has nothing to do with anything and says everything can be a side. Top,
10 bottom left, right, inside, outside. They're all sides. But like I said before,
11 the word in the claim is not side. That's the modifier. The base term is
12 surface. And so what they're saying is in the claim, and I believe he said it
13 today, any surface is a side surface. He answered one of the questions of,
14 yes, a top surface is also a side surface. Well, we know that's wrong from
15 the claim language.

16 But if we go to slide 26, what we see is that as another problem --
17 sorry, 27. No, sorry. Go back to 26. Yeah. So what that does then is it
18 reads side out of the claim, because side is the modifier, right. If every
19 surface can be a side surface, then what work is side doing in the claim?

20 But we don't read claims that way. We don't construe claims to make
21 claim language superfluous. That's Intel, SSI, that we cited in our papers.
22 Really, this is akin to the Phillips case, right. The oft-used example, steel
23 baffles. That means not all baffles are steel baffles. Side surface, not all
24 surfaces are side surfaces. It's the exact same concept. Petitioner wants you
25 to ignore Phillips and not do it that way. They mentioned Acumed today
26 and in their papers to suggest that, hey, the specification uses other words.

1 Why aren't they in the claim? It's a very narrow reading of what Acumed
2 says. Acumed, in fact, relies on the exact same Phillips principle I just
3 explained that you have to look at what the words are.

4 In Acumed, the claim said transverse holes, and one of the parties
5 wanted that to be perpendicular holes based on what was seen in the
6 specification. But when the Federal Circuit read the claims in context and
7 read the specification, the issue was that transverse and perpendicular were
8 used in the specification to have different meanings. That's why it couldn't
9 be construed as perpendicular. Here, as we've talked about, the specification
10 is consistent throughout that the side surface is a vertical.

11 JUDGE CYGAN: So Counselor, am I understanding your argument
12 correctly that the top surface is a surface which is a side. But whenever
13 you're talking about a side surface, those two -- whenever you see those
14 terms together inside the patent, they have a more specific meaning from
15 consistent usage in there. And that's overriding, sort of, those -- the
16 understanding of those separately. Is that a good way to put it or am I
17 missing --

18 MR. MAKKER: I think that's one way to think about it. I mean, I've
19 been obviously thinking about it from the claim language point of view, and
20 so top side doesn't appear in the claims. But I think if you wanted to step
21 back and abstract it a little bit like the figure on the right, there are sides to
22 something, but in the claim we're talking about surfaces. We're talking
23 about a top surface and a side surface. And if you read those claims in the
24 context of the spec, you will get a consistent usage.

25 Now, I paused on I because you said when you see side surface, and
26 I'm not sure that side surface is how it's always described in the

1 specification, but it is clear in the context that when they're referring to sides
2 of objects, they are talking about verticals, which are the side surfaces
3 claimed. Does that help?

4 JUDGE CYGAN: We'll see.

5 MR. MAKKER: Okay. Let me go to slide 28, because now I want to
6 talk a little bit about the curvature in the vertical direction that's part of the
7 construction as well. We saw that a person of skill will recognize that this
8 vertical curvature has benefits. And so when you see that as a person of
9 skill, you understand what's happening there. You're getting an increased
10 minimum distance, and that's coming because it's curved in the vertical.

11 If we go to slide 29 for a moment, there's no dispute about what is
12 shown in this figure is consistent with Patent Owner's construction. Dr. Lee
13 agreed in his deposition, he was really just quoting what he was given in his
14 declaration of Paragraph 29, that is a vertically curved surface, just like
15 Patent Owner's construction. So we all agree what we see in the figure is
16 consistent with Patent Owner's construction.

17 And if we go to slide 30, so Dr. Giapis, Patent Owner's expert, had
18 these figures in his declaration and were in our Patent Owner response. So
19 the left is really what the '666 patent is. And so this has the vertical curved
20 side surface. And if you were to look at that from above, what you would
21 see if you follow that process is it's straight in the X, Y, and that's what the
22 process, if you follow it, explains. On the right is not the '666 patent. None
23 of these figures are from the '666 patent, nor does the '666 patent describe
24 anything like this. Yet what on -- what's on the right is what Petitioner says
25 is inside the scope of this claim.

1 So there's two things to point out about that. The first is that in this
2 cross section, if you can see it, right, because the vertical curvature is gone,
3 you've lost that minimum distance improvement. So you -- you're making it
4 worse, essentially. Second, this kind of a figure and this kind of a process
5 and something that would curve in the X, Y direction, that's not described
6 anywhere in the patent. And so then you're -- you know, Petitioner is asking
7 you to construe the patent so that it wouldn't have written description
8 support. Again, something else we don't do in claim construction. So what
9 this shows --

10 JUDGE CYGAN: I'm sorry. I'm sorry, Counsel, are you saying that
11 the -- there's only written description support if it's shown in a figure?

12 MR. MAKKER: Only written scripture if it is shown in the figure?
13 What I --

14 JUDGE CYGAN: You say your argument there is that that's not the
15 '666 patent because there's no figure that shows that?

16 MR. MAKKER: Well, what I'm saying is there's -- so if you're -- if
17 you read the part about the patent and the patent that talks about how that
18 curve side surface is formed, there is no process that is described that says,
19 here's what you would do that would result in an X, Y curvature, like on the
20 top right. It -- it's just not described as something that's part of the process
21 that's described, right. This is semiconductor manufacturing. Everything is
22 made by the process, right.

23 JUDGE CYGAN: But it's not a -- it's not a product by process claim?

24 MR. MAKKER: I'm not saying it's a product by process claim, but
25 I'm saying one of skill understands these structures don't just come into
26 being. There's a process there.

1 JUDGE CYGAN: But just to be clear, Claim 19 would cover
2 anything that falls under that structure, no matter what process was made out
3 of?

4 MR. MAKKER: That is correct. Yes.

5 JUDGE CYGAN: Okay.

6 MR. MAKKER: Of course.

7 Okay. So let me go to slide 31 for a moment. Petitioner's counsel
8 touched on this a little bit today too, sort of -- and this goes to this point we
9 were just talking about, is -- you know, are we trying to limit this to an
10 embodiment? And the issue here is that not every claim of a patent has to
11 cover every embodiment in the specification. That's the AllVoice case that
12 we cited. Petitioner has not responded to that case. Has no answer for that
13 case. And so there are various patents -- various claims in this patent family.
14 And as Petitioner's counsel pointed out, Claim 1, for example, does not
15 claim a curved side surface. So there's no real reason to be looking at every
16 embodiment possible to try and figure out how to construe this particular
17 claim.

18 And we see in their papers, they make this mistake, right. They say,
19 well, take a look. Not every embodiment has contact between the insulating
20 layer and the curved side surface. Okay. Claim 17 specifically recites that
21 there is such contact. So when you start thinking about how do you construe
22 claims, you should look at what's relevant and important as opposed to
23 trying to just blindly say it covers everything.

24 If we go to slide 32, right, they said it again today, there's no
25 description of how this curved side surface is made. Well, again, they're
26 ignoring the intrinsic evidence. Dr. Giapis explained that a person of skill

1 reading these process steps, including with figure 6, that you would see that
2 there is description of poor step coverage. And that, combined with the
3 shadowing that would come from that, is what results in the curvature in the
4 vertical direction. Petitioner is ignoring that too by just saying, well, there's
5 no description of how it's made. There is a description of how it's made if
6 you are one of skill that is reading this in context.

7 Petitioner --

8 Next slide, please, 33.

9 Petitioner argues that, well, ignore that too, because there's other
10 processes that could be used that use good step coverage. Okay, but we just
11 saw that what the patent describes and how you get this curved side surface
12 and what's claimed is an embodiment using poor step coverage. Why are we
13 looking at every other embodiment that might have good step coverage?
14 And just proving that they didn't even consider it, Dr. Lee was frantically
15 looking in his deposition, where did I talk about poor step coverage? We
16 don't talk about it. They're ignoring what is in the specification, both in
17 claim construction, but also in the way that they applied the art to the claims.

18 JUDGE CYGAN: Counsel, can you clarify "curved" - is it a correct
19 characterization that there is no term "curved" outside the claims in the
20 patent?

