

Case IPR2024-00535
U.S. Patent No. 9,724,802

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Samsung Electronics Co., Ltd.,
Samsung Electronics America, Inc.,
Samsung Semiconductor, Inc., and
Samsung Austin Semiconductor, LLC,
Petitioner

v.

Chien-Min Sung,
Patent Owner

Case IPR2024-00535

U.S. Patent No. 9,724,802

**PETITIONER SAMSUNG'S
AUTHORIZED RESPONSE TO DIRECTOR REVIEW REQUEST**

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Patent Trial and Appeal Board
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1004	Tsai et al., “Organic diamond disk versus brazed diamond disk for dressing a chemical-mechanical polishing pad,” <i>Diamond & Related Materials</i> , 23, 2012, 144-149 (“Tsai”)
1005	U.S. Patent Application Publication No. 2007/0060026 (“Sung’026”)
1006	“The Organic Diamond Disk (ODD) for Dressing of Polishing Pads of Chemical Mechanical Planarization”, International Conference on Planarization / CMP Technology, 25-27 October 2007 (“SungICPT”)
1007	Fenna, Donald. “Hardness Numbers,” <i>A Dictionary of Weights, Measures, and Units</i> , 1st ed., Oxford University Press, 2004.
1008	Tsai et al., “Effect of CMP conditioner diamond shape on pad topography and oxide wafer performances,” <i>Int. J. Adv. Manuf. Technology</i> , 55: 253-262 (2011)
1009	U.S. Patent Application Publication No. 2008/0292869 (“Sung’869”)
1010	U.S. Patent Application Publication No. 2010/0248595 (“Dinh-Ngoc”)
1011	Declaration of Dr. [Chien-Min] James Sung In Support of Plaintiff’s Answering Brief In Opposition To Defendant’s Motion To Stay in <i>Chien-Min Sung v. Kinik Co.</i> , 1:20-cv-00247-RGA
1012	Order Denying Stay in <i>Chien-Min Sung v. Kinik Co.</i> , 1:20-cv-00247-RGA
1013	Ishizuka et al. “PCD Dressers for Chemical Mechanical Planarization with Uniform Polishing”, Proceedings of International Conference on Leading Edge Manufacturing in 21 st Century: LEM21, 2007, Volume 2007.4
1014	U.S. Patent No. 5,036,015
1015	Pysher et al. “Design, Characteristics and Performance of Diamond Pad Conditioners”, Materials Research Society Symposium Procedures, Vol. 1249, 2010 (“Pysher”)

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1016	<i>Design, Characteristics and Performance of Diamond Pad Conditioners</i> . SpringerLink. https://link.springer.com/article/10.1557/PROC-1249-E02-04
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1022	Webpage of Diamond and related materials vol. 23, archived on May 9, 2012, by Internet Archive, available at https://web.archive.org/web/20120509185427/http://www.sciencedirect.com/science/journal/09259635/23 , accessed and obtained on February 11, 2024
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1038	<i>Chien-Min Sung v. Samsung Electronics Co. Ltd., et al.</i> , Case No. 4:23-cv-00752 (E.D. Tex.), 56 (Motion To Stay Pending Resolution of TI MSJ)
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1060	Declaration of Alex Chan In Support Of Plaintiff’s Answering Brief In Opposition To Defendant’s Motion To Stay in <i>Chien-Min Sung v. Kinik Co.</i> , 1:20-cv-00247-RGA
1061	Single Diamond Dressing Characteristics of CMP Polyurethane Pad” <i>Key Engineering Materials</i> Vol 329 (2007) pp 151-156
1062	PCD Pad Conditioners for Low Pressure Chemical Mechanical Planarisation of Semiconductors” <i>Int. J. Abrasive Technology</i> , Vol. 1, Nos. 3/4, 2008
1063	“Dressing Behaviors of PCD Conditioners on CMP Polishing Pads” <i>Advanced Materials Research</i> Vols 76-78 (2009) pp 201-206
1064	“Mosaic Diamond Pad Conditioners for Improved CMP Performance” <i>ECS Transactions</i> , 27 (1) 575-580 (2010)

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1065	“The Black Pad with Graphite Impregnation for CMP” <i>ECS Transactions</i> , 27 (1) 581-586 (2010)
1066	“The CMP by Polishing with GiP Dressed by BODD” <i>Advanced Materials Research</i> Vols 126-128 (2010) pp 1013-1018
1067	“Development of a novel cooling system-assisted minimum quantity lubrication method for improvement of milling performance” <i>Journal of the Chinese Institute of Engineers</i> , 2015, Vol. 38, No. 3, 322–331
1068	Dr. Tsai’s drawing of the “designated profile” (generated as EX2013 during re-direct)
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I. INTRODUCTION

