

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION,
Petitioner,

v.

INSTITUTE OF MICROELECTRONICS,
CHINESE ACADEMY OF SCIENCES,
Patent Owner.

IPR2018-01574
Patent 9,070,719 B2

Before DONNA M. PRAISS, JO-ANNE M. KOKOSKI, and
CHRISTOPHER M. KAISER, *Administrative Patent Judges*.

KAISER, *Administrative Patent Judge*.

DECISION
Denying Petitioner's Request on Rehearing of
Decision Denying Institution of *Inter Partes* Review
37 C.F.R. § 42.71(d)

INTRODUCTION

Intel Corporation (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–3, 6, and 7 of U.S. Patent No. 9,070,719 B2 (Ex. 1001, “the ’719 patent”) on eight asserted grounds:

Claims	35 U.S.C. §	Reference(s)/Basis
1, 2, 6	102	Liaw ¹
7	103(a)	Liaw, Kim ²
1–3, 6	103(a)	Okuno, ³ Liaw
7	103(a)	Okuno, Liaw, Kim
1–3, 6	103(a)	Mandelman, ⁴ Liaw
7	103(a)	Mandelman, Liaw, Kim
1–3, 6	103(a)	Okuno, Chang ⁵
7	103(a)	Okuno, Chang, Kim

Petitioner supported its challenges with the Declaration of Dr. Scott Thompson, dated September 18, 2018 (Ex. 1002).

Institute of Microelectronics, Chinese Academy of Sciences (“Patent Owner”) filed a Preliminary Response (Paper 11, “Prelim. Resp.”). With our authorization, Petitioner filed a Reply to the Preliminary Response

¹ US 9,362,290 B2, issued June 7, 2016 (Ex. 1003).

² US 2006/0175669 A1, published Aug. 10, 2006 (Ex. 1010).

³ US 2009/0309141 A1, published Dec. 17, 2009 (Ex. 1005).

⁴ US 2008/0251934 A1, published Oct. 16, 2008 (Ex. 1006).

⁵ US 7,335,583 B2, issued Feb. 26, 2008 (Ex. 1004).

(Paper 16, “Reply”), and Patent Owner filed a Sur-Reply (Paper 17, “Sur-Reply”).

In the Decision on Institution (Paper 18, “Decision” or “Inst. Dec.”), we determined that the Petition failed to establish a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one challenged claim, so we denied institution of an *inter partes* review on the asserted grounds. Specifically, we determined that each of Petitioner’s asserted grounds relied on the inherency of a particular result (the “forming a dielectric spacer surrounding the gate line” recited in the challenged claims) in the processes disclosed in the prior art, and we determined that the evidence of record did not show sufficiently that this result was inherent in those processes. Inst. Dec. 10–27.

Petitioner filed a Request for Rehearing (Paper 19, “Req. Reh’g”) seeking rehearing of our Decision. Simultaneously, Petitioner also sought review of our Decision by the Precedential Opinion Panel (“POP”). Paper 20; Ex. 3001. POP considered and denied the request to review our Decision. Paper 21. We have considered Petitioner’s Request for Rehearing and, for the reasons set forth below, we deny the requested relief.

STANDARD OF REVIEW

A party requesting rehearing bears the burden of showing that a decision should be modified. 37 C.F.R. § 42.71(d) (2018). The party must identify all matters it believes the Board misapprehended or overlooked, and the place where each matter was addressed previously in a motion, an opposition, or a reply. *Id.* When rehearing a decision on a petition, we review the decision for an abuse of discretion. 37 C.F.R. § 42.71(c). An abuse of discretion occurs when a “decision was based on an erroneous

conclusion of law or clearly erroneous factual findings, or . . . a clear error of judgment.” *PPG Indus. Inc. v. Celanese Polymer Specialties Co.*, 840 F.2d 1565, 1567 (Fed. Cir. 1988) (citations omitted).

DISCUSSION

Petitioner argues that we abused our discretion in five respects. Req. Reh’g 6–15. We consider each of Petitioner’s arguments below.