21 MR. MAKKER: I believe that is correct.

22 JUDGE CYGAN: Okay. So can you re-summarize the portions of
23 support for your interpretation of curve?

24 MR. MAKKER: Yeah. So let me -- I'll -- I'm going to do it without a
25 couple of slides, but I'm going to do -- go back to one. So first, the claim
26 language, we have top surface, side surface. If we read that consistent with

1 claims 1 and 2, and the In re Varma case, side surface is a vertical surface.
2 That's the starting point. The claim language tells us that. I went through
3 the description of the staircase structure. If we're reading these claims both
4 consistently across claims as we should and with the specification, we know
5 that's a vertical surface.

6 If I could have slide 30.

7 And then we know that there is a benefit from the curvature that is
8 depicted in the specification figure 8, the curvature that is consistent with
9 Patent Owner's construction, there is a benefit there. The alternate option
10 that Petitioner is saying is also within the scope is not described in the
11 patent. There wouldn't be a written description support, and there's no way
12 to make a curve that would be in the X-Y direction. And so all of that claim
13 language intrinsic evidence rebutted only by extrinsic evidence of their
14 expert's made-up figure, shows that Patent Owner's construction is correct.
15 And --

16 JUDGE CYGAN: To your first point, the fact that the side is vertical,
17 does that tell you how it's curved? Because a curve in any --

18 MR. MAKKER: So the -- I think what the point here of why we spent
19 some time on that is, this is all part of a particular structure. That's where I
20 started at the top, right? I was going through those specific claimed
21 elements, and it helps you understand what that structure is, because that's
22 where the contact is with the insulating layer. And then the curvature is
23 what the benefit is in terms of that minimum distance improvement.

24 JUDGE CYGAN: Okay.

25 MR. MAKKER: And so just to close on claim construction, slide 36,
26 please. Certainly Petitioner is saying we're importing embodiments, but you

1 have to construe claims consistent with the specification. So how do you
2 reconcile these arguments? Well Petitioner's approach violates rule after
3 rule. They're reading the claims in a vacuum, they're ignoring the
4 specification, they're reading out claim language, they want you to construe
5 the same term differently across the same -- across claims of the same
6 patent, and their only response was a cutoff quote from Thorner saying, "Just
7 read it in a vacuum, plain and ordinary meaning." You know, going back to
8 the Phillips case, as you weigh all of that, it's Patent Owner's construction
9 that most naturally aligns with the patent's description and the invention and
10 the specifics in Claim 19 at issue. So federal circuit precedent essentially
11 shows that Patent Owner's is the correct construction.

12 Slide 37, please. I'm going to move off claim construction now,
13 absent any other questions, to ground 1 in Kim. There was a little bit of
14 confusion, I think, from the questions of what do we have with Kim. I
15 understand it as there's kind of two reads. One is no dispute that it does not
16 meet Patent Owner's construction. It's curved sort of as a cylinder, and then
17 there's the other ground that, it's not another ground, but another argument
18 for Kim that the pads are somehow curved to meet Patent Owner's
19 construction. I'm going to go through the cylindrical one first, and then I'll
20 touch on the second.

21 So slide 38, please. So I think we heard it. There's no dispute, the
22 cylindrical pad does not meet Patent Owner's construction. There's no
23 curvature in the vertical direction. The curve is only in the X-Y direction, so
24 when viewed from above and I'll explain why in a moment why that's part of
25 Kim's process.

1 But if we go to slide 39, just off the bat, Dr. Lee agrees, if I just look
2 at Kim, Kim does not alone show this limitation of a curved side surface in
3 contact with an insulated layer. And even if you were to not construe the
4 claim to have the vertical curvature as part of Patent Owner's construction --
5 slide 40 -- Petitioner is still reading side surface out of the claim to get there.
6 So the -- what they pointed to in their reply was, again, every single surface
7 is a side surface, and even if you take their broad dictionary, this is their own
8 dictionary here, the inner surfaces are not side surfaces. They're not the
9 right or left side, they're not away from a central point, and they're not the
10 outer surface of an object.

11 So even if you took a dictionary definition, what they have to point to
12 for contact with the side surface of an insulating layer is not shown. And
13 that's the best they can do with Kim alone, so they need to move to
14 obviousness.

15 JUDGE CYGAN: Counsel, can I take you back to slide 39 for a
16 second? That statement by Dr. Lee, that -- that's a statement on the legal
17 question, right? That's not the statement on a fact. That -- that's a statement
18 to the requirements for when something's disclosed, correct? Does he have a
19 factual basis for that, I guess is what I'm getting at?

20 MR. MAKKER: I mean, I think the question that was asked was, are
21 you saying that this is in Kim or are you saying it's obvious from Kim? And
22 he's agreeing it's not in Kim. I'm relying on obviousness to get there is kind
23 of the line of questioning there.

24 JUDGE CYGAN: Okay.

25 MR. MAKKER: So slide 41, and so the ground 1 was Kim alone,
26 right? And so the petition was ground was Kim alone. And if we go to slide

1 42, what we pointed out in our Patent Owner response was Kim only shows
2 vertical side surfaces and we went through at length, as Petitioner's counsel
3 noted, what Kim's process is and why that happens. But he seemed to be
4 saying today that, no, Kim discloses this thing on the left where we've just
5 perfectly curved it like the patent. But he didn't ever say how Kim achieves
6 that.

7 And so if we go to slide 43, the petition just said, well, obviously it
8 would be shaped that way. Well, the petition didn't tell us. Certainly the
9 expert told us how that's done. No, his sentence is identical. Obviously, it
10 would be shaped that way. There's no explanation for how you get from
11 Kim's process to the figure that they are relying on that they made up to have
12 this curved surface. They underlined this virtual -- or we underlined, but
13 they point to this virtual rectangular parallel shape. There is no description
14 of what that is. There's no explanation for why a person of skill would think
15 that that means this shape. It -- it's just ipse dixit from Dr. Lee with no
16 explanation.

17 In similar conclusory fashion, in the petition, they relied on the
18 general knowledge of a person of skill to start swapping out Kim's pads for
19 other pads. But again, I mentioned this before, this is semiconductor
20 manufacturing. These are not Lego blocks. We don't snap a pad off just
21 because I saw another one and snap another one on. A person of skill
22 understands these are process steps. Each thing is made from the last. You
23 need to understand how those process steps are going to interact to know if
24 you can actually combine prior art together. It's not as simple as, I've seen a
25 curve side surface, I guess I can just put it over here like a Lego. That's not
26 how it works. We pointed out this deficiency about how they didn't provide

1 a motivation to combine or explain any reasonable expectation of success of
2 just swapping out Kim's approach. They don't have an explanation for that
3 in their papers either.

4 What we got --

5 JUDGE CYGAN: I-- sorry. Isn't the question not so much swapping
6 in the curved surface, but the question is, Kim mentions it can have some
7 sort of a curved surface. Where's that curve located? And how would
8 someone read that to understand where the curve's located?

9 MR. MAKKER: Yeah. So maybe, let me -- I'm going to skip ahead
10 real quick and just sort of show you something. Give me slide 51, please, I
11 think.

12 Okay. So the way Kim's process works, and I was going to run
13 through this, is you put a photosensitive resin patent on top, so you're going
14 to do photolithography. And so you pattern that -- you pattern the
15 photosensitive resin to shape the pad. The thing is, you're doing that from
16 above. That's the X-Y plane only. You can make that shape, as Kim says,
17 any shape. It might have a curve, it might not have a curve, but that's an X-
18 Y plane shape, and that's it. And then what happens next, maybe just run it
19 to the next slide on 50 -- yeah, so it's still on 51. So then ions are injected
20 into those openings, so into the shapes that you've made, and they change
21 the X selectivity of what's inside that hole. Then when Kim continues, it
22 etches out the whole thing.

23 There is no description in Kim or any explanation or a suggestion that
24 you could somehow tailor this ion injection process to create this curvature.
25 And turns out, neither does any of the prior art they rely on. And that's why
26 they did not show a motivation to change Kim this way, nor did they show

1 any expectation of success in doing so, because it's not in Kim and it's not in
2 the other prior art. This is just them saying, obviously it could be done.

3 JUDGE CYGAN: Counsel, doesn't Kim, and correct me if I'm
4 misremembering this, does -- doesn't Kim say that you could form any
5 shape?

