

Case IPR2024-00533  
U.S. Patent No. 8,974,270

Petitioner's Reply

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

Chien-Min Sung,  
Patent Owner

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Case IPR2024-00533

U.S. Patent No. 8,974,270

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**PETITIONER SAMSUNG'S  
REPLY IN SUPPORT OF ITS PETITION**

Mail Stop Patent Board  
Patent Trial and Appeal Board  
U.S. Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450

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| <b>Petitioner Exhibit No.</b> | <b>DESCRIPTION</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1001                          | U.S. Patent No. 8,974,270 (“’270 Patent”)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1002                          | Declaration of Dr. Stanley Shanfield                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1003                          | File History of the ’270 Patent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1004                          | U.S. Patent Application Publication No. 2010/0022174 (“Chou”)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1005                          | U.S. Patent Application Publication No. 2008/0096479 (“Sung’479”)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1006                          | U.S. Patent Application Publication No. 2008/0004743 (“Goers”)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1007                          | Sung et al. “Polycrystalline Diamond (PCD) Shaving Dresser: The Ultimate Diamond Disk (UDD) for CMP Pad Conditioning,” <i>ECS Transactions</i> , 18 (1) 523-528 (2009) (“SungECS”)                                                                                                                                                                                                                                                                                                                                                                               |
| 1008                          | U.S. Patent No. 5,036,015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1009                          | Ishizuka et al. “PCD Dressers for Chemical Mechanical Planarization with Uniform Polishing” Proceedings of International Conference on Leading Edge Manufacturing in 21 <sup>st</sup> Century: LEM21, 2007, Volume 2007.4                                                                                                                                                                                                                                                                                                                                        |
| 1010                          | U.S. Patent Application Publication No. 2003/0084894                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1011                          | U.S. Patent No. 7,741,764                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1012                          | Scheduling Order in <i>Sung v. Samsung Electronics Co., Ltd. et al</i> , 4-23-cv-00752                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1013                          | 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)                                                                                                                                                                                                                                                                                                                                                                                                |
| 1014                          | Fenna, Donald. “Hardness Numbers,” <i>A Dictionary of Weights, Measures, and Units</i> , 1st ed., Oxford University Press, 2004.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 1015                          | A copy of SungECS obtain from CCC RightFind                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1016                          | Proceedings of <i>ISTC/CSTIC 2009</i> , published by the Electrochemical Society, obtained from the Electrochemical Society                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1017                          | WorldCat record for <i>ISTC/CSTIC 2009</i> , available at <a href="https://search.worldcat.org/title/426038995">https://search.worldcat.org/title/426038995</a> ; Bibliographic and MARC records for the electronic version of <i>ISTC/CSTIC 2009</i> , available at <a href="http://merlin.lib.umsystem.edu/record=b7054493~S1">http://merlin.lib.umsystem.edu/record=b7054493~S1</a> from the online catalog of the library of the University of Missouri, Columbia; and OCLC FirstSearch record for <i>ISTC/CSTIC 2009</i> (subscription required for access) |

| <b>Petitioner Exhibit No.</b> | <b>DESCRIPTION</b>                                                                                                                                                                                                                                                                                                                                                             |
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| 1018                          | MERLIN, Missouri Education and Research Libraries Information Network, The catalogs of the libraries of the University of Missouri system, archived on January 12, 2011, by Internet Archive, available at <a href="https://web.archive.org/web/20110112054807/http://laurel.lso.missouri.edu/">https://web.archive.org/web/20110112054807/http://laurel.lso.missouri.edu/</a> |
| 1019                          | Declaration of Dr. Ingrid Hsieh-Yee                                                                                                                                                                                                                                                                                                                                            |
| 1020                          | EDTX Caseload Profile (December 31, 2023)                                                                                                                                                                                                                                                                                                                                      |
| 1021                          | <i>Chien-Min Sung v. Samsung Electronics Co. Ltd., et al.</i> , Case No. 4:23-cv-00752 (E.D. Tex.), 82 (Order to Stay Pending Motion for Inter-District Transfer)                                                                                                                                                                                                              |
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| 1023                          | <i>Chien-Min Sung v. Texas Instruments Inc.</i> , Case No. EDTX-4-23-cv-00753 (E.D. Tex.), 26 (TI's Motion for Summary Judgment of Invalidity)                                                                                                                                                                                                                                 |
| 1024                          | <i>Chien-Min Sung v. Texas Instruments Inc.</i> , Case No. EDTX-4-23-cv-00753 (E.D. Tex.), 68 (Order To Stay the Case Pending Resolution of TI's Motion for Summary Judgment).                                                                                                                                                                                                 |
| 1025                          | <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 Texas Instruments Incorporated's Motion for Summary Judgment )                                                                                                                                                                    |
| 1026                          | <i>Chien-Min Sung v. Samsung Electronics Co. Ltd., et al.</i> , Case No. 4:23-cv-00752 (E.D. Tex.), 72 (Plaintiff's Sur-reply )                                                                                                                                                                                                                                                |
| 1027                          | <i>Chien-Min Sung v. Samsung Electronics Co. Ltd., et al.</i> , Case No. 4:23-cv-00752 (E.D. Tex.), 43 (Notice Of Intent To File A Motion To Stay Pending Inter Partes Review)                                                                                                                                                                                                 |
| 1028                          | <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)                                                                                                                                                                                                                           |
| 1029                          | <i>Chien-Min Sung v. Samsung Electronics Co. Ltd., et al.</i> , Case No. 4:23-cv-00752 (E.D. Tex.), 62 (Plaintiff's Opposition to MTS Pending Resolution of TI MSJ)                                                                                                                                                                                                            |
| 1030                          | <i>Chien-Min Sung v. Samsung Electronics Co. Ltd., et al.</i> , Case No. 4:23-cv-00752 (E.D. Tex.), 67 (Defendant's Reply)                                                                                                                                                                                                                                                     |

