

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICRON TECHNOLOGY, INC., and MICRON SEMICONDUCTOR
PRODUCTS, INC.,

Petitioners,

v.

PALISADE TECHNOLOGIES, LLP,

Patent Owner.

Case IPR2025-01009

Patent No. 9,281,314

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	THE '314 PATENT AND THE CHALLENGED CLAIMS	1
A.	Overview of the '314 Patent	1
B.	The Challenged Claims.....	2
III.	LEVEL OF ORDINARY SKILL	3
IV.	CLAIM CONSTRUCTION.....	3
V.	APPLICABLE LEGAL STANDARD	3
A.	Obviousness	4
1.	Claims cannot be found obvious if an element is absent.	4
2.	A petition must address the <i>Graham</i> factors.....	5
3.	A petition must provide articulated reasoning with rational underpinning to combine and/or modify references.....	6
VI.	THE PETITION DOES NOT ESTABLISH A REASONABLE LIKELIHOOD OF SUCCESS.....	7
VII.	GROUND 1 FAILS.	8
A.	Limitation 1[e]	8
B.	Limitation 13[e]	11
C.	Ground 1 improperly relies on expert testimony about what a person of ordinary skill in the art “would have known” or “would have understood.” .	11
VIII.	GROUND 2 FAILS.	16
IX.	GROUND 3 FAILS.	17
A.	Limitation 1[e]	17
B.	Limitations 13[e].....	18
C.	Ground 3 improperly relies on expert testimony about what a person of ordinary skill in the art “would have understood.”	19
X.	GROUND 4 FAILS.	20
XI.	CONCLUSION.....	21

TABLE OF AUTHORITIES

<u>Cases:</u>	<u>Page(s):</u>
<i>accord Innogenetics, N.V. v. Abbott Labs.</i> , 512 F.3d 1363 (Fed. Cir. 2008)	6
<i>CFMT, Inc. v. YieldUp Int’l Corp.</i> , 349 F.3d 1333 (Fed. Cir. 2003)	4
<i>Eizo Corp. v. Barco N.V.</i> , IPR2014-00358 (PTAB July 23, 2014)	6
<i>Garmin Int’l, Inc. v. Patent of Cuozzo Speed Techs. LLC</i> , IPR2012-00001 (PTAB Jan. 9, 2013).....	5
<i>Graham v. John Deere Co.</i> , 383 U.S. 1 (1966).....	4, 5
<i>In re Kahn</i> , 441 F.3d 977 (Fed. Cir. 2006).....	6
<i>In re Rijckaert</i> , 9 F.3d 1531 (Fed. Cir. 1993).....	5
<i>In re Royka</i> , 490 F.2d 981 (C.C.P.A. 1974)	5
<i>InTouch Techs., Inc. v. VGo Comm’ns., Inc.</i> , 751 F.3d 1327 (Fed. Cir. 2014)	5
<i>Johns Manville Corp. v. Knauf Insulation, Inc.</i> , IPR2018-00827 (PTAB Oct. 16, 2018)	7
<i>KSR Int’l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007).....	5, 6

LG Elecs., Inc. v. Cellular Commc’ns Equip. LLC,
IPR2016-00197 (PTAB April 29, 2016).....6

Personal Web Techs., LLC v. Apple, Inc.,
848 F.3d 987 (Fed. Cir. 2017).....7

*Securus Techs., Inc. v. Global Tel*Link Corp.*,
701 F. App’x 971 (Fed. Cir. 2017) 7

Rules, Statutes and Other Regulations:

35 U.S.C. § 103 5

35 U.S.C. § 103(a) 4

35 U.S.C. § 311(b) 12, 16, 20

35 U.S.C. § 313 1

35 U.S.C. § 314(a) 4, 7

37 C.F.R. § 42.104(b)(4)..... 12, 16, 20

37 C.F.R. § 42.107 1

37 C.F.R. § 42.108(c).....4

TABLE OF EXHIBITS

Exhibit No.	Description
2001	Plaintiff’s Complaint for Patent Infringement, No. 7:24-cv-00262, Dkt. 1 (W.D. Tex. Oct. 16, 2024) in the District Court Litigation
2002	Scheduling Order (Dkt. No. 38) in the District Court Litigation
2003	Docket Entry List for the District Court Litigation
2004	Micron’s Invalidity Contentions Cover Document (excerpted and highlighted) in the District Court Litigation

I. INTRODUCTION

Under 35 U.S.C. § 313 and 37 C.F.R. § 42.107, Patent Owner Palisade Technologies, LLP (“Patent Owner”) submits this Preliminary Response to the Petition for *Inter Partes* Review (“Petition,” Paper 1) filed by Petitioners Micron Technology, Inc. and Micron Semiconductor Products, Inc. (collectively, “Petitioner” or “Micron”) challenging claims 1-7, 13-14, and 17-19 of U.S. Patent No. 9,281,314 (the “’314 Patent”) (Ex. 1001).