6 MR. MAKKER: It says any shape. And I think we explained with --
7 Dr. Giapis explained this in his declaration that, because of the process and
8 photolithography, we're talking about any shape from above. That's what
9 one of skill in the art would understand because Kim's process flow
10 specifically talks about shaping the landing pad using photolithography.
11 And so that's what one of skill in the art would understand when it says any
12 shape.

13 To start shaping it this way, there's no explanation for how you would
14 do that. And like I -- I'll get to, the other prior art doesn't show you how to
15 do that either.

16 JUDGE CYGAN: Thank you.

17 MR. MAKKER: Let me go to 46 for a moment. So what I wanted to
18 just point out here is -- was, you know, he tried to say they were keeping
19 Kim's process here, but if you read this sentence, "Even if a POSITA did
20 attempt to maintain much of Kim's existing process," what that means is
21 everything that they're saying is significantly changing Kim. And if we just
22 go back, the ground is single reference obviousness. They're talking about
23 changing Kim significantly. That is not single reference obviousness. That
24 is a combination, which is a shift and an improper shift that should be
25 disregarded.

1 So we started going through Kim's process. Let me skip back there
2 then. So give me 51, where we were. And then go to 52, please. So the
3 resin pattern is removed. You have these ion injected parts of the auxiliary
4 layer, and then next, slide 53. Keep going. Insulating layer comes on, next
5 layer, next -- and then that is all dug out. All of the sacrificial layer and the
6 ion injected part of the auxiliary layer is all removed.

7 Next slide, please, 55. That is what's replaced. And so in that
8 process, like I said, the ions are injected into the -- what will become PAD P
9 and the entire part of that is removed. And that's why Kim depicts, and one
10 of skilled in the art understands, you always have vertical surfaces with
11 Kim's pads. They're not going to be curved that way. So Petitioner knows
12 that's not going to work. And so they tried to say, just snap another pad in
13 there. In reply, they've abandoned that and like I said, they're moving to
14 combinations. So they rely on Kim with Park and Kim with Nam.

15 Let's talk about Park first, slide 56, please. So Dr. Lee said, yeah, the
16 rounding in Park comes from the oxidation process. We heard a little bit
17 about that from Counsel a moment ago. And I want to just walk through
18 why this doesn't work either.

19 So slide 57, the oxidation, if you see what happened just between slide
20 56 and 57, the oxidation is that teal layer that has grown on the sacrificial
21 layers, right? It's only grown on those layers. The -- in part, there has been
22 no coverage by an auxiliary layer like in Kim. You need those sacrificial
23 layers to be exposed so that when you flow oxidant, it will grow on the
24 sacrificial layers. Now, I think Counsel, maybe he misspoke. He referred to
25 this as two process steps. It's not. It's just referring to additional insulating

1 layer 40. That's just what it's called. There's not additional steps of this
2 process. It is an oxidation process and this is how it's grown.

3 One thing I want to point out on slide 58 that's important. Okay, 58.
4 Park calls the blue layers here silicon oxide. And notice how in Park's own
5 figures, there's no oxidation on the oxide. Park does not disclose oxidizing
6 oxide. And even if it says silicon oxide, what that tells you is, in this art, and
7 if you look at a lot of the -- even the stuff that's in this proceeding, one of
8 skill understands that when you see silicon oxide, I'm not talking about non-
9 stoichiometric oxide. That's really part of a, again, a new theory here that
10 was not in the petition. But the point is that, is Park is saying I'm going to
11 oxidize the sacrificial layers before anything else happens.

12 Go to slide 59, please. So then it injects ions, changes their etch ratio,
13 slide 60, ILD, slide 61, digs it out, and then you finish that up. So what
14 happens in Park is the oxidation and the rounding, that's what they're trying
15 to get to, right? A rounded side surface in the pad. That only happened
16 because you oxidized the sacrificial layer and you did it along the outside.

17 Now, if we go to slide 62 and look at the brand new combination we
18 get, their proposed combination with Park, the sacrificial layers are gone.
19 They're already removed. And so what they're saying is, why don't you
20 oxidize the oxide? Well, Park didn't say to do that. Kim doesn't say to do
21 that. And if you read Dr. Lee's testimony, he agreed that the auxiliary layer
22 in Kim 122, that's deposited. And later, in another context, he says, yeah,
23 deposited oxide, that's silicon dioxide. It's not meant to be oxidized. Yet
24 somehow that's what they're saying here.

1 And so this isn't Kim, it isn't Park, it's not rooted in the prior art, it's
2 made up and it's all hindsight to try and show a curved side surface that is
3 not part of Kim.

4 As to the non-stoichiometric part, as I said, that wasn't in the petition.
5 It's brand new in reply. I would say at best, Petitioner has shown that non-
6 stoichiometric oxides exist in microelectronic structures, but has not shown
7 specifically in 3D NAND. Exhibit 1029, while is part of 3D NAND, what
8 that shows you is that one of skill is -- needs to be explicitly told that when
9 I'm talking about silicon oxide here, I'm including both. Otherwise, it's
10 known that that's what you're talking about is silicon oxide that's not going
11 to oxidize further.

12 And if we look at slide 63, right, they had their expert cobble together
13 this sentence, that is a sentence from two disparate parts of the page, even in
14 Petitioner's demonstratives today, they just put ellipses over this entire page.
15 This is not one coherent sentence, right? This is, let me please try to find
16 non-stoichiometric and say that it exists here, too. It's not.

17 JUDGE CYGAN: Counsel, going back to your argument about the
18 combination on the previous slide --

19 MR. MAKKER: Can you go back? Yeah.

20 JUDGE CYGAN: How are you accounting for the fact that Kim isn't
21 limited to any disclosed type of etching?

22 MR. MAKKER: Any type of etching. I don't know that it -- that
23 that's what matters. I think the point that I was trying to make was the
24 etching has already happened, meaning the sacrificial layer is gone. So what
25 are you going to oxidize, right? Park -- if you're going to say you're going to
26 combine Kim with Park, Park's process is not make a rounded corner. It is a

1 manufacturing set of steps, right? And it is oxidize a sacrificial layer, and
2 because of that process, you get rounding around corners of the sacrificial
3 layers.

4 In their proposed combination, there are no sacrificial layers. They
5 already removed them. And so how do you say this is a combination of Kim
6 and Park or say that one of skill would read Kim and say, oh, maybe I'll do
7 that, too. It's not taught, there's no motivation to do it, and there's no
8 reasonable expectation of success that was given to you in the petition.

9 JUDGE CYGAN: So if I understand correctly, even if Kim uses a
10 different process, if Kim says that it's disclosed process and claim -- in
11 Figure 12 isn't the only one that could be used, no matter which process Kim
12 would use, you would still end up with the final stage where you're trying to
13 oxidize something which has already been oxidized; is that correct?

14 MR. MAKKER: I mean, I'm going off of what they're saying is their
15 combination, right? I mean, again, this is -- the semiconductors, there's a lot
16 of things that you could do, you could change a lot of different things, but if
17 we're starting from Kim, which is what ground 1 is, and saying it's obvious
18 from just Kim alone to end up with the claimed curve side surface, they have
19 not shown that. They just said it obviously would be shaped this way. And
20 when they were pressed and gave you a new combination reply, it's not Kim
21 and Park either, right? This is just made up stuff that they're backfilling to
22 try and cover up the technical holes in the petition.

23 Okay, so that's one of their new combinations. The other one is Kim
24 with Nam. If we go to 64, please. So Nam starts somewhat like this, and if
25 we go to slide 65, now in Kim, ions are injected through a photo mask into a
26 particular part of the auxiliary layer to create what Kim refers to as the PAD

1 P. By contrast, Nam is injecting ions into the sacrificial layer, right? So it's
2 going into the gray, not the blue.

3 If you go to the next slide, please, 66. And so what that does is
4 creates a damaged region in the sacrificial layer. And on slide 67, Nam
5 explains that through the process of heat, those damaged regions spread.
6 Nam only depicts that spread in the vertical direction. The damaged region
7 was in the middle, and it spread up and down. There's no spread left and
8 right. There's no description of that happening. Nam only depicts this.
9 Now, another reason why a person of skill would not then use this with Kim,
10 if we go to slide 68, I'm going to blow up the step here, keep going. So right
11 before you do the etching in Nam, there's a certain distance, right? Between
12 the conductive steps. Now, Nam's idea is I want a larger sized pad to avoid
13 punch through. So this whole process is to bulk up that pad.