Director Review is reserved for exceptional circumstances—it is not a vehicle for relitigating the record.¹ The Final Written Decision (Paper 41, “FWD”) grounded its findings in the explicit teachings of the prior art references (Tsai, Sung’026, and Sung’146) corroborated by confirmatory testimony from both parties’ experts. Patent Owner nevertheless argues that the Board erred in two separate ways, without specifying whether the alleged errors are erroneous findings of material fact or erroneous conclusions of law. Each argument fails.

First, Patent Owner alleges the Board erred because “the Board credited two incompatible [‘tip-to-tip variation’ vs. ‘tip-to-designated profile variation’] theories advanced by Petitioner” and “discount[ed] Dr. Tsai’s un rebutted testimony.” Request, 2, 9. The record shows otherwise. The Board explicitly noted that “we do not rely on Petitioner’s alternative ‘tip-to-tip variation’ claim construction.” FWD, 84. Patent Owner now attempts to recast Figure 2(e) of Tsai to depict only the “tip-to-tip variation” theory, in order to concoct its argument that the Board credited two incompatible theories. But the Board relied on Figure 2(e) of Tsai to teach a “designated profile.” Specifically, the Board explained that “Petitioner utilized Figure 2(e) to illustrate the contention that Tsai’s entire disclosure, *read as a whole*,

¹ See www.uspto.gov/patents/ptab/decisions/director-review-process, §II.B.

indicates the Tsai ODD has a ‘*designated profile.*’” FWD, 79. The Board then explained, *as confirmed by Dr. Tsai’s (Patent Owner’s expert’s) testimony*, that Tsai taught the claimed variation from this designated profile. The Board explained that “the intent of the study reported in Tsai was to *level the diamond grit tips to the same height as closely as the authors could achieve* within cost constraints.” FWD, 78. Relying on Tsai’s explicit teaching, coupled with confirmatory admissions from Patent Owner’s own expert, is neither an erroneous finding of material fact nor an erroneous conclusion of law.

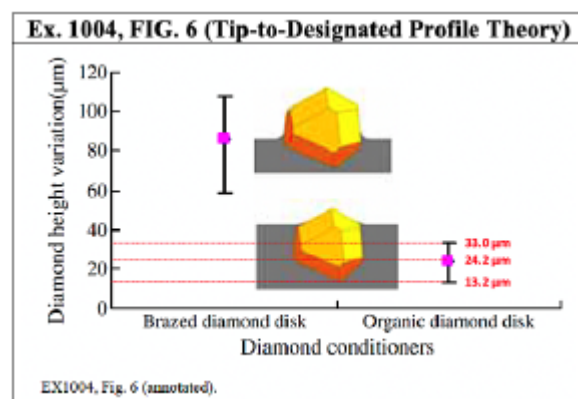
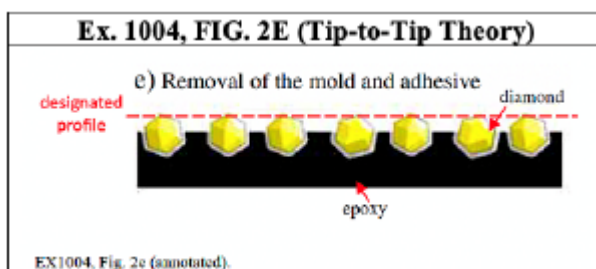
Second, the Board did not err in finding that Sung’146 is prior art to the ’802 Patent. Patent Owner alleges that the “FWD is internally inconsistent” because the Board (1) “did not perform the required element-by-element written-description analysis” and (2) “misused the Sung declaration” from the Kinik litigation. Request, 14. Not so. The Board first provided a five-page analysis explaining why Dr. Sung’s declaration severs priority for all claims of the ’802 Patent. FWD, 22-27. But the Board did not stop there: instead, the Board devoted 38 additional pages of the FWD to performing a limitation-by-limitation written description/priority analysis for claim 1 of the ’802 Patent to determine that “claim 1 is entitled only to the ’802 patent’s actual filing date.” FWD, 27-65. In addition, relying on Patent Owner’s prior sworn declaration to determine that the claims of the ’802 Patent are not entitled to an earlier priority date—especially when “Patent Owner successfully

relied on the testimony to argue ... the ['802 patent] cannot be the subject of the joint venture between Dr. Sung and Kinik” to avoid giving Kinik an ownership stake in the patent (FWD, 25)—is neither an erroneous finding of material fact nor an erroneous conclusion of law.