For at least the reasons detailed below, Petitioner has not met its burden of showing a reasonable likelihood of prevailing on any of its proposed grounds of unpatentability, and the Board should not institute *inter partes* review.

II. THE ’314 PATENT AND THE CHALLENGED CLAIMS

A. Overview of the ’314 Patent

The ’314 Patent relates to “non-volatile storage devices and methods for fabricating non-volatile storage devices.” Ex. 1001 at 1:50-51. The ’314 Patent describes that “[w]ith ever decreasing size of features, combating breakdown voltage can be difficult. One type of voltage breakdown occurs between neighboring word lines. As the distance between word lines decreases, breakdown voltage may become a greater problem.” *Id.* at 1:52-56. The ’314 Patent further describes that “some conventional techniques for combating breakdown voltage lead to other problems,

such as undesirably trapping charges in dielectric materials. These trapped charges can impair device performance.” *Id.* at 1:56-59.

The ’314 Patent describes that “[o]ne embodiment includes a memory device having memory cells associated with a word line. Sidewalls of the memory cells and the word line may be covered with silicon oxide.” *Id.* at 1:61-64. The ’314 Patent further describes that “[s]ilicon nitride covers the silicon oxide adjacent to the word lines, which may provide protection for the word lines during fabrication. However, silicon nitride can trap charges, which can degrade operation if the trapped charges are near a charge trapping region of a memory cell.” *Id.* at 1:64-2:1. In this embodiment, “[t]hus, the silicon nitride does not cover the silicon oxide adjacent to charge storage regions of the memory cells, which can improve device operation. For example, memory cell current may be increased.” *Id.* at 2:1-5.

B. The Challenged Claims

The Petition challenges claims 1-7, 13-14, 17-19 of the ’314 Patent. Claims 1 and 13 are the only two challenged independent claims.

Independent claim 1 recites:

1. A memory device comprising:
a plurality of lines of memory cells, the memory cells comprising:
a charge storage region having sidewalls; and
a control gate;

a plurality of word lines each having sidewalls, each of the word lines being associated with a line of the memory cells, each of the word lines being coupled to the control gates of the memory cells with which it is associated;

first oxide regions that cover the sidewalls of the charge storage regions;

second oxide regions that cover the sidewalls of the word lines;

nitride regions that cover the second oxide regions; and

electrical isolation regions other than silicon nitride adjacent to the first oxide regions that cover the sidewalls of the charge storage regions.

III. LEVEL OF ORDINARY SKILL

For the limited purpose of this Preliminary Response, Patent Owner does not contest Petitioner's definition of a person of ordinary skill in the art, but it reserves the right to do so in the event that trial is instituted.

IV. CLAIM CONSTRUCTION

Petitioner "does not believe that any term requires explicit construction". Petition at 24. Thus, for the limited purpose of this Preliminary Response, Patent Owner does not offer any terms for construction. To the extent necessary, Patent Owner reserves the right to provide claim constructions if trial is instituted.

V. APPLICABLE LEGAL STANDARD

The Board may only grant a petition for *inter partes* review if "the information presented in the petition ... shows that there is a reasonable likelihood that the

petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a); 37 C.F.R. § 42.108(c). Petitioner bears the burden of showing that this statutory threshold has been met. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756 (Aug. 14, 2012) (“The Board ... may institute a trial where the petitioner establishes that the standards for instituting the requested trial are met”).

A. Obviousness

Section 103 of the Patent Act provides that “[a] patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a). The obviousness analysis requires several threshold inquiries: the level of ordinary skill in the art must be established; the scope and content of the prior art must be determined; and any differences between the prior art and the claims at issue must be ascertained. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

1. Claims cannot be found obvious if an element is absent.

If a single element of the claim is absent from the prior art, the claim cannot be considered obvious. *See CFMT, Inc. v. YieldUp Int’l Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) (“Obviousness requires a suggestion of all limitations in a claim.”)