14 So if you go to slide 69, that pad bulks up, but what you see is you're
15 shrinking that distance. And this is, again, minimum distance issues. And
16 so you're -- while they might be solving their punch through problem, they
17 could be creating another problem with decreasing that distance. And if we
18 go to slide 70, let's not forget what the petition itself told us about Nam's
19 process. They told us this is not a very precise process. It's going to result
20 in a range of structures. They might be bigger, they might be smaller, they
21 might extend. So the figures on the left are from the petition, and what you
22 see is the pad might grow too far to the -- well, I don't know if it's too far,
23 but it -- it's growing also to the left, right? And so if you just look at the
24 figure in the upper right for a moment, I just told you how the minimum
25 distance shrunk in Nam's process.

1 If you go to slide 71, if it bulks up like that, it's even worse. So now
2 you're making some serious problems with minimum distance and short
3 circuit risk, and what's Petitioner's answer? No, you just use that in Kim.
4 That's fine. There's no explanation for this. They don't take it on, they don't
5 try to even explain why one of skill in the art would ignore all these potential
6 problems of putting Nam's process into Kim.

7 Now, I think in the reply, they -- maybe they figured this out. Go to
8 slide 72. So instead of actually using Nam's process, they've given you now
9 another brand new process. Instead of using Nam, like Nam says in this
10 combination, we're going to inject the ions into the auxiliary layer, and even
11 though in Nam, they -- it grew vertically. Let's grow horizontally now, and
12 even though Nam is imprecise, we can make that horizontal expansion
13 perfect to suddenly give you the claimed curve side surface. This is, again,
14 not in the petition, it's made up, it's not supported, and it's clearly hindsight
15 to try and get to the curved side surface.

16 Just real briefly, on slide 73, Kim does already have a lot of features
17 trying to prevent short circuit. Slide 74 is another one, and slide 75. There's
18 all these ways that Kim has already tried to solve this problem. And as we
19 just saw, introducing new problems into this is not the way that one of skill
20 in the art would say, yes, I can get a curve side surface at the risk of
21 increasing short circuit. That's just not what one of skill in the art would do.
22 And so Petitioner ignores all that and says, yeah, just blindly do it anyway.
23 And we cited some case law about why that would not be the case.

24 So that's the end of ground 1. I was going to move to ground 2 just
25 briefly.

1 So if we go to slide 77, the petition was unclear, right? If we went
2 through, there was different figures saying, what is the insulating layer?
3 When you ask their expert, maybe it surrounds the whole thing. I heard
4 Counsel say today that it does surround the whole thing, so I might still be
5 confused. But if we go to slide 79, this is where they landed in the reply,
6 and I'm just going to explain what the problems are with this, because it's not
7 the claim structure. If you go to slide 80, right? So if we label this now, the
8 side surface of the insulating layer, the vertical surface, is way off to the
9 right. It goes past the pad, and what you have touching the pad is the bottom
10 surface. And you don't have to take my word for that. If you go to slide 81,
11 Dr. Lee looked at the same figure and said, what's the bottom surface of the
12 insulating layer? It's the contour that follows the contact pad. So one of
13 skill in the art looking at this nose, this is the bottom surface. It's not the
14 side surface.

15 And if we go to slide 82, just comparing where they landed in reply to
16 the claim language. First, the insulating layer is now not over a portion of
17 the conductive layer at all. It's over the entirety. So now we've eliminated
18 that part of the claim language, that doesn't match. You don't have it over a
19 portion at all. It's also not -- the side surface of the insulating layer is not in
20 contact with the side -- the curved side surface that they're pointing to
21 because it's way off to the right. And so now that we have a final answer,
22 we see it does not actually show obviousness of Claim 19.

23 With that, I'm going to pass it to Mr. Watson for ground 3.

24 MR. WATSON: Good afternoon. My name is Tom Watson. As my
25 colleague, Mr. Makker, previewed, I'll be discussing Petitioner's ground 3,

1 which involves the Liam Park references, and why ground 3 does not render
2 Claim 19 of the '666 patent obvious.

3 Let's go to slide 85. Ground 3 fails for four reasons. And any of these
4 three reasons jettisons and renders the claims non-obvious. So the first
5 reason is Lee cannot be oxidized to form a curved side surface. We go to the
6 next slide. There's no dispute that Lee does not teach a curved side surface.
7 If you see the figure on the left here on slide 86, that's what Lee figure 7-6
8 minus the -- or 7B minus the annotations, that's what it looks like. And so
9 you can see a straight surface there. So what Petitioner does is they say,
10 well, you know, we can curve that side surface and that's what they've done
11 when they've made their modification on the right.

12 Let's go to slide 87. So in the petition, what they propose is they
13 argue that a person aware of skill in the art would add oxidant into the
14 structure in Lee, into the -- that red box which says "oxidant." The result,
15 the Petitioner claims, would be rounding the edges of the insulating layer 22,
16 such that there would be a curved side surface between the contact pads and
17 the insulating layer.

18 If you go to the next slide, but that's technically infeasible. And the
19 reason it's technically infeasible is layer 22 of Lee is an oxide layer, and
20 that's discussed repeatedly here in Paragraph 30 of Lee shown on slide 88.
21 If we could go to slide 89, we asked Dr. Lee about this Petitioner's expert.
22 And what did he say? "Lee does not oxidize layer 22." So there's no dispute
23 Lee does not oxidize layer 22 when it's referenced. It doesn't suggest doing
24 so.

25 If we go to the next slide, slide 90. So we asked him again, layer 22 is
26 not subject to any subsequent oxidation. Dr. Lee went a step further this

1 time and even said, it's not designed to oxidize. It's not designed to be
2 oxidized. And he repeated this twice as shown here on slide 90.

3 If we go to slide 91, that testimony is consistent with Dr. Giapis,
4 Patent Owner's expert. He testified that introducing an oxide -- introducing
5 an oxidant into the openings of Lee's structure, and that's the structure here
6 on the left shown on slide 91, will not promote further oxidation to the
7 existing oxide layers 22. And he notes, "It's not possible to further oxidize
8 the solid oxide material with oxygen gas as in Park." And that's based, when
9 you read the rest of his declaration, that's based on the fundamental
10 chemistry concepts, including the octet rule and thermal dynamics.

11 Let's go to slide 92. Now Lee does oxidize a layer, but it oxidizes
12 layer 21. And what is layer 21? Well, we see in Paragraph 48, as shown
13 here on Page 92, that layer 21 it -- or excuse me. In Paragraph 30 of Lee,
14 layer 21 is made of a polysilicon or a nitride layer. The same materials that
15 we were just talking about with the Park reference. And it says that those
16 materials may be oxidized, but again, that layer is not made of oxide.

17 We go to the next slide. My colleague talked about this already, but
18 what Petitioner does is they say, well, you know, Park teaches that we could
19 oxidize the oxide layer. Well, no, that's not what Park teaches. If you look
20 at what Park teaches, it says there's an insulating layer of patterns, 12A
21 through 12F. And those are silicon oxide layers. Those are the silicon oxide
22 layers. Also teaches a sacrificial layer, layers 14A through 14F, and that
23 includes a silicon nitride layer or polysilicon layer.

24 If we go to the next slide, slide 94. And what Park discusses is
25 forming these surface -- let's go to slide 95, actually. What Park discusses is
26 adding oxidant to the sacrificial layers to form rounded pads. And this

1 comes from Dr. Lee's own testimony. We asked him, "Where is the oxidant
2 added?" And he says, "Well, it's due to the oxidation step as shown in
3 Figure 6E." Again, we're in oxidation step, and it's formed by oxidizing the
4 surface and the side surface of the step sacrificial patterns at 14A through
5 14F that are externally exposed. So again, Park doesn't teach that we're
6 going to oxidize the oxide layer. In fact it expressly teaches oxidizing other
7 layers, sacrificial layers.

8 If we go to slide 96. Another problem with Petitioner's initial theory
9 is it's also technically infeasible because of where they propose the oxidation
10 will take place.