A. Alleged Error by Distinguishing Prior Art Based on Unclaimed Method Steps After Blanket Deposition

Each of the claims challenged in the Petition recites “forming a dielectric spacer surrounding the gate line.” Ex. 1001, 10:19–57. In its anticipation ground, to show such formation, Petitioner directed us to Liaw’s disclosure of “blanket depositing a spacer layer,” followed “by anisotropically etching to remove the spacer layer from the horizontal surfaces of the structure.” Pet. 33 (quoting Ex. 1003, 7:35–38). Petitioner argued that this process inherently “leaves dielectric sidewall spacer material on all vertical surfaces (or sidewalls) of the gate line,” resulting in a spacer surrounding the gate line. *Id.* (citing Ex. 1002 ¶ 223). In the testimony cited in the Petition, Dr. Thompson testified that “Liaw’s sidewall spacers surrounded the gate line” because, “[a]fter [Liaw’s] etching step, dielectric sidewall spacer material was left on the perimeter of the gate (i.e., spacers on the long lateral sides and at the end faces of the gate line).” Ex. 1002 ¶ 223. Similarly, in its obviousness grounds, Petitioner directed us to evidence in Okuno and Mandelman of prior-art processes similar to that disclosed by Liaw, relying on formation of a spacer surrounding a gate line as the inherent result of such processes. Pet. 49–50, 62–63.

We were not persuaded by these arguments in our Decision. Inst. Dec. 10–13. Instead, we noted that a portion of Liaw identified in the Preliminary Response disclosed a process of blanket deposition followed by anisotropic etching—the same type of process as that identified by Petitioner—in which the result was a spacer only on the long sides of a structure, rather than surrounding that structure. *Id.* Given this disclosure, we were not persuaded that Liaw’s mere disclosure of a process of blanket deposition followed by anisotropic etching was “sufficient to show that Liaw discloses a process of spacer formation that results in spacer material being placed on all side surfaces of the gate line.” *Id.* at 12. Similarly, we were not persuaded that Petitioner had shown sufficiently that the processes taught by Okuno and Mandelman inherently resulted in the formation of spacers that surrounded gate lines. *Id.* at 18–19, 22–23.

In the Rehearing Request, Petitioner now argues that “blanket deposition alone,” without any later anisotropic etching, forms a spacer surrounding the gate line, “satisf[y]ing the limitation at issue.” Req. Reh’g 7–9. This is a new argument, not previously presented by Petitioner. As noted above, Petitioner argued previously that Liaw’s entire process (including both blanket deposition and the anisotropic etching that follows) “leaves dielectric sidewall spacer material on all vertical surfaces (or sidewalls) of the gate line.” Pet. 33. Similarly, Dr. Thompson testified that “Liaw’s sidewall spacers surrounded the gate line” because, “[a]fter [Liaw’s] etching step, dielectric sidewall spacer material was left on the perimeter of the gate (i.e., spacers on the long lateral sides and at the end faces of the gate line).” Ex. 1002 ¶ 223. Dr. Thompson also testified that the process described in the challenged patent (including both “blanket

deposition” and “Reactive Ion Etching”) “resulted in sidewall spacers that ‘surround the respective gate lines.’” *Id.* ¶¶ 269–270 (quoting Ex. 1001, 6:11–23). Petitioner argued the same. Pet. 33. In addition, Petitioner argued that Mandelman produced its spacers by blanket deposition followed by “reactive ion etching or plasma etching.” *Id.* at 62–63; *see also* Ex. 1002 ¶ 317 (Dr. Thompson testifying that Mandelman produces its spacers in this way). Thus, Petitioner’s argument on rehearing that a spacer surrounding the gate line would have been formed by blanket deposition alone, even in the absence of etching, is new. The presentation of such a new argument violates the requirement that Petitioner identify the place in the record where it previously addressed any argument it raises in the Rehearing Request. 37 C.F.R. § 42.71(d). Accordingly, this new argument is improper on rehearing, and we do not consider the merits of this argument.