(citing *In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974)); *In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993) (reversing obviousness rejection where prior art did not teach or suggest all claim limitations); *Garmin Int’l, Inc. v. Patent of Cuozzo Speed Techs. LLC*, IPR2012-00001, Paper 15 at 15 (PTAB Jan. 9, 2013) (refusing to institute an *inter partes* review under 35 U.S.C. § 103 where prior art did not disclose all claim limitations).

Additionally, it is improper to use the challenged claim as a roadmap to piece together disparate disclosure using hindsight bias. See *InTouch Techs., Inc. v. VGo Comm’ns., Inc.*, 751 F.3d 1327, 1351 (Fed. Cir. 2014) (reversing obviousness where “[i]t appears that [the expert] relied on the [] patent itself as her roadmap for putting what she referred to as pieces of a ‘jigsaw puzzle’ together.”); *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (“A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning.”).

2. A petition must address the *Graham* factors.

Obviousness is resolved on a number of factual determinations “including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, and (3) the level of ordinary skill in the art.” See *Graham*, 383 U.S. at 17-18. A petition for *inter partes* review “must address the *Graham*

factors.” *Eizo Corp. v. Barco N.V.*, IPR2014-00358, Paper 11 at 29-30 (PTAB July 23, 2014).

3. A petition must provide articulated reasoning with rational underpinning to combine and/or modify references.

The conclusion of obviousness based on a combination of references must also be supported with explicit analysis of a reason to combine those references. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). The Federal Circuit has stated that such reasons must be more than “mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); *accord Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1374 (Fed. Cir. 2008) (agreeing with the district court’s reasoning that “some kind of motivation must be shown from some source, so that the jury can understand why a person of ordinary skill would have thought of either combining two or more references or modifying one to achieve the patented method”); *see also LG Elecs., Inc. v. Cellular Commc’ns Equip. LLC*, IPR2016-00197, Paper 7 at 7-11 (PTAB April 29, 2016) (faulting a petition’s obviousness analysis for lack of sufficient articulated reasons with rational underpinnings for modifying references to achieve particular elements required in the claims).

Furthermore, “[d]emonstrating that a reference is analogous art or relevant to the field of endeavor of the challenged patent is not sufficient to establish that one of ordinary skill would have had reason to combine its teachings with other prior art in the manner set forth in the claim.” *Johns Manville Corp. v. Knauf Insulation, Inc.*, IPR2018-00827, Paper 9 at 10 (PTAB Oct. 16, 2018) (citing *Securus Techs., Inc. v. Global Tel*Link Corp.*, 701 F. App’x 971, 977 (Fed. Cir. 2017) (“a broad characterization of [prior art references] as both falling within the same alleged field . . . without more, is not enough for [Petitioner] to meet its burden of presenting a sufficient rationale to support an obviousness conclusion”)). “Mere compatibility of the references is likewise not sufficient.” *Id.* (citing *Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 993 (Fed. Cir. 2017) (it is not enough to show that “a skilled artisan, once presented with the two references, would have understood that they could be combined”)).

VI. THE PETITION DOES NOT ESTABLISH A REASONABLE LIKELIHOOD OF SUCCESS.

To justify the institution of an *inter partes* review, a petitioner must establish that there is a “reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Petitioner has not met its burden of establishing a reasonable likelihood of success as

demonstrated below. Thus, the Board should deny the Petition and decline to institute this *inter partes* review.

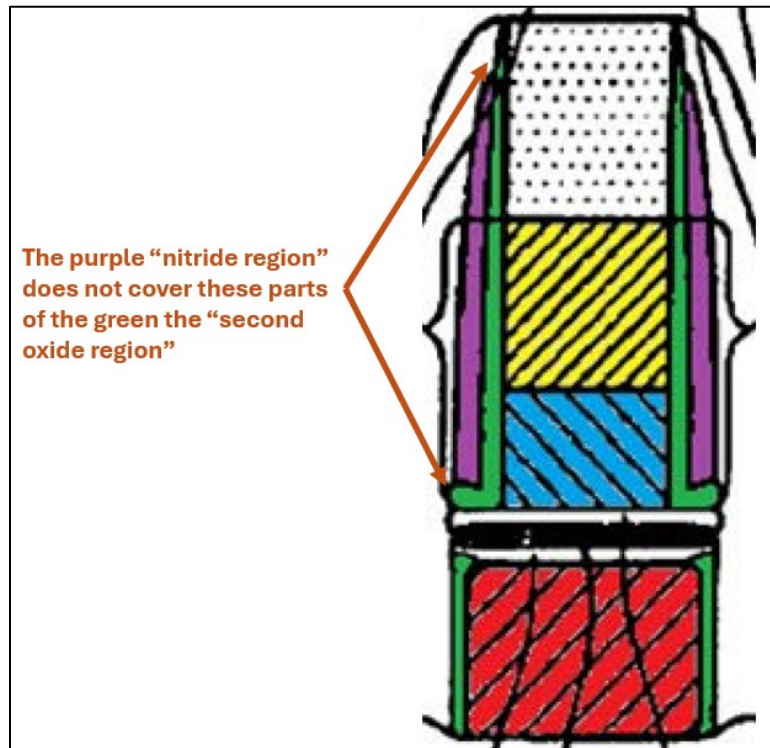
VII. GROUND 1 FAILS.