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| 1031                   | <i>Chien-Min Sung v. Samsung Electronics Co. Ltd., et al.</i> , Case No. 4:23-cv-00752 (E.D. Tex.), 72 (Plaintiff's Sur-Reply)                                                            |
| 1032                   | <i>In re: Chien-Min Sung Subpoena Upon 3M Company</i> , Case No. 0:2023mc00104 (D. Minnesota), 1 (3M's Nov. 16, 2023 Motion To Quash Subpoena In The District of Minnesota)               |
| 1033                   | <i>In re: Chien-Min Sung Subpoena Upon 3M Company</i> , Case No. 0:2023mc00104 (D. Minnesota), 15 (Dr. Sung's Nov. 22, 2023 Cross-Motion To Compel And Motion For Sanctions)              |
| 1034                   | <i>In re: Chien-Min Sung v. 3M Company</i> , Case No. 6:23-mc-00002 (N.D. Tex.), 1 (Dr. Sung's Nov. 27, 2023 Motion To Compel In The Northern District of Texas)                          |
| 1035                   | <i>In re: Chien-Min Sung Subpoena Upon 3M Company</i> , Case No. 0:2023mc00104 (D. Minnesota), 38 (Court Entry Showing A Discovery Hearing Before The Court In The District Of Minnesota) |
| 1036                   | Judge Jordan's Time To Order Motion of Summary Judgement Statistics                                                                                                                       |
| 1037                   | Single Diamond Dressing Characteristics of CMP Polyurethane Pad" <i>Key Engineering Materials</i> Vol 329 (2007) pp 151-156                                                               |
| 1038                   | U.S. Patent No. 9,138,862 ("862 Patent")                                                                                                                                                  |
| 1039                   | U.S. Patent No. 9,724,802 ("802 Patent")                                                                                                                                                  |
| 1040                   | EX2011 in IPR2024-00535 Declaration of Ming-Yi Tsai (EX2011 in '802 Patent)                                                                                                               |
| 1041                   | EX2011 in IPR2024-00534 Declaration of Ming-Yi Tsai (EX2011 in '862 Patent)                                                                                                               |
| 1042                   | "PCD Pad Conditioners for Low Pressure Chemical Mechanical Planarisation of Semiconductors" <i>Int. J. Abrasive Technology</i> , Vol. 1, Nos. 3/4, 2008                                   |
| 1043                   | "Novel diamond conditioner dressing characteristics of CMP polishing pad" <i>International Journal of Machine Tools &amp; Manufacture</i> 49 (2009) 722-729                               |
| 1044                   | "Dressing Behaviors of PCD Conditioners on CMP Polishing Pads" <i>Advanced Materials Research</i> Vols 76-78 (2009) pp 201-206                                                            |
| 1045                   | "Mosaic Diamond Pad Conditioners for Improved CMP Performance" <i>ECS Transactions</i> , 27 (1) 575-580 (2010)                                                                            |
| 1046                   | "The Black Pad with Graphite Impregnation for CMP" <i>ECS Transactions</i> , 27 (1) 581-586 (2010)                                                                                        |

| <b>Petitioner Exhibit No.</b> | <b>DESCRIPTION</b>                                                                                                                                                                                               |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1047                          | “The CMP by Polishing with GiP Dressed by BODD” <i>Advanced Materials Research</i> Vols 126-128 (2010) pp 1013-1018                                                                                              |
| 1048                          | “Organic diamond disk versus brazed diamond disk for dressing a chemical–mechanical polishing pad” <i>Diamond &amp; Related Materials</i> 23 (2012) 144–149                                                      |
| 1049                          | “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 |
| 1050                          | Deposition of Dr. Tsai in IPR2024-00533, Vol I                                                                                                                                                                   |
| 1051                          | Deposition of Dr. Tsai in IPR2024-00533, Vol II                                                                                                                                                                  |
| 1052                          | U.S. Patent Application Publication No. 2010/0248595 (“Dinh-Ngoc”)                                                                                                                                               |
| 1053                          | U.S. Application No. 11/223,786 (’786 Application)                                                                                                                                                               |

## **I. INTRODUCTION**

Patent Owner focuses solely on limitation [1B] for claim 1, arguing that (1) U.S. Patent Publication No. 2008/0096479 (“Sung’479”) is not an enabling reference, (2) neither U.S. patent Publication No. 2010/0022174 (“Chou”) nor Sung’479 discloses limitation [1B], and (3) there is no motivation to combine the references. None of these arguments have merit.