II. ARGUMENT

A. The Board Did Not Adopt Two Mutually Inconsistent Theories And Explicitly Rejected The “Tip-To-Tip” Variation Theory In Arriving At Its Conclusions In The FWD

Patent Owner argues that “the Board clearly erred” because “the Board credited two incompatible theories advanced by Petitioner.” Request, 2-3. In particular, Patent Owner alleges that “the Board adopted Petitioners’ ‘flat-profile’ theory (which Petitioners and Dr. Shanfield also called the ‘tip-to-tip’ theory) tied to Tsai’s Fig. 2(e)” that “the Board rejected at institution,” and “the Board also adopted Petitioners’ ‘average protrusion height’ (which Petitioner and Dr. Shanfield also called the ‘tip-to-designated profile’ theory) tied to Tsai’s Fig. 6.”



Request, 3-4.

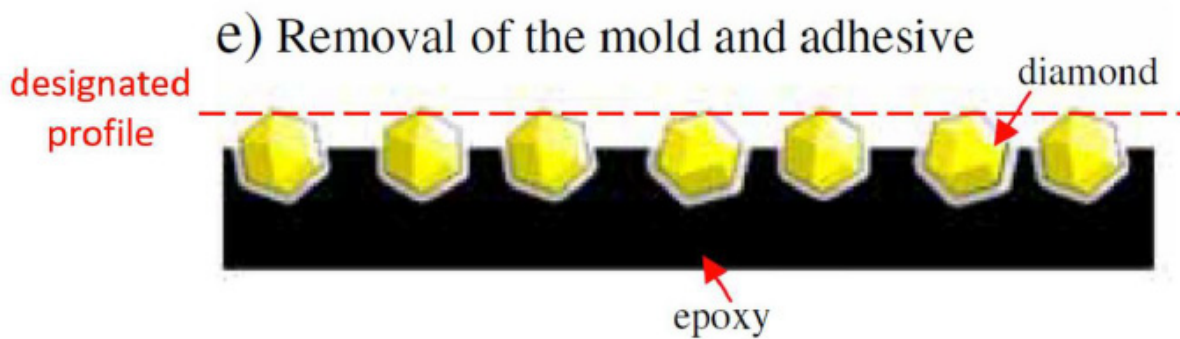
But contrary to Patent Owner’s assertions, the Board explicitly rejected the “tip-to-tip” theory in arriving at its determination in the FWD. The Board explicitly noted that “[w]e also need not and *we do not rely on Petitioner’s alternative ‘tip-tip variation’ claim construction.*” FWD, 84. Patent Owner never addresses this explicit rejection of the “tip-to-tip variation” theory articulated by the Board in its Request.

1. The Board Only Credited The “Tip-To-Designated Profile” Theory And Its Findings Are Supported By The Evidence Of Record

Indeed, the Board did not err by crediting two incompatible theories, as Patent owner now argues, (Request, 6-7), because the Board credited only the “tip-to-designated profile” variation theory. Specifically, the Board relied on Figure 2(e) to demonstrate that Tsai teaches the “*designated profile*” limitation and relied on Figure 6 to demonstrate how the tips *vary from that designated profile*, thus meeting the claims under the “*tip-to-designated profile variation*” theory.

First, the Board properly understood that “Petitioner utilized Figure 2(e) to illustrate the contention that Tsai’s entire disclosure, *read as a whole*, indicates the Tsai ODD *has a ‘designated profile’* as a flat contour of leveled diamond grit tips.” FWD, 79. Nowhere in the FWD does the Board characterize Figure 2(e) of Tsai as meeting only the “tip-to-tip” variation theory, as Patent Owner now asserts. Indeed,

as the Board recognized, the Petition clearly identified how Figure 2(e) teaches the claimed “designated profile” by annotating Figure 2(e) with a red dotted line to demonstrate the existence of a “designated profile.”



Tsai, Figure 2(e) (As Annotated at Pet. 37).

FWD, 71.