Claim 1 relies on the Kang reference as purportedly rendering obvious claims 1, 3-4, 6-7, 13, 17 and 19. Petition at 24-25. But the Petition does not show that Kang discloses several claim limitations relating to nitride regions that cover second oxide regions, i.e., limitations 1[e] and 13[e]. Because those limitations are found in the only challenged independent claims (claims 1 and 13), Ground 1 fails.

A. Limitation 1[e]

The Petition fails to show that Kang (Ex. 1005) discloses “nitride regions that cover the second oxide regions” (limitation 1[e]). The annotated excerpt of Fig. 2 below demonstrates Ground 1’s deficiency for limitation 1[e]. In that excerpted image, Petitioner annotated the green as a second oxide region and the purple as a nitride region.¹ *See, e.g.* Petition at 41. But the purple portions do not cover at least two parts of the corresponding green portions.

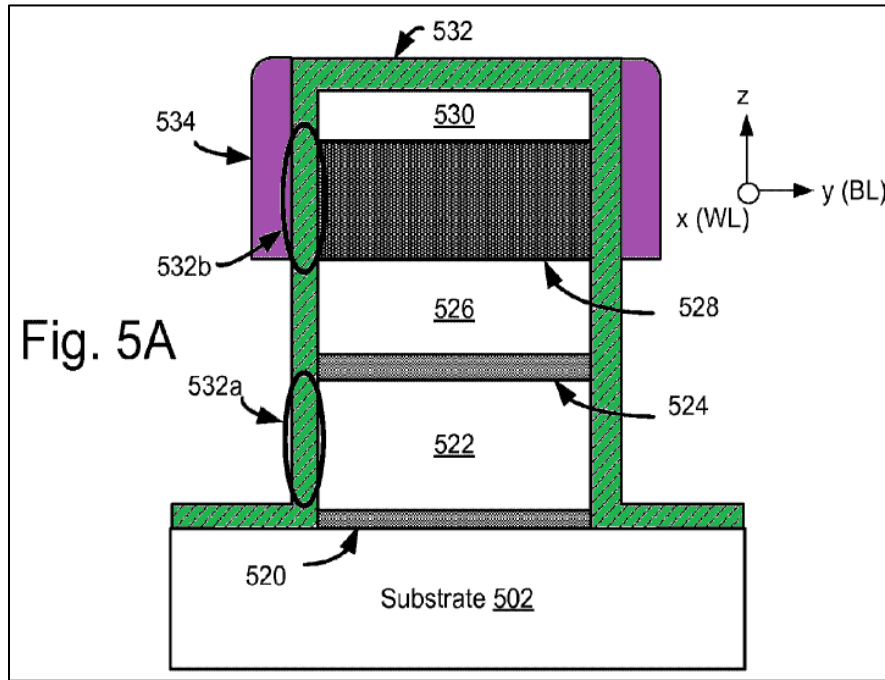
¹ In this preliminary response, claim language may be discussed in summary or shorthand for ease of reading. Any such summaries are not intended to rewrite or limit the scope of the claims, and the claim language itself still controls.



Ex. 1005 at Fig. 2 (color annotation by Petitioner, orange text and arrows by Patent Owner).