11 Let me go back one. So go forward. Sorry.

12 MR. MAKKER: Oh, forward?

13 MR. WATSON: Yeah, right there. Oh, you went one click too far.

14 So on the left here, on slide 96, we see Dr. Lee's initial figure from his
15 declaration, and it shows where they add the oxidant. Note that it's inside
16 layer 22, and if you see what they do to make it figure -- turn into Figure 7B
17 -- you can click it. The way they get it is they say, well, it removes part of
18 layer 22. That is technically infeasible.

19 Let's go to slide 98. And Dr. Giapis testified as much. He said that
20 the oxidation process in Park is growing of an oxide layer. So it's not going
21 to remove part of layer 22, it's going to grow it, if it actually could be
22 oxidized. So there's several -- those are some fundamental technical flaws
23 with Petitioner's original theory.

24 If we go to slide 99.

25 So we provided these technical flaws in our Patent Owner's response
26 and when they -- we did, they changed their theories. They now have a new

1 tune. He -- I think Opposing Counsel just said, well, they're just some
2 technical changes. Well, those technical changes are new theories. And you
3 can see the difference in theories when you look at the two figures on the
4 screen on slide 99. On the left is Lee's original -- is their original theory
5 where the oxidant is added, resulting in the removal of layer 22 to form the
6 plain side surface. And this is reflected in the petition as well in Page 82
7 where they say it's formed in its insulating layer.

8 And so, once Petitioner and its expert recognized its mistakes, they
9 recanted this immediately. During Dr. Lee's deposition, when we asked
10 him, is there anything you want to collect in your declaration? This was one
11 of the things he pointed to, and that's at Exhibit 2010, Lines -- or Line 38, 7
12 through Page 40, Line 17. And he made clear that, you know, the oxidation
13 process is an additive process. So again, everyone agrees it's an additive
14 process and he agreed that this is an incorrect theory. So now, on the right,
15 is Petitioner's new theory. This is a changed theory.

16 Let's go to the next slide.

17 If you juxtapose them, it's pretty easiest to see --

18 One more click.

19 -- that we're talking about two separate theories. The original theory,
20 which involves the removal of layer 22, and this change theory, which now
21 says, oh, we're going to add the oxidant and it's going to curve a variety of
22 surfaces here.

23 If we go to the next slide, slide 101.

24 The other change in theory is one we noted, well, you can't oxidize an
25 oxide. That's not what happens. Well, they say, well, you know, there's this
26 type of non-stoichiometric oxide that can be further oxidized. Again, there's

1 12 prior references that Petitioner cites in its petition, not one of them
2 discuss non-stoichiometric oxide. So this is a new theory and there's a
3 number of problems with the new theory. First of all, Petitioner needs to
4 make these arguments in its petition.

5 Go to slide 102.

6 They have an obligation, as shown here from the Intelligent Bio-
7 Systems case to make their case in their petition to institute. They can't
8 make it later. But even if -- if even substantively, their arguments lack
9 merit.

10 We go to slide 103.

11 My co-counsel brought this up, but Dr. Lee admitted in his own
12 deposition that layer 22 is deposited as an oxide, so a silicon dioxide. So at
13 least one time, Dr. Lee has admitted that this is not a non-stoichiometric
14 oxide and he further notes that's not subject to any subsequent oxidations.
15 So that confirms that layer 22, when they say it's an oxide, it's not intended
16 to be further oxidized to form a curved side surface or to be further oxidized
17 in any way.

18 If we go to slide 104.

19 They asked Dr. Giapis about this new theory and so he provided an
20 answer about non-stoichiometric oxide. Shown here on slide 104, he states
21 it's unstable oxide.

22 And if you can click again.

23 "Because it's an unstable oxide, the structure will never work because
24 it will not be able to withstand the electric fields that are forming during
25 operation. It will conduct and it will corrupt all your information. It'll never
26 be on a NAND structure. It's just incompatible." As my colleague, Mr.

1 Makker, stated previously, there's nothing that Petitioner has pointed to that
2 would refute that, and certainly nothing in any of the art they provide to
3 suggest the oxidation of a non-stoichiometric oxide layer.

4 Let's go to the next slide.

5 So the second reason that ground 3 fails is even if you accept
6 Petitioner's theory that you can oxidize that layer 22 and Lee, it still fails
7 because a person of ordinary skill in the art would not be motivated to do so.
8 And that's because the oxidation, if you added it to the Lee process, would
9 actually increase the risk of failure.

10 We go to slide 106.

11 So one of the problems with their theory is it increases the risk of
12 short circuits so I'm showing here figure 5B.

13 And so, if we go to the next slide, 107.

14 So if we accept their theory that you can have non-stoichiometric
15 oxide and you add oxidant where they argue in their reply, if we have to -- if
16 we accept those theories, which again, we would argue that that's not the
17 case, that won't oxidize. If you do that --

18 Can you hit the next button?

19 -- the thickness of the pad, which we've been talking about, this is this
20 red arrow, will actually decrease in size.

21 Click one more time.

22 And the problem with that is since oxidation is an additive process,
23 this pad is going to decrease in size if you increase the -- if you -- if layer 22
24 were able to be oxidized. Why is that a problem? Well, thinner pads
25 increase the risk of short circuits to a phenomenon known as punch through.

26 If we go to the next slide.

1 As shown here on slide 109, this is the testimony of Dr. Lee and he
2 notes if the contact pad is thin, you will have a -- you would have a potential
3 shorting issue. You have this punch-through issue that we've been talking
4 about. Another flaw with Petitioner's theory --

5 You can go to the next slide, slide 110.

6 -- is it ignores other oxidation processes that would occur if layer 20 --
7 if you did add this oxidant in this place that they now say you would add
8 oxidant to. So not only do we increase the risk of electrical failure through
9 short circuits and punch through, we have a different risk of electrical
10 failure, as I'll explain here. So on the left of slide 110, you have figure 5A,
11 and this is the -- another view of what we just saw in figure 5B. And as we -
12 - just as a reminder, layers 21 are polysilicon and nitride layers and those
13 layers are intended to be oxidized. We just discussed that.

14 So if we'll go to slide 111.

15 If you were to add oxidant into that space that Petitioner says in reply
16 that you'd add oxidant to, there'd be a fundamental problem and here's what
17 would happen. You can see the width of the pad will actually shrink in size.
18 Because, again, layer 21 will also grow and it will grow out and so it will
19 grow so that the space where you're going to fill it in to form the contact pad
20 becomes smaller in the Y direction. Why is that a problem?

21 Let's go to the next slide.

22 The problem with that is you're decreasing the contact pad's width and
23 because you're decreasing the contact pad's width, that makes it harder to
24 land the contact plug, which goes into the contact pad. It makes it harder to
25 land it, which increases, again, the risk of short -- of electrical failure.

26 And so, if we go to the next slide.

1 So Petitioner argues that, well, you'd want to oxidize Lee because you
2 decrease the risk of short circuit. But if you actually did oxidize Lee, and
3 this is why processes are important, if you oxidized Lee the way they
4 suggest in reply, that would actually increase and not decrease the risk of
5 electrical failure.

6 JUDGE CYGAN: Counsel, can you clarify a point for me?

7 MR. WATSON: Sure.

8 JUDGE CYGAN: Are you arguing that in Lee, layer 22 can't be
9 etched any further?

10 MR. WATSON: What we're saying is layer 22 -- so layer 22 is the
11 insulating layer, right. And so, it's not intended to be etched. So what
12 happens --

13 JUDGE CYGAN: It seems like it is in Paragraph 38 of Lee. It says,
14 for example, the second material layer is 22 --

15 MR. WATSON: I think I misspoke. I -- what I -- what I'm trying to -
16 -

17 JUDGE CYGAN: I'm trying to make sure I have your exact point on
18 what can and can't be done. Because, for example, when you're -- when
19 Professor Giapis was -- when you go to Professor Giapis, he said it's not
20 possible to further oxidize a solid oxide material with oxygen gas as in Park.
21 Those are very -- that's a very specific statement.

22 You can't use oxygen gas to further oxidize that type of oxygen
23 material in Park's way of thinking. I want to make sure that we're matching
24 up the facts that you have about what can and can't be done with Petitioner's
25 exact argument. So if you can clarify that to me a little bit.