Second, in its analysis of Tsai’s Figure 6, the Board was “persuaded by *Dr. Tsai’s testimony*” that Tsai’s Figure 6 is consistent with the ’802 Patent’s usage of the term “designated profile,” which expressly contemplates *a flat designated profile* with *variation from the designated profile*. See FWD, 76-80 (citing EX1001, 6:25-28, 10:63-11:11, 13:1-13 and EX1004, 2:10-17, 3:7-10, 6:8-10, 8:9-26, 11:16-18). Specifically, the Board had “no doubt, *as Dr. Tsai testifies*, that he did not think that he would actually achieve a *perfectly* flat contour of diamond grit tips, particularly when assessed at the micron level discussed in the Tsai article and claimed in the ’802 patent, and the fact that the ‘error bar’ in Tsai’s Figure 6 indicates all the tips do not have the same height, do not detract from finding Tsai discloses a ‘designated profile’ of a flat contour of leveled tips.” FWD, 78-79.

Indeed, as the Board noted, ***Dr. Tsai*** testified:

That was what *we intend to try* [with the Tsai ODD], using different approaches to, first of all, reducing the cost and *also to minimizing the differences of the tip heights to try to make them into equal height*.

FWD, 78 (citing EX1055, 40:18–21). Hence, the Board properly concluded that “from the collection of disclosures in the Tsai article ... we find that the intent of the study reported in Tsai was to level the diamond grit tips to the same height as closely as the authors could achieve within cost constraints.” FWD, 78. The artificial distinction now advanced by Patent Owner—that Tsai’s Figure 2(e) is somehow limited only to the “tip-to-tip” theory—holds no water because the Board only credited the “tip-to-designated profile” theory in its analysis.

2. The Board Did Not Abuse Its Discretion By Disregarding Patent Owner’s Belated Arguments And Rejecting Patent Owner’s Erroneous Interpretation Of “Designated Profile” To Argue Tsai Provides No Such Teaching

Patent Owner adds two sub-arguments to argue that the Board abused its discretion. Request, 9-14. But Patent Owner’s arguments regarding the purported abuse of discretion by the Board are based on the incorrect premise that the term “designated profile” must be “anchored at the highest tip.” Request, 6. This argument was clearly rejected by the Board on two independent grounds.

First, as the Board properly noted, “this argument was not raised in the Patent Owner Response [“POR”], so it is waived.” FWD, fn. 15. Patent Owner cites to the

POR at 17 as alleged support that this argument had been timely raised. But **POR at 17** (reproduced below) is under the heading “Sung’817 Shows that Dr. Sung Was in Possession of Claim Limitation [1E]” regarding “the highest and the second highest tips.” POR, 15-17. That portion of the POR never explains why the lexicographic definition for the term “designated profile” must be “anchored at the highest tip.” Request, 6.

a. Sung ’817 Shows that Dr. Sung Was in Possession of Claim Limitation [1E]

* * * * *

As to the disclosure of the height relationship between the highest and the second highest tips, Sung ’817 is clear that “the term ‘tip’ is intended to *include the highest protruding point* of a superabrasive particle . . .” (Ex. 2011 at ¶ 63 (quoting Sung ’817 at 14:10-13).) In other words, those ranges (and their differences) cited above are measured with respect to the highest protruding tip (i.e., at least one of the two tips as discussed in the above examples necessarily is the highest protruding tip). (Ex. 2011 at ¶ 63.)

POR, 15, 17. Hence, the Board properly found this argument waived because no such argument had been properly raised in the POR. Refusing to consider belated arguments is not an abuse of discretion.

Second, notwithstanding waiver, the Board *separately* found that there is nothing in the evidentiary record to support Patent Owner’s assertion that “the claimed ‘designated profile’ must be defined to include the ‘highest tip.’” FWD, fn. 15. The Board explicitly noted that “[t]his argument also is not supported by the claim language (*see* Ex. 1001, 27:61-64) or the specification disclosure cited by Patent Owner which defines ‘tip’ not ‘designated profile’ (*see id.* at 11:42-45).” *Id.*

Rather, the Board explained why “designated profile” need not be “anchored to the highest tip.” In particular, the Board explained that “[t]he ’802 patent also defines the term ‘profile’ to mean ‘a *predetermined contour* above a support substrate to which a plurality of superabrasive particles or other cutting elements are *intended to align.*’ [EX1001] at 6:21–25 (emphasis added). Further: ‘Examples of such profiles may include, without limitation, *flat or planar profiles.*’ *Id.* at 6:25–28 (emphasis added).” FWD, 76-77. Hence, “the breadth of claim 1 allows Petitioner and Dr. Shanfield to assign the desired flat contour of leveled tips at the average diamond grit tip height in the Tsai ODD, even if other applications might assign that contour at the highest tip height as Dr. Tsai posits.” FWD, 80. In other words, the Board fully considered both parties arguments and concluded that the “designated profile” can be “anchored to the highest protruding tip” in certain instances but to other contours, such as the “average diamond grip tip height,” in other instances. Tsai meets the latter instances. *See* FWD, 76-80.