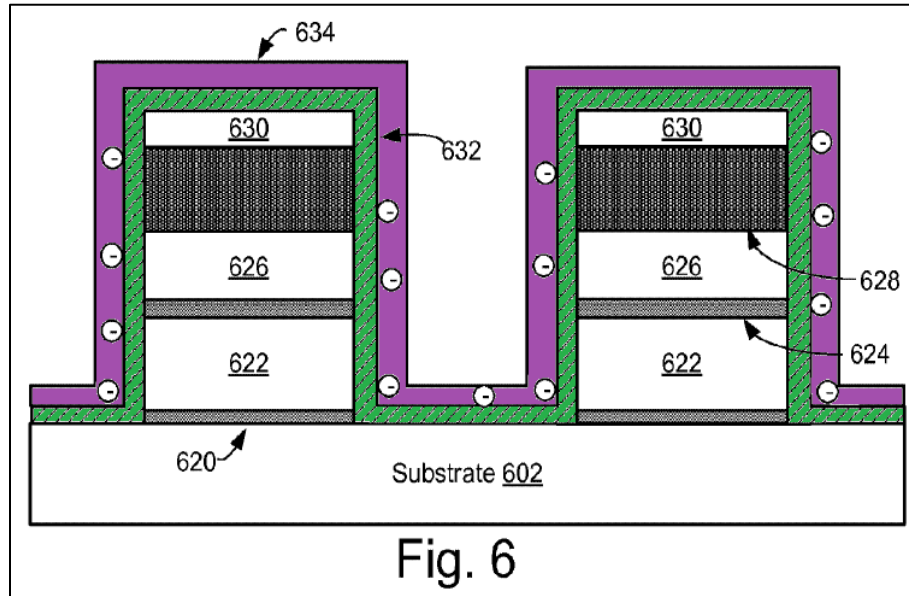
The '314 Patent explains this distinction by comparing its Fig. 5A to Fig. 6. For Fig. 5A, the specification describes that "[s]ilicon nitride region 534 [purple below] covers the sidewalls of the silicon oxide region 532 adjacent to the word line 528. Thus, the silicon nitride region 534 covers the second region 532b of silicon oxide." Ex. 1001 at 6:38-41 (emphasis added). As shown below, the purple region (534) only covers a part of the green region (532). *See also id.* at 6:27-37 (discussing the terms "covered," discussing the regions 532a and 532b that "are roughly depicted

by the circled areas” and which are adjacent to the charge storage region and word line, respectively).



But in Fig. 5A, the purple region 534 does not cover the parts of the green region 532 to which it is not adjacent. As the specification explains, “silicon nitride region 534 does not cover the sidewalls of the silicon oxide region 532 that is adjacent to the charge trapping region 522. Thus, the silicon nitride region 534 does not cover the first region 532a of silicon oxide.” *Id.* at 6:48-51 (emphasis added).

In contrast, in Fig. 6 of the '314 Patent, “[t]he silicon nitride 634 covers the sidewalls of the silicon oxide 632 that are adjacent to the charge storage regions 622.” *Id.* at 7:38-40 (emphasis added). As shown below, the silicon nitride region 634 (purple) covers the adjacent surface of the silicon oxide region 632 (green).



Given these examples in the specification, for Petitioner’s annotated portions of Kang’s Fig. 2, there are many portions of Petitioner’s identified green oxide regions that are not covered by a corresponding purple nitride region. Accordingly, Ground 1 fails because it does not disclose limitation 1[e].

B. Limitation 13[e]

For limitation 13[e], Ground 1 fails for the same reasons as for limitation 1[e]. Limitation 13[e] recites “forming nitride regions that cover the second oxide regions.” Petitioner’s only argument for limitation 13[e] is to incorporate its prior arguments for limitation 1[e]. Petition at 48. Accordingly, Ground 1 fails for limitation 13[e].

C. Ground 1 improperly relies on expert testimony about what a person of ordinary skill in the art “would have known” or “would have understood.”

Ground 1 fails because it frequently resorts to filling holes in the disclosure of the references themselves with expert testimony about what a person of ordinary skill in the art “would have known” or “would have understood.”

In her July 31, 2025, Memorandum (“July 31 Memorandum”), Director Stewart recognized the problem with using expert testimony and general declarations about what a person of ordinary skill purportedly would know. Specifically, doing such violates 37 C.F.R. § 42.104(b)(4), which requires that “[t]he petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”² Director Stewart explained that “enforcement of Rule 104(b)(4) means that applicant admitted prior art (AAPA), expert testimony, common sense, and other evidence that is not ‘prior art consisting of patents or printed publications’ (collectively, ‘general knowledge’) may not be used to supply a missing claim limitation.” July 31 Memorandum at 1 (emphasis added).