B. Alleged Error by Distinguishing Prior Art Based on Unclaimed Method Steps After Anisotropic Etching

Next, Petitioner argues that we abused our discretion by interpreting the Liaw process resulting in spacer material only on the long lateral sides of the dummy layers as including only blanket deposition and anisotropic etching. Req. Reh’g 9–10. Petitioner argues that instead, we should have interpreted that process as including an additional, later step in which the spacer material left on the end faces of the dummy layers is removed. *Id.*

We do not find this argument persuasive of an abuse of discretion. Although Liaw states that its process of anisotropic etching “remov[es] the spacer layer 210 from the horizontal surfaces of the structure,” it also states that this process creates first spacers 211 from spacer layer 210. Ex. 1003, 4:4–6. The result of Liaw’s process of blanket deposition followed by

anisotropic etching is a lack of spacer material on the end faces of dummy layers 207 and 209, even though those end faces are vertical surfaces that were covered by spacer layer 210. *Id.* at 3:61–4:6, Fig. 2C. Petitioner argues that a process including only the blanket deposition and anisotropic etching that Liaw discloses could not produce this result, and Petitioner hypothesizes the existence of another process step not disclosed in Liaw, but Petitioner does not direct us to any evidence to support this argument. Req. Reh’g 9. Without evidence of an additional process step in Liaw that we did not understand was present, we do not find that our interpretation of Liaw as missing such a step was an abuse of discretion. Petitioner’s attorney argument does not take the place of that evidence. *Enzo Biochem, Inc. v. Gen-Probe, Inc.*, 424 F.3d 1276, 1284 (Fed. Cir. 2005) (“Attorney argument is no substitute for evidence.”). Accordingly, we are not persuaded that this argument shows an abuse of discretion.

C. Alleged Error by Misapprehending Figure 2C of Liaw

In reaching our conclusion that Liaw’s process of blanket deposition followed by anisotropic etching need not necessarily result in spacer material left on all side surfaces of a gate line, we relied on Liaw’s Figure 2C and the description of that figure. Inst. Dec. 8–13. Petitioner argues that we misapprehended Figure 2C. Req. Reh’g 10–13. To assist in understanding Petitioner’s argument and our analysis, we reproduce Figure 2C below:

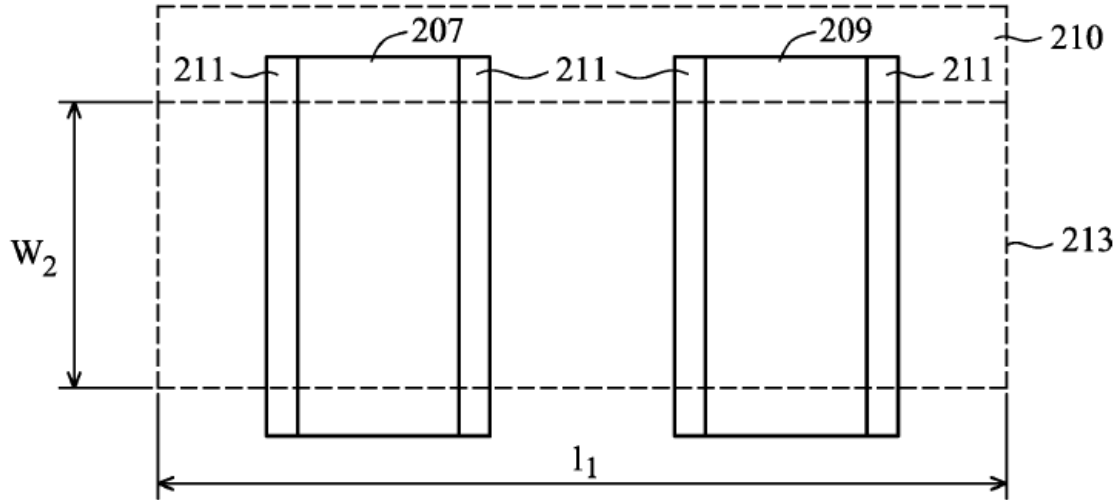


Figure 2C

Figure 2C “illustrate[s] process steps in the formation of a fin in accordance with an embodiment” of Liaw. Ex. 1003, 2:20–21. In particular, Figure 2C depicts dummy layers 207 and 209 along whose sidewalls first spacers 211 are formed. *Id.* at 3:61–62. A dashed line illustrates the placement over dummy layers 207 and 209 of spacer layer 210, which is anisotropically etched to produce first spacers 211. *Id.* at 3:62–4:6.