Fully considering and rejecting Patent Owner's arguments that the "designated profile" "must be anchored at the highest protruding tip" is not an abuse of discretion.

3. The Board Did Not Abuse Its Discretion By Allegedly Disregarding Dr. Tsai's Testimony To Find That Tsai Teaches The Claimed "Designated Profile" Based On The Lexicographic Definition

Patent Owner additionally complains that Board abused its discretion by "disregarding Dr. Tsai's un rebutted testimony" (Request, 12) that Tsai's ODD uses the substrate—not the highest protruding tip—as the baseline for its design. Request, 12-14. Again, Patent Owner bases that argument on the incorrect premise that the "designated profile must be anchored to the highest protruding tip." Request, 6. But more importantly, the Board did not "disregard" Dr. Tsai's testimony. Rather, the Board explained that, *based on Dr. Tsai's testimony*, "the intent of the study reported in Tsai was to level the diamond grit tips to the same height as closely as the authors could achieve within cost constraints" which is "all that is required by the 'designated profile' claim term." FWD, 78 (citing EX1004, 3:1-10; EX1055, 39:18-40:17).

Patent Owner further argues that "the Board did not even address why Dr. Tsai is wrong or why the Tsai reference does not disclose what Dr. Tsai has

demonstrated in Exs. 2013 and 2014.” Request, 10. However, the Board explicitly provided three independent rationales supporting its conclusions:

Dr. Tsai’s testimony about how the “designated contour” claim term might or might not be applied to Tsai is not persuasive, for three reasons. (A) As just discussed, the breadth of claim 1 allows Petitioner and Dr. Shanfield to assign the desired flat contour of leveled tips at the average diamond grit tip height in the Tsai ODD, even if other applications might assign that contour at the highest tip height as Dr. Tsai posits. (B) To the extent Dr. Tsai relies on the Tsai ODD’s support substrate as the “designated profile,” this mis-applies the ’802 patent’s lexicographic definition of “profile” as “a predetermined contour *above a support substrate*.” Ex. 1001, 6:21–25 (emphasis added). (C) This testimony was not offered until Dr. Tsai’s deposition, and exceeds the scope of his initial declaration testimony. *See, e.g.*, Ex. 2011 ¶¶ 18–36.

FWD, 80.

In fact, not only did the Board fully consider (but discredit) Dr. Tsai’s testimony, the Board instead “***agree[d] with Dr. Shanfield’s testimony*** that Tsai’s ‘designated profile’ is ‘a *flat profile* . . . to which each of the tips of the [diamond grits] *should align*,’ despite Tsai’s recognition that ‘[s]ome tips may protrude above or below (*i.e.*, vary from) the designated profile.’ Ex. 1002 ¶¶ 131–132 (emphases added).” FWD, 77.

The Board's consideration of both parties' experts' testimony and its conclusion that Tsai teaches the claimed "designated profile" that meets the lexicographic definition articulated in the '802 Patent is not an abuse of discretion.

B. The Board Properly Determined That Sung'146 Is Prior Art To The '802 Patent (1) After Having Performed A Limitation-By-Limitation Analysis And (2) By Properly Relying On Dr. Sung's District Court Declaration That Disclaimed Earlier Priority

Finally, Patent Owner appears to request "substantial-evidence review" (Request, 15) in arguing that the Board "adopted Petitioners' position by treating Dr. Sung's district-court declaration as a blanket disclaimer of earlier priority and, *on that basis alone*, held that Sung'146 (and Sung'026) are prior art." Request, 14. Setting aside the fact that "substantial-evidence review" is not appropriate for Director Review, Patent Owner again mischaracterizes the record. Although the Board devoted over *five pages* of the FWD to explain why Dr. Sung's prior declaration alone serves to sever priority for all the claims (*see* FWD, 22-27), the Board also devoted the next *38 pages* of the FWD to perform a limitation-by-limitation analysis explaining why the purported priority documents proffered by the Patent Owner do not provide priority. *See* FWD, 27-65. And after having performed

that extensive analysis, the Board “agree[d] with Petitioner’s argument that *claim 1*² is entitled only to the ’802 patent’s actual filing date.” FWD, 22.