1 MR. WATSON: Sure. I apologize, I think I misspoke earlier. What
2 we're saying is you can't oxidize this layer 22 in Lee. And that -- I think
3 that's expressly, you know -- that's stated by Dr. Lee earlier, right. He's
4 expressly said, "This layer is not intended to be oxidized. We're not
5 intending to do that." And so, that would be my response.

6 JUDGE CYGAN: And the reason why you're saying oxidized as
7 opposed to etching is because that's Petitioner's theory, correct?

8 MR. WATSON: Exactly. That's correct. Yeah, that's correct.
9 Because Petitioner is arguing, we would take the oxidation process from
10 Park and we'd apply it to Lee. That's their theory. Yes. Thank you, Your
11 Honor.

12 And so, let's go to slide 115.

13 The Plas-Pak case, which we cited in our papers, notes that
14 combinations that change the basic principles under which the prior art was
15 designed to operate or that render the prior art inoperable for its intended
16 purpose may fail to support a conclusion of obviousness. And that's the case
17 here. Modifying Lee by adding an oxidant isn't -- even if you could oxidize
18 layer 22, which again, we say we can't.

19 But even if you could do that, you're contradicting Lee's purpose of
20 avoiding electrical failure because you're actually increasing the risk of
21 electrical failure for the reasons I've explained. So this -- forming a curved
22 side surface is not a suitable option as Petitioner claims.

23 JUDGE CYGAN: Counsel, focusing on this as a suitable option. If
24 one purpose is to prevent punch through, so you're making it bigger, why
25 would a person of ordinary skill in the art not sort of weigh that as a trade-
26 off? Well, maybe I have a little bit higher risk because I'm shortening the

1 distance between contacts. But I have this advantage of getting a -- of
2 preventing punch through because I have a thicker pad. So how should we
3 understand POSITA to weigh those two?

4 MR. WATSON: Well, I think your problem is not only having punch
5 through, you're having all these electrical failure problems. You know, it's
6 not just punch through, it's the contact pad. You're having all these
7 problems. So a person of ordinary skill in the art, when they looked at this,
8 they would not say, oh, you know, we're going to do this to get this benefit
9 of less short circuit. Because they know, well, actually if I curved it using
10 oxidation, I'm not going to have the benefit that would supposedly come
11 through a curved side surface.

12 Because now you're not getting the benefit of the curved side surface
13 in the sense that you can have a thicker pad. And so, I guess I could also go
14 and explain that a little bit with my third point, if that's okay.

15 Let's go to the third point, which is slide 3 -- slide 116.

16 Which says, "A person of ordinary skill in the art would not be
17 motivated to add a curved side surface to Lee because it's redundant of Lee's
18 protection."

19 So if we go to slide 117.

20 Lee already teaches having a sufficient distance between the
21 conductive layers to prevent deterioration. So there's already a distance
22 involved, making the curved side surface isn't going to change that. And I
23 think that goes to your question, which is: How do you weigh it? Well, we
24 already have sufficient distance. We don't need to add a curved side surface
25 to make it better. It's already sufficient distance. So what does it do?

1 Well, it also has these other problems of punch through, has the
2 problem of contact plug, electrical failure, and so all these detriments and
3 there's no benefits. And so, a person of ordinary skill in the art, they would
4 weigh it so that you would not be motivated to make that oxidation process
5 and use the oxidation process.

6 If we go to slide 118.

7 The Federal Circuit and the Kinetic Concepts case expressly notes that
8 when references independently accomplish similar functions or
9 independently operate effectively, as is the case here, there's no reason to
10 combine the features of both devices into a single device. That applies here.
11 There's already sufficient distance. There's no reason to change that.

12 If we can go to slide 119.

13 The last flaw -- another flaw with Petitioner's ground 3 is that Lee
14 lacks an insulating layer disposed of a first portion of a conductive layer.
15 My colleague mentioned this argument with Nam, and I'll briefly mention it
16 here.

17 If we go to slide 120.

18 You can see, again, the insulating layer is required to be disposed over
19 a first portion of the conducted layer. But what you have, as shown on the
20 right, is the insulating layer is disposed over the entire conductive layer.
21 That reads out the word portion and that is --

22 If we go to slide 121.

23 -- impermissible -- or it's highly disfavored in the words of the Federal
24 Circuit because it's high disfavored to just construe terms in a way that
25 renders them void, meaningless, or superfluous. And that's the Intel Corp.

1 versus Qualcomm case we cite on -- shown here on slide 121. And so, for
2 these --

3 If we can go to the next slide.

4 For these four reasons, ground 3 fails. Unless you have any further
5 questions, we save the rest of our time for rebuttal.

6 JUDGE CYGAN: Okay. You have about a minute left, so that will
7 give you 11 minutes for your surrebuttal.

8 And Petitioner you have, by my count, 17 minutes, and you may start
9 when you are ready.

10 MR. HERMAN: Thank you.

11 Thank you, Your Honors. So during its presentation today, Patent
12 Owner did a little more than highlight why the narrow clean construction, on
13 which many of its arguments rely, is improper and lacks record support. It
14 also repeatedly mischaracterized Dr. Lee's testimony, citing it out of context,
15 and using it to make points to which the testimony did not even remotely
16 apply. He did not recant any of his opinions or say anything contradictory to
17 his declarations. And as it does in his briefing, Patent Owner continued to
18 misunderstand both the petition and the prior art. No new arguments have
19 been made in this proceeding.

20 So I'll begin with claim construction. Again, Patent Owner proposes
21 that the '666 patent -- patent's claims be narrowly construed to require that
22 the claimed curved side surface be vertical and perpendicular to the top
23 surface of the substrate. It also seeks to read in a limitation that the curve be
24 in the z-axis direction only. While this construction is wrong and lacks
25 support in the claims, the specification, and the prosecution history, as I have
26 explained, it's also largely meaningless. Every single one of the prior art

1 references at issue here teaches a curved surface that is vertically oriented
2 and perpendicular to the substrate surface. All of Kim's proposed curve side
3 surfaces are vertical, including the cylindrical landing pad and the landing
4 pad that's curved when viewed from the side. Nam's curved side surface is
5 vertical. The curved surface of Lee and Park is vertical. So while it would
6 be wrong and unnecessary to insert the word "vertical" or "perpendicular"
7 into the claims as Patent Owner proposes, doing so would have absolutely
8 no impact on the issue here and does not serve to distinguish the prior art.

9 Next, with the exception of Kim's generally cylindrical landing pad,
10 every single landing pad cited in the petition is also curved in the z-axis
11 direction. Kim's rectangular pads with a curved surface are curved in the z-
12 axis direction. Nam's landing pad is curved in the Z-axis direction, and the
13 pad of Lee and Park is curved in the z-axis direction. So the claims are
14 satisfied by every prior art reference at issue, even when Patent Owner's
15 narrow interpretation of curved side surface is applied. Because of this, at
16 the end of the day, this claim construction dispute has very little bearing on
17 the issues. The art teaches what the claims require, either when properly
18 construed as having their plain and ordinary meaning, or when Patent
19 Owner's erroneous, overly narrow construction is applied.

20 Moving on to the substance of Patent Owner's claim construction,
21 Patent Owner asks the boards to improperly graft a series of narrowing
22 limitations onto the claims. Rather than allowing the claims to embrace any
23 type of curved side surface, as their plain language specifies, Patent Owner
24 seeks to limit the claims to just vertical surfaces that curve in the z-axis
25 direction. And rather than allowing contact with any side surface, which is
26 what the claims say, any side surface of the insulating layer, Patent Owner

1 seeks to graph on what is effectively a negative limitation, excluding contact
2 between the landing pad and internal or inner surfaces. The words of the
3 claim require none of that. They do not require curvature in the z-axis
4 direction only. They do not require contact with only the ends and nothing
5 else of the insulating layer. The word "curve" does not require curvature
6 along any particular axis, and a side surface can be any side, not necessarily
7 the extreme end of the insulating layer.

8 The specification also does not narrowly define these terms. Instead,
9 the specification states that the figures are only examples, the claims are not
10 to be limited to those examples, and that none of the terms it uses are meant
11 to be definitional or are meant to impose any limitation whatsoever on the
12 claims, nor is there any consistent usage of the term "side surface" in the
13 specification to refer to just z-axis curvature. In fact, there is no mention of
14 curvature at all in the specification, let alone any sort of consistent usage of
15 that term to refer to only curvature in the z-axis direction.