The below list shows how heavily Petitioner relies on expert testimony about what a POSITA “would have understood/known” to fill holes in the references themselves:

² It also violates 35 U.S.C. § 311(b) (“[a] petitioner in an inter partes review may request to cancel as unpatentable 1 or more claims of a patent only on a ground that could be raised under section 102 or 103 and only on the basis of prior art consisting of patents or printed publications.”) (emphasis added).

- Ground 1, element 1[a1]: “A POSITA would have understood that ‘[t]he storage of charges in...a MOSFET can be realized in two ways, which has led to the subdivision of nonvolatile semiconductor memory devices into two main classes,’ i.e., floating gate devices and charge-trapping devices. Ex-1024 at 5-6; Ex-1002³ ¶¶71, 41-44 ...” Petition at 29 (emphasis added).
- Ground 1, element 1[b]: “A POSITA would have known that Kang’s composite control gate of polysilicon and tungsten is the control gate (526) and tungsten word line (528), respectively, of the ’314 Patent. Ex-1002 ¶75.” Petition at 33 (emphasis added).
- Ground 1, element 1[b]: “Particularly, a POSITA would have understood that tungsten layer 19 acts as a word line that makes up part of second control gate 20b because tungsten layer 19 forms a conductive path that connects the control gates (i.e., polysilicon layer 17) of memory cells within a string, enabling the selection and control of data access for a specific row of cells, or page, within the NAND flash memory array. Ex-1002 ¶¶76, 45-49.” Petition at 33-34 (emphasis added).

³ Citations to “Ex-1002” are citations to Petitioner’s expert declaration.

- Ground 1, element 1[b]: “These two layers, together, make up Kang’s control gate 20b, so a POSITA would have understood that Kang’s tungsten layers 19 are coupled to the control gates 20b of the memory cells with which they are associated. Ex-1002 ¶¶79, 50 ...” Petition at 36-37 (emphasis added).
- Ground 1, element 1[c]: “A POSITA would have known that an oxide region would cover the charge storage region (floating gate 5b) under the second oxidation process, which is described as either a thermal oxidation process or an In-Situ Stream Generation (ISSG) oxide formation process. *See id.*, 11:65-12:20; Ex-1002 ¶80.” Petition at 38 (emphasis added).
- Ground 1, element 1[f]: “a POSITA would have understood that spacers 35 are adjacent to thermal oxide layer 31—i.e., first oxide regions—that cover the sidewalls of floating gate 5b—i.e., charge storage regions. Ex-1002 ¶¶87, 45-49 ...” Petition at 44 (emphasis added).
- Ground 1, element 1[f]: “Further, a POSITA would have found it obvious for Kang’s spacers 35 to be electrical isolation regions other than silicon nitride because it was well known that using an insulating

layer with a low dielectric constant would reduce parasitic capacitance between adjacent gate structures. Ex-1002 ¶88 ...” Petition at 44 (emphasis added).

- Ground 1, element 1[f]: “And a POSITA would have recognized that silicon nitride had a relatively high dielectric constant, especially in comparison to air. Ex-1002 ¶88 ...” Petition at 44 (emphasis added).
- Ground 1, claim 3: “a POSITA would have understood that tungsten layer 19 acts as a word line coupled to the polysilicon layer 17. Ex-1002 ¶¶89, 50 ...” Petition at 45 (emphasis added).
- Ground 1, claim 4: “A POSITA would have known that using a polysilicon layer doped with N-type impurities would form a conductive floating gate. Ex-1002 ¶¶90, 41-44 ...” Petition at 45 (emphasis added).
- Ground 1, claim 6: “A POSITA would have understood that a peripheral circuit ‘driving the cell array region’ would include row decoders and word line drivers connected to the word lines to enable memory access by selectively activating specific rows of memory cells for reading and writing. Ex-1002 ¶¶91, 51 ... Thus, a POSITA would have understood that Kang describes peripheral circuitry electrically

coupled to the word lines of the memory device.” Petition at 46 (emphasis added).

- Ground 1, claim 7: “A POSITA would have understood that a thermal oxide layer typically comprises silicon oxide. Ex-1002 ¶92 ...” Petition at 46 (emphasis added).
- Ground 1, claim 7: “A POSITA would have known that MTO (medium-temperature oxide) is a part of a broader thermal oxidation process that occurs at various temperatures. Ex-1002 ¶93. Thus, Kang discloses nitride regions comprising silicon nitride that cover the second oxide region and renders obvious MTO layer 23b being silicon oxide. *Id.*” Petition at 47 (emphasis added).