Even if the Board did not perform a limitation-by-limitation analysis (and to be clear, the Board did do a detailed analysis) and solely relied on Dr. Sung’s earlier declaration (and to be clear, the Board did not rely solely on Dr. Sung’s earlier declaration), that too would have been proper. Patent Owner argues that “the Board misused the Sung declaration” because “[t]he district court never adjudicated priority (Paper 17 at 32), and Petitioners chose not to depose Dr. Sung.” Request, 14. However, as the Board explained, “Patent Owner successfully relied on the testimony [in Dr. Sung’s Declaration in the Kinik Litigation] to argue ... the [’802 patent] cannot be the subject of the joint venture.” FWD, 25. In other words, “[i]f claim 1 of the ’802 patent is indeed entitled to filing date priority to any one of [the

² To be clear, Patent Owner is incorrect that “[e]ntitlement to an earlier date is limitation-specific.” Request, 15. Instead, as the Board properly concluded, entitlement to an earlier date is claim specific because “35 U.S.C. §120 requires an applicant to meet the disclosure requirement of §112, ¶1 in a single parent application in order to obtain an earlier filing date for individual claims.” Petition, 20 (citing *Studiengesellschaft Kohle, M.B.H. v. Shell Oil Co.*, 112 F.3d 1561, 1562, 1564 (Fed. Cir. 1997)).

earlier filed applications], then it would seem that at least claim 1 of the '802 patent should have been subject to the joint venture with Kinik, contrary to Patent Owner's representations to the District Court." FWD, 26.

As such, the Board properly relied on Dr. Sung's statements in the Kinik Litigation to find that: (1) "*the Declaration's reference to the subject matter claimed in the '802 patent must have included at least claim 1*, because claim 1 is the sole independent claim in the patent;" and (2) "*Dr. Sung unambiguously testified that the subject matter claimed in the '802 patent is not disclosed in any of its parent applications preceding the joint venture's termination in October 2013.*" FWD, 24-26 (citing EX1001, 27:54-29:15, code (60) (App. No. 61/489,074), code (63) (App. No. 11/223,786); EX1011, ¶¶17-21; EX1012, 1-2, 5, fn.4; EX1059, 2-3, 6). Indeed, inventors' prior statements, and statements in other litigations, can and do impact priority. *See, e.g.,* Petition, 19-20 (citing MPEP § 211.02(a) (explaining that if an applicant intentionally waived the benefit claim to prior applications, the Office will reject applicants' later attempts to reclaim the earlier priority benefit)). There was nothing incorrect about the Board's reliance on Dr. Sung's prior filed declaration—filed “with the knowledge that willful false statements and the like so made are [punishable] by fine or imprisonment” (FWD, 22 (citing EX1011, ¶¶17-18, 24))—to find that the '802 Patent is not entitled to an earlier priority date.

Lastly, despite the Board having carried out a 38-page limitation-by-limitation priority analysis, Patent Owner complains that the Board never performed a limitation-specific finding to reconcile the following alleged internal inconsistency: “if Sung ’146 discloses every limitation of claim 1 (anticipation), that disclosure clearly demonstrates possession sufficient to support claim priority under §120; if it does not, then Sung ’146 cannot anticipate and cannot be prior art.” Request, 15.

But as the Board already explained, “[t]here is ‘a subtle distinction between a written description adequate to *support* a claim under § 112 and a written description sufficient to *anticipate* its subject matter under § 102(b).’ *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1562 (Fed. Cir 1991) (cited at Pet. 22 n.8). For example: ‘[T]he description of a single embodiment of broadly claimed subject matter constitutes a description of the invention for anticipation purposes ..., whereas the same information in a specification might not alone be enough to provide a description of that invention for purposes of adequate disclosure.’ *Id.* (quoting *In re Lukach*, 442 F.2d 967, 970 (CCPA 1971)); *see also Indivior*, 14 F.4th at 1325–30.” FWD, 36-37. Hence, there is no internal inconsistency: it is altogether proper to find that Sung’146 cannot provide written description support under § 112 as a priority document even though Sung’146’s specific example can fall within the scope of the claim to render the claim invalid as prior art.

Accordingly, the Board properly concluded that Sung'146 is prior art to the '802 Patent.

III. CONCLUSION

For the above reasons, Petitioner respectfully requests that Patent Owner's Request for Director Review be denied.

Dated: October 27, 2025

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies that on October 27, 2025, a complete copy of the foregoing was served on counsel was served on counsel of record for the Patent Owner by filing the documents through P-TACTS and by sending via electronic mail to the following addresses:

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