16 Claim I does not change this analysis. Claim I references just the side
17 surface, not a curved side surface. And as I've explained, a curved side
18 surface cannot be defined as being just vertical. It must change direction.
19 That's what a curve does. So there is no reason to limit curved side surface
20 to just z-axis curves in a specification that does not say anything at all about
21 curved side surfaces.

22 Now, as I noted in my opening remarks, while the specification does
23 reference manufacturing cost improvements, it never says what features
24 produce those improvements. It does not say, as Patent Owner implied in its
25 presentation, that only z-axis curves produce manufacturing cost
26 improvements. That statement is not in the specification. Construing the

1 way the claims the way Patent Owner proposes would require abandoning
2 both the language of the claim itself, which does not impose Patent Owner
3 limitations, and the specification, which contradicts Patent Owner by
4 explaining that the claims must be broad.

5 So in sum, Patent Owner points to absolutely nothing that would
6 require only a curve in the z-axis directions. The claims don't say it. The
7 specification does not even mention direction of curvature. Yes, a figure
8 appears to show it, but the specification unambiguously says that its claims
9 are not to be limited to what are shown in the figures.

10 Now, I'll move on to briefly address Patent Owner's characterizations
11 of Dr. Lee's testimony. It is simply not the case that Dr. Lee recanted his
12 opinions. He did no such thing. Patent Owner repeatedly pointed the board
13 to very short testimony passages, and the excerpts it showed you were
14 provided out of context and do not even remotely reflect what Dr. Lee told
15 Patent Owner.

16 For instance, Patent Owner alleges that Dr. Lee somehow admitted
17 that Kim fails to render obvious a curved side surface on his slide 39. That
18 is not what Dr. Lee testified. He explains to Patent Owner repeatedly that
19 while Kim is not anticipatory, because it does not include a figure showing a
20 curved landing pad, it is his opinion that Kim renders the claims obvious.
21 You can see that in Exhibit 210 on Page 131, Line 16, through Page 132,
22 Line 16.

23 What Patent Owner did was essentially try to quiz Dr. Lee on the legal
24 meaning of words like "teach" and "obvious," but Dr. Lee is a technical
25 expert, not a legal expert. His role in this proceeding was to discuss the
26 technology, not to opine on the differences between "anticipation" and

1 "obvious," and what words like "teach" and "obvious" mean from a legal
2 perspective.

3 On other slides, including slides 89 through 90, Patent Owner
4 characterizes Dr. Lee as admitting somehow that Lee's layers will not
5 oxidize in the way he depicts in demonstratives that are in his declaration.
6 Petitioner submits that that grossly misrepresents Dr. Lee's testimony. The
7 testimony that Patent Owner quoted does not even relate to Dr. Lee's
8 demonstrative. It relates to Lee's Figure 8B, where Lee depicts oxidation of
9 its silicon nitride layer for purposes of creating an etch stop. You can see
10 Dr. Lee explaining that to Patent Owner's Counsel in Exhibit 2024 on Page
11 184, Lines 2 through 22. So all that Dr. Lee was saying in the testimony that
12 Patent Owner quotes is that in that particular figure, Figure 8B of Lee, Lee
13 intends to oxidize the silicon nitride, not the silicon oxide. This says nothing
14 at all about what will occur when there is only silicon oxide and no silicon
15 nitride presence. Nor did Dr. Lee testify that Lee employs only silicon
16 dioxide. In fact, he told Patent Owner the opposite in Exhibit 2024 on Page
17 187, Lines 14 through 17. Of course, that testimony is nowhere to be found
18 in Patent Owner's exhibits.

19 Patent Owner also took issue with Dr. Lee's testimony regarding what
20 "poor step coverage" means, contending that he did not address that at all in
21 any of his testimony. In fact, he testified about that issue at length, spending
22 pages and pages of testimony explaining to Patent Owner's counsel what that
23 means, and what its import is to this particular proceeding in Exhibit 210 on
24 Page 81, starting at Line 22 and continuing all the way on to Page 91.

25 Next, during its presentation, Patent Owner argued that Petitioner
26 somehow made a series of new, different arguments in reply. Petitioner did

1 no such thing. Petitioner's positions are unchanged. While the reply pointed
2 out technical errors with Patent Owner's arguments, it pointed to the same
3 art and makes the same arguments that the petition made.

4 So for instance, regarding Kim, the reply did not make new arguments
5 regarding modification of Kim to employ the curved pads of Nam or Park.
6 No modification argument was made because Kim already teaches curved
7 landing pads. This is what Kim means when it says that its pads can have "a
8 curved surface based on a vertical, rectangular, parallel shape," at Column 8,
9 Lines 29 through 34.

10 While Petitioner did cite to Nam and Park, it did so only as evidence
11 of what a person having ordinary skill in the art would have understood this
12 statement in Kim to mean. Both references depict landing pads with the
13 types of curved surfaces that Kim mentions. Both references also provide
14 examples of how such pads can be manufactured, so Petitioner pointed to
15 those examples to rebut Patent Owner's argument that such a curved pad
16 cannot be made. Moreover, the fact that Park, Nam, and Yun all disclose
17 curved pads and methods to make them rebuts Patent Owner's argument that
18 there would be some sort of issue in forming such a pad in Kim.

19 As an aside, the claims here are all apparatus claims, not method of
20 manufacturer claims. All of this manufacturing discussion is largely a
21 sideshow. Kim itself renders the claims obvious because it teaches and
22 depicts curved paths, so none of this is a new argument. Pages 45 through
23 49 of the petition pointed to both Park and Nam as examples of the types of
24 curved pads a person having ordinary skill in the art would understand Kim
25 to be referencing, and Pages 50 through 51 analogize the patent

1 manufacturing methods of Kim to those able to be achieved -- to those that
2 are able to be achieved using processes like in Nam and Park.

3 Likewise, the petition's arguments regarding Nam remain unchanged.
4 It has always been Petitioner's position that Nam's layer 248 and the adjacent
5 portion of layer 271 together constitute the claimed insulating layer. That's
6 expressed in the petition on Pages 60 through 61 and 67. All the Petitioner
7 has done here is include a clarifying figure in its reply to try to clear up the
8 confusion Patent Owner is attempting to create.

9 Petitioner's arguments regarding Lee and Park are no different. It has
10 always been Petitioner's position that a curved pad would be formed in Lee
11 by applying Park's additional oxidation step to Lee's silicon oxide layers.
12 This is explained in the petition at Pages 82 through 87, where the petition
13 details what Park discloses and how Park would be applied to Lee to
14 produce a curved pad. The reply did include some clarifying figures, but the
15 argument is the same. Lee's pads would be rounded by performing the
16 further oxidation step as set forth in Park. New, clearer figures that make
17 the same argument is not a new argument. The reply simply addressed
18 Patent Owner's technical mischaracterizations, including its position that
19 Lee's oxide layers are unoxidizable, but this is a proper reply. It is directly
20 responsive to a technical error that Patent Owner and its expert interjected
21 into the record.

22 Next, it's simply wrong that Park does not teach oxidizing its existing
23 silicon oxide layer. It says it does this explicitly. In Park, in Column 8, at
24 Lines 31 through 42, Park states that the additional insulating layer 40 may
25 be rounded by an oxidation process. In other words, Park discusses

1 performing an oxidation process on an already existing oxide. That is
2 exactly what the petition said would generate a curved pad in Lee and Kim.

3 JUDGE CYGAN: Counsel, can you repeat that cite?

4 MR. HERMAN: The cite?

5 JUDGE CYGAN: To Kim, that you're -- you've just mentioned.

6 MR. HERMAN: There was a cite to Park. Park in Column 8 at Lines
7 31 through 42. Park is discussing performing an oxidation process on an
8 already existing additional insulation layer 40.

9 JUDGE CYGAN: Is that an additive oxidation?

10 MR. HERMAN: It is -- it's an additional process being performed on
11 an already existing oxide layer. So yes, it would be additive since all
12 oxidation is additive.

13 JUDGE CYGAN: So they're adding more oxidation onto an existing
14 feature as opposed to removing by oxidation?

15 MR. HERMAN: Yes, that's right. Oxidation always creates
16 additional oxide, so by performing it -- an oxidation process on an oxide,
17 you are adding to that oxide.