In our Decision, we described spacer layer 210 as “covering one end of dummy layers 207 and 209.” Inst. Dec. 12. In the Rehearing Request, Petitioner takes issue with this description, arguing that we misinterpreted Figure 2C as depicting spacer layer 210 covering *only* one end of each dummy layer. Req. Reh’g 11–12. In particular, Petitioner argues that our “factual finding that spacer layer 210 covers only one end of the structure was not supported by substantial evidence.” *Id.* at 12.

We are not persuaded that we misapprehended Liaw’s Figure 2C. First, at no point did we make a factual finding that spacer layer 210 covered

“only one end of” dummy layers 207 and 209, as Petitioner contends. Req. Reh’g 12. Instead, we noted that, despite Figure 2C showing coverage of one end of Liaw’s dummy layers, the anisotropic etching of the spacer layer left behind first spacers 211 on only the long lateral sides of the dummy layers, as opposed to additionally on their end faces. Inst. Dec. 12. That we described Figure 2C as depicting coverage of “one end” of dummy layers 207 and 209 by spacer layer 210 was not a finding that the spacer layer actually covered “only one end” of the dummy layers, as Petitioner argues, but rather a description of what Figure 2C shows. *Id.*; Req. Reh’g 12. As can be seen above, Figure 2C in fact depicts spacer layer 210 covering only one end of the gate lines, but our conclusion did not depend on the spacer layer actually covering only a single end of the dummy layers, nor did we find that the spacer layer did so. Thus, we are not persuaded that this argument shows an abuse of discretion.

Petitioner also argues that we abused our discretion by “focusing solely on Liaw’s Fig. 2C, ignoring the portions of Liaw relied on by [Petitioner] and the balance of the unrebutted evidence which uniformly established that a person of ordinary skill would have envisaged Liaw’s dielectric spacer layer as surrounding the gate line.” Req. Reh’g 12–13. We did not ignore any evidence. As discussed above, Petitioner argued that Liaw’s process of blanket deposition followed by anisotropic etching inherently would produce as a result the “spacer surrounding the gate line” recited in the challenged claims. A reference inherently discloses an element of a claim “if that missing characteristic is necessarily present, or inherent, in the single anticipating reference.” *Schering Corp. v. Geneva Pharms.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003) (citation omitted).

“Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient.” *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010) (citing *Cont’l Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1269 (Fed. Cir. 1991)). Here, Dr. Thompson testified that Liaw’s process would result in the formation of spacers surrounding the gate lines, Ex. 1002 ¶ 223, but Liaw itself showed that a process of blanket deposition followed by anisotropic etching need not necessarily produce that result. Ex. 1003, 3:61–4:6, Fig. 2C. That our Decision focused on the evidence demonstrating the failure of Petitioner’s inherency argument does not mean that we ignored any other evidence. Accordingly, we are not persuaded that this argument shows an abuse of discretion.

D. Alleged Error by Applying Misapprehension of Liaw to Obviousness Grounds

Petitioner next argues that we abused our discretion by applying our alleged misapprehension of the teachings of Liaw to Petitioner’s asserted obviousness grounds. Req. Reh’g 13. As discussed above, we are not persuaded that we misapprehended the teachings of Liaw. Accordingly, we are not persuaded that this argument shows an abuse of discretion.

Petitioner also argues that we abused our discretion by “misapprehending Okuno’s teachings.” *Id.* at 13–14. In particular, Petitioner takes issue with our statement that “Okuno states that its sidewall spacers ‘are provided only in the longitudinal direction of the gate (i.e. along the gate length direction),’ which is evidence that the spacers actually are not placed on the end faces of the gate lines.” *Id.* at 13 (quoting Inst. Dec. 18).

Petitioner argues that this statement in Okuno should be interpreted to mean only that no spacer material is present on the ends of the gates that are created after the gate lines and their associated spacers are cut into separate gate structures, not the original ends of the gate line that exist at the time of blanket deposition and etching. *Id.* But our conclusion that Okuno does not teach or suggest forming a spacer surrounding the gate line did not rely exclusively on the teaching that Okuno’s spacers “are provided only in the longitudinal direction of the gate (i.e. along the gate length direction).” Ex. 1005 ¶ 28. Instead, we concluded that the disclosure of a process of blanket deposition followed by anisotropic etching in Okuno was insufficient “to show that Okuno teaches or suggests a process of spacer formation that results in spacer material being placed on all side surfaces of the gate line.” Inst. Dec. 18–19. This determination relied on our conclusion that, given the disclosure of Liaw, Petitioner had not shown that a process like that disclosed in Okuno would inherently result in the recited “forming a spacer surrounding the gate line.” *Id.* Thus, we are not persuaded that Petitioner’s argument that we misapprehended Okuno’s teaching that its spacers “are provided only in the longitudinal direction of the gate” shows an abuse of discretion.