For each challenged independent claim (and several dependent claims) in Ground 1, Petitioner improperly relies on general knowledge instead of the disclosure of prior art or printed publications. Accordingly, Ground 1 fails for violating 37 C.F.R. § 42.104(b)(4) and 35 U.S.C. § 311(b).

VIII. GROUND 2 FAILS.

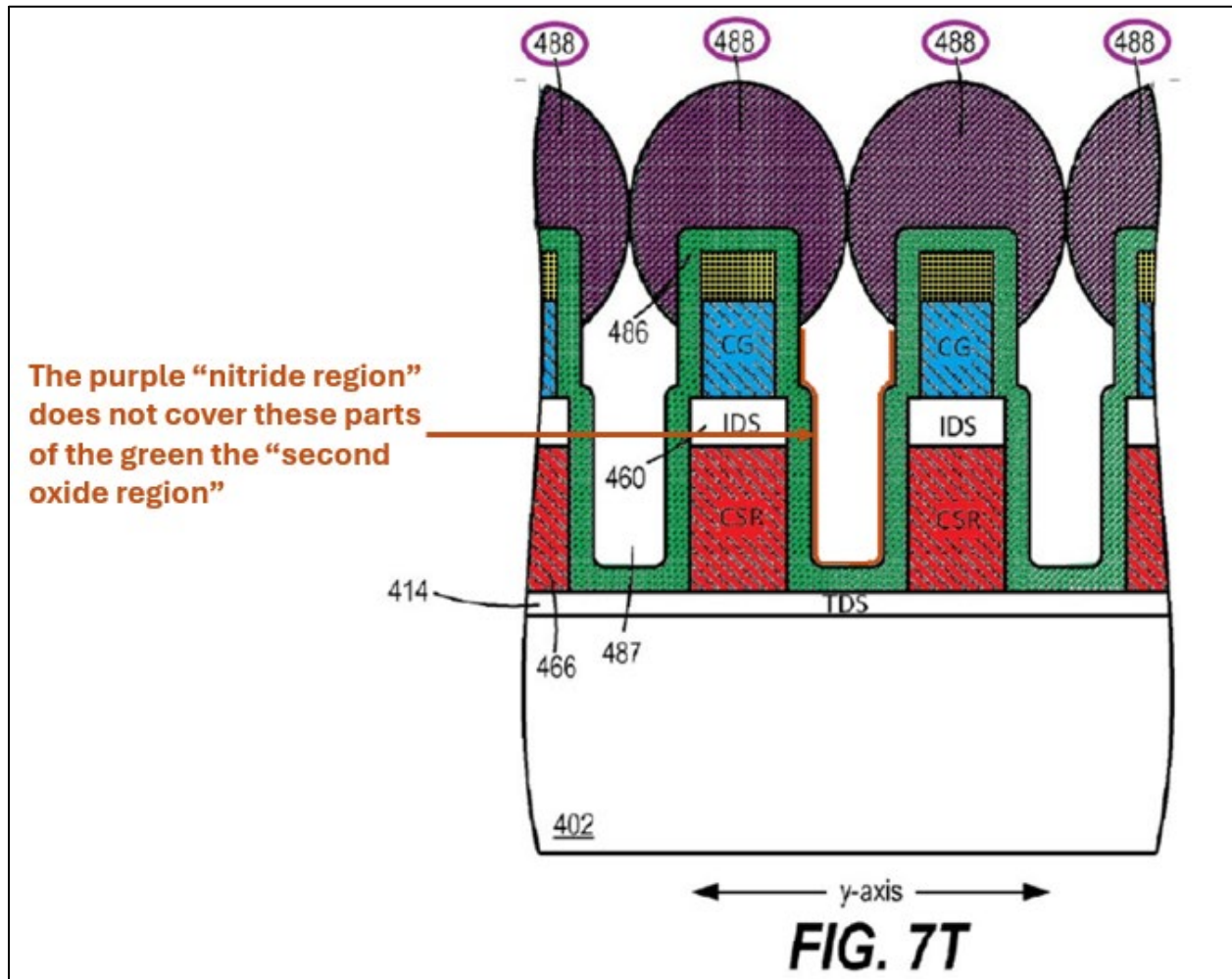
Ground 2 relies on Ground 1 for limitation 1[e]. Petition at 52. And claim 1 is the only independent claim challenged under Ground 2. *Id.* at 48. Accordingly, Ground 2 fails for the same reasons as Ground 1.