18 Now, there's two more points I'd like to briefly discuss. So first,
19 Patent Owner argued that Nam and Lee are somehow outside of the claims
20 because their insulation covers all of the first portion of their conductive
21 layer. But here they appear to be reading an extra portion into the '666
22 patents claims. The claims say only that the insulation be disposed over a
23 first portion of the conductive layer. They do not say that the insulation can
24 be disposed only over a portion of the first portion. That's not what the
25 claims say. The first portion is the entire length of the gate electrode,

1 including what is -- including what is underneath the landing pad. So of
2 course, the insulation will cover all of it.

3 And the last point I'd like to address is Patent Owner argued that
4 rounding will somehow result in a thinning or shrinking of the landing pads.
5 In Lee, to begin, this was entirely unsupported attorney argument. There is
6 no evidence of record or testimony that supports it. And second, it's just
7 wrong. As Dr. Lee explained in his opening declaration, which is Exhibit
8 1003, at Paragraph 412, he says the same thing in his reply declaration,
9 "Almost all rounding occurs in the corners of a landing pad. Very little
10 additional oxidation will occur on the flat surfaces of the landing pad." He
11 also explained this during his deposition. That's Exhibit 2024 on Page 154,
12 Lines 2 through 19.

13 So because oxidation is occurring only in the corners and not on the
14 flat surfaces, the pad will have the same height and width just with rounded-
15 off edges. Thus, none of the problems that Patent Owner discussed will in
16 fact occur. And with that, I'd be happy to answer any further questions the
17 board may have.

18 JUDGE CYGAN: Thank you, Counsel.

19 Patent Owner, you have 11 minutes for your surrebuttal.

20 MR. MAKKER: I'll start with this. There we go.

21 Thank you, Your Honor. It's just a few brief points. Counselor came
22 up and discussed claim construction. I would bring you back to our slide 36.
23 You didn't hear very much reliance again on anything in the intrinsic
24 evidence, like I walked you through and why the intrinsic evidence actually
25 supports Patent Owner's construction. Really, the only thing we heard from
26 the specification was the specification tries to keep things broad. I want to

1 point out one of these statements at the end of the specification that was on
2 Counselor's slides. It says, "Yes, the breadth and scope of the present
3 disclosure should not be limited by the exemplary embodiments, but should
4 be defined only in accordance with the following claims and their
5 equivalents." And I walked through why the specification points that I
6 pointed to are directly applicable to the Claim 19 that is at issue here, and
7 why the specifically claimed structures of Claim 19 relate to specific parts of
8 the specification. Counselor did not address that.

9 As to, you know, saying that we've taken Dr. Lee's testimony out of
10 context, what I would say is when Dr. Lee was uncoached and not being
11 asked questions on redirect, he answered what was in front of him and he
12 explained how these things work, and we are showing you that in that
13 uncoached moment, he is agreeing with what we are saying in terms of how
14 these things technically work. As to the step coverage point that I had made,
15 I think Counselor maybe misunderstood what I was saying. I didn't say that
16 Dr. Lee never talked about step coverage. My point was, he looked for it in
17 his opening declaration, he couldn't find it. And the reason why was
18 because the petition ignored the intrinsic record when putting together its
19 prior art. I didn't say he never talked about step coverage at some point in
20 this proceeding.

21 As to Kim and its -- the, you know, combining it with other
22 references, he's saying now that -- you know, Counselor is saying now that,
23 well, we didn't actually mean to change anything. Kim would just do this.
24 We pointed out to numerous cases in our paper POR 42 to 49, a number of
25 cases there about why you can't just say general knowledge and do it. There
26 still has to be a motivation to combine. There still has to be a reasonable

1 expectation of success. The petition failed to do that, and their reliance and
2 reply of going to combinations shows exactly why, because when you walk
3 through how these processes work, you cannot just say, oh, the pad will be
4 done. You have to think about how those processes are combined and put
5 together, and they cannot show that they work together because they don't,
6 as we went through here today.

7 If I could have slide 34. And just as a point, we all -- you know, Dr.
8 Lee clearly understands, is the structure of a landing pad determined by the
9 manufacturing process used to create it? Of course. That's what one skilled
10 in the art understands is, yes, this is a claim to an apparatus, as I agreed with
11 you, and as Counselor said. That doesn't change the fact that when you are
12 making a semiconductor memory device that is claimed, you have to
13 understand the processes. You don't just put it together like a Lego. You
14 have to understand how each process is going to interact with the other to
15 actually create the claim structure.

16 If I could have slide 57. I want to address this point about Park,
17 because I believe Counselor is really misquoting what we're talking about
18 here in Park. So we went through this. He quoted, I think, 831 to 42, so I
19 might be missing a little bit of it here. But what Dr. Lee said was, there's an
20 oxidation step, and that's what's being described in Park, is one step. It's not
21 an additional process of additional rounding. The confusion may be that
22 layer 40 is called an additional insulating layer 40, because there's insulating
23 layers in the staircase, and an additional insulating layer is grown. It's one
24 oxidation step. And what Park is doing is each sentence is telling you about
25 what's happening during that step. So the first sentence is, "The additional
26 layer is formed by oxidizing the surfaces," and side surfaces, by the way.

1 "Then the additional insulating layer maybe" -- this -- it's not an additional
2 step. We're still talking about layer 40. That layer maybe formed by doing
3 a thermal oxidation process. So you're going to oxidize to make it. That
4 might be a thermal oxidation process. And as part of that process, it may be
5 formed to have rounded sides.

6 Dr. Lee understood that. He explained, yes, there's an oxidation step,
7 and when you do that, you get rounded sides. This is not further steps where
8 further oxide is being added to the oxide. That's not what's being explained
9 here. And even if it were, that's not the point, because the -- this is thermally
10 grown oxide out of a sacrificial layer. In everything else we're talking about,
11 it's deposited oxide, such as in the stair step where, as I said before, notice
12 how no oxide grows on silicon oxide layer 12 of Park. Even though, if you
13 go to the next slide, 58, even though Park itself says that's a silicon oxide
14 layer. It's a silicon oxide layer because one of the skilled understands it's not
15 going to oxidize further when I subject it to this oxidation process. And so
16 there's not multiple steps happening, as Counselor was suggested today.
17 That's not what Park says.

18 Briefly, if I could have slide 7, actually. Just on the portion point, I --
19 I'm not really sure I understood what Counselor's point was here. The claim
20 language says it is deposited -- it's disposed -- the insulating layer is
21 disposed over a portion. If it's disposed over the whole thing, then it's just
22 disposed over the conductive layer. What's portion doing? He's read it out
23 of the claim again. So we see a consistent approach here from Petitioner that
24 we want to ignore what the claims say, we want to ignore what the intrinsic
25 evidence is. Let's just read it out of the claim so that we can show
26 obviousness.

1 And then finally, if we just go to slide 111, this last point. You know,
2 so Dr. Lee provided some explanation about oxide growth inside of this
3 area. But if you go and look at his declaration, he never gives you this view.
4 He never considers the fact that there's still sacrificial layers inside those
5 openings. He only looks at 5B. He doesn't look at 5A, and I would submit
6 to you that he's made a mistake there by not even considering the alternate
7 view.

8 Anything else? Do you want to address it? You can --

9 MR. WATSON: Yeah. I'll just address that.

10 MR. MAKKER: And my colleague, Mr. Watson, is going to make
11 one last point as well.

12 MR. WATSON: Yeah. One last point, Your Honors. Counsel
13 mentioned -- said that our test -- our argument that it would -- oxidizing
14 layer 22 would actually increase the risk of short circuit is pure attorney
15 argument. That's simply not true. Both experts admit that oxidation is a
16 growth process. And so, if you grow layer 22, or if you oxidize -- grow
17 layer 22, by definition, as an additive process, it will make it so that the
18 landing pad -- the room for the landing pad will decrease in size, making it
19 thinner. And with that, I think -- okay.

20 JUDGE CYGAN: Thank you, Patent Owner.

21 And I'd like to thank again, both counsel today for their presentations,
22 and again, for the level of preparedness and for the demonstratives, and
23 again, to our hearing staff for handling the video and in-person aspects of
24 this. Final written decision will be issued in due course. We're now off the
25 record.

1 (Whereupon, the above-entitled matter went off the record at 4:17
2 p.m.)

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