E. Alleged Error by Concluding that Petitioner’s Unrebutted Evidence Was Insufficient to Show a Reasonable Likelihood of Prevailing

Finally, Petitioner argues that, given that it presented “unrebutted expert evidence” supporting its arguments, we abused our discretion by failing to find a reasonable likelihood of Petitioner prevailing in showing the unpatentability of at least one challenged claim. Req. Reh’g 14–15. In particular, Petitioner argues that “issues relating to unrebutted expert

testimony regarding reference disclosure and the understanding of a skilled person” are properly reserved for trial on the merits, rather than resolved at the institution stage. *Id.* at 14 (quoting *Enercorp Sand Sols. Inc. v. Specialized Desanders Inc.*, IPR2018-01748, Paper 7 at 26, 32 (PTAB Feb. 25, 2019)).

There are multiple problems with this argument. First, Petitioner is incorrect when it describes Dr. Thompson’s testimony as “unrebutted.” Dr. Thompson testified that Liaw’s process of blanket deposition followed by anisotropic etching necessarily produces a spacer that surrounds a gate line. Ex. 1002 ¶ 223; *see also* Ex. 1002 ¶ 227 (testifying that a process of “blanket deposition and [reactive ion etching] removed deposited sidewall spacer material from horizontal surfaces,” leaving “sidewall spacer material on vertical surfaces,” including the “end faces of the gate line”). But, as discussed at length above and in our Decision, Liaw itself discloses that a process of blanket deposition followed by anisotropic etching does not necessarily result in a spacer that surrounds the structure on which the spacer is constructed. Dr. Thompson’s testimony that a given result necessarily occurs cannot reasonably be described as “unrebutted” where the prior art demonstrates that result need not necessarily occur.

Moreover, the decisions Petitioner cites as compelling us to institute review any time there is alleged to be a dispute between expert witness testimony and the prior art⁶ do not require that result. First, none of these

⁶ In addition to *Enercorp*, cited above, Petitioner cites the PTAB decisions in *Kokusai Elec. Corp. v. ASM IP Holding B.V.*, IPR2018-01357, Paper 11 at 25, 29 (PTAB Jan. 18, 2019), and *Hyperbranch Med. Tech., Inc. v. Confluent Surgical, Inc.*, IPR2018-01099, Paper 14 at 30 (PTAB Nov. 27, 2018).

decisions is precedential, so they are not binding on us. Even if these decisions were binding precedent, none of them presents a situation in which the expert testimony supporting a petitioner's position was rebutted by the disclosure of the prior art. No evidence in *Enercorp* contradicted the petitioner's evidence. IPR2018-01748, Paper 7 at 32 ("Absent evidence to the contrary, Petitioner's position is sufficient for institution purposes."). Likewise, in both *Kokusai* and *Hyperbranch*, the petitioner's evidence had not been rebutted. IPR2018-01357, Paper 11 at 25 ("Petitioner's evidence stands unrebutted As such, Petitioner's evidence is sufficient to present a reasonable likelihood of prevailing as to this ground."); IPR2018-01099, Paper 14 at 30 ("At present, Petitioner's evidence stands unrebutted and is sufficient to present a reasonable likelihood of prevailing as to this first ground."). Thus, none of these decisions controls the outcome here, where, as explained above, the prior art rebuts the expert testimony. Accordingly, we are not persuaded that this argument shows an abuse of discretion.

CONCLUSION

For the foregoing reasons, Petitioner has not demonstrated that we abused our discretion in declining to institute an *inter partes* review of claims 1–3, 6, and 7 of the '719 patent.

ORDER

It is hereby

ORDERED that the Request for Rehearing is denied.

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