IX. GROUND 3 FAILS.

Ground 3 relies on the Purayath reference as purportedly rendering obvious independent claims 1 and 13 and dependent claims 2, 4-6, 14, and 18-19. Petition at 64. But, similar to Ground 1, the Petition does not show that Purayath discloses several claim limitations relating to nitride regions that cover second oxide regions, i.e., limitations 1[e] and 13[e]. Because those limitations are found in the only challenged independent claims (claims 1 and 13), Ground 3 fails as discussed below.

A. Limitation 1[e]

The Petition fails to show that Purayath discloses “nitride regions that cover the second oxide regions” (limitation 1[e]). The annotated excerpt of Fig. 2 below demonstrates the flaw in Purayath. In that image, Petitioner annotated the green as a second oxide region and the purple as a nitride region. *See, e.g.* Petition at 76-78. Petitioner further identified liner 486 (green) as the “second oxide regions” of element 1[d]. Petition at 76-77. But as shown in the example below, the purple portion (Petitioner’s nitride region) does not cover at least a significant section of the corresponding green portion (Petitioner’s second oxide region).



Ex. 1007 at Fig. 7T (all color annotation by Petitioner except orange lines, arrows, and text by Patent Owner).

For the same reasons as discussed for Ground 1, there are many portions of the green oxide region identified by Petitioner in Purayath that are not covered by a corresponding purple nitride region. Accordingly, Ground 3 fails because it does not disclose limitation 1[e].

B. Limitations 13[e]

For limitation 13[e], Ground 3 fails for the same reasons as for limitation 1[e]. Limitation 13[e] recites “forming nitride regions that cover the second oxide regions.” Thus, Petitioner’s only argument for limitation 13[e] is to incorporate its prior arguments for limitation 1[e]. Petition at 86. Accordingly, Ground 3 fails for limitation 13[e].

C. Ground 3 improperly relies on expert testimony about what a person of ordinary skill in the art “would have understood.”

Ground 3 fails because it frequently resorts to filling holes in the disclosure of the references themselves with expert testimony about what a person of ordinary skill in the art “would have understood.” The below list shows how heavily Petitioner relies on expert testimony about what a POSITA “would have understood/known” to fill holes in the references themselves:

- Ground 3, element 1[b]: “A POSITA would have understood that a metal silicide end portion 453 of a control gate may form a word line coupled to the control gate of the memory cell with which it is associated. Ex-1002 ¶118” Petition at 71 (emphasis added).
- Ground 3, element 1[b]: “Under this context, again a POSITA would have understood that a control gate layer having an upper portion formed from metal in Purayath would form the word line coupled to the control gate of the memory cell with which it is associated. Ex-

1002 ¶119.” Petition at 71 (emphasis added).

- Ground 3, element 1[b]: “Thus, a POSITA would have understood that Purayath’s silicided portions 453 are coupled to the control gates 452 of the memory cells with which they are associated and are associated with a line of memory cells. Ex-1002 ¶¶121, 50” Petition at 73 (emphasis added).
- Ground 3, claim 6: “Thus, a POSITA would have understood that Purayath describes peripheral circuitry electrically coupled to the word lines of the memory device. Ex-1002 ¶¶134, 51” Petition at 84 (emphasis added).

For each challenged independent claim in Ground 3, Petitioner improperly relies on general knowledge instead of the disclosure of prior art or printed publications. Accordingly, Ground 3 fails for violating 37 C.F.R. § 42.104(b)(4) and 35 U.S.C. § 311(b).

X. GROUND 4 FAILS.

Ground 4 only addresses dependent claims, but it does not address how it covers independent claims 1 and 13. Petition at 86-96. If Ground 4 is read to rely on Ground 3 to meet those independent claims, Ground 4 fails for the same reasons as

Ground 3. Otherwise Ground 4 has not shown how the independent claims are met and fails for that reason.

XI. CONCLUSION

For the reasons discussed above none of the four grounds shows that there is a reasonable likelihood that the Petitioner would prevail with respect to at least one of the claims challenged in the Petition. Thus, the Board should not institute *inter partes* review.

Dated: September 16, 2025

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing was served on September 16, 2025, to Lead and Back-up Counsel for Petitioner at the service email addresses provided in the Petition: jkappos@omm.com; vzhou@omm.com; bhaber@omm.com; tfink@omm.com; preinbold@omm.com; OMMPALISADEMICRON@omm.com.

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CERTIFICATE OF COMPLIANCE

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/s/ David T. DeZern
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