First, Sung’479—a patent publication—is presumptively enabling, which Patent Owner has not overcome. Moreover, Patent Owner’s arguments are contradicted by the arguments made in parallel proceedings, in which Patent Owner argued that nearly identical disclosures to those of Sung’479 provide §112 support (and hence must be enabling). Moreover, Patent Owner’s expert, Dr. Tsai, admitted that he lacks not only the basic understanding of the law on enablement, but could not even articulate what a key technical term (*i.e.*, “RA values”) refers to in the context of Sung’479—despite opining that it is not enabled.

Second, the Board already considered and rejected Patent Owner’s arguments that Chou and Sung’479, when combined, fail to disclose limitation [1B]. Patent Owner’s reliance on unsupported expert opinion does not change this.

Third, the Board has already found that the Petition establishes clear motivation to combine Chou and Sung’479. Patent Owner’s attempt to relitigate these points with conclusory attorney arguments does not change the outcome.

As for the remaining arguments against Grounds II and III, Patent Owner presents nothing more than mere conclusory attorney arguments that should be rejected.

Accordingly, Petitioner respectfully submits that all challenged claims are unpatentable.

## **II. CLAIM CONSTRUCTION**

Patent Owner does not dispute that certain claim terms identified by the Petitioner (*i.e.*, “superabrasive,” “protrusion,” “sharp portion,” and “attitude”) have been expressly defined in the '270 Patent. *See* POR, 4.

## **III. PERSON OF ORDINARY SKILL IN THE ART (“POSITA”)**

Patent Owner disagrees with the level of ordinary skill in the art articulated by Petitioner in an effort to disqualify Dr. Shanfield as an expert. *See* POR, 3-4. Patent Owner argues Dr. Shanfield's opinions should be given little to no weight because he does not have personal experience in designing and developing CMP pad dressers. But tellingly, Patent Owner *chose not* to cross-examine Dr. Shanfield, which would have been the proper time to probe his qualifications as an expert and credibility. Rather, as revealed during cross-examination, it is Dr. Tsai's opinions—despite his professed expertise in design and development of CMP pad dressers—that lack credibility.

First, Dr. Tsai could not even decide what the proper education level of a POSITA should be prior to submitting his Declaration. During cross-examination, he admitted that the education level he articulated in his declaration was incorrect. *See* EX1050, 107:18-25 (“Q. So is a bachelor in mechanical engineering sufficient or not sufficient to meet the level of a POSITA? A. Well, personally, to my opinion, such a professional technology, I think it would take at least master degree or Ph.D. degree. Then this person may have a better chance, but still no guarantee of that, but that would be my opinion.”). When asked again to clarify, he remained uncertain. EX1050, 109:2-8 (“Q. And I’m just trying to make sure that the record is clear, so it’s just a very simple question. Do you want to change this from ‘at least a bachelor’s degree in mechanical engineering’ to ‘at least a master’s degree in materials science’? A. I’m not sure, I’m not sure. I’m not sure. I’m not sure.”). Dr. Tsai’s inability to consistently articulate even the proper education level of a POSITA—and his subsequent changes in testimony—serve as a clear indication that Dr. Tsai’s opinion lacks credibility.

Second, Dr. Tsai contends that “*experience in the field of integrated circuit processing and fabrication techniques*,” (Pet., 19), should be replaced by “*experience in developing CMP technology, including some specific experience with the design and development of CMP pad dressers*.” EX2004, ¶29. But Dr. Tsai articulates no objective rationale why the requisite experience must be so

limited. In fact, the '270 Patent itself begins by noting that “[t]he semiconductor industry currently spends in excess of one billion U.S. dollars each year *manufacturing silicon wafers* that must exhibit very flat and smooth surfaces.” EX1001, 1:12-14. As another example, the references overcome during prosecution explain how CMP technology is relevant in the field of integrated circuit processing and fabrication. *See* EX1003, 207-213. US 2010/002485995 (“Dinh-Ngoc”) explains that “[i]n the fabrication of electronic devices, .... [c]hemical mechanical planarization (CMP) is a common technique used to planarize or polish workpieces such as semiconductor wafers.” EX1052, [0005].

Accordingly, Petitioner's proposed definition of a POSITA should be adopted.

#### **IV. COLLATERAL ESTOPPEL APPLIES AGAINST [1PRE] AND [1D]**

In response to Petitioner's argument that Patent Owner “is collaterally estopped from re-litigating the issue of whether the Chou reference discloses at least [1Pre] and [1D] of the '270 Patent,” (Pet., 57), Patent Owner argues that “collateral estoppel does not apply” because “the ‘issues of patentability’ here are not identical.” POR, 20. Patent Owner's main argument is that the '270 Patent includes [1B] that is not recited in the '699 Patent. However, whether claim 1 recites an additional limitation [1B] has no bearing on whether collateral estoppel applies for limitations [1Pre] and [1D]. *See Keysight Technologies, Inc. v. Centripetal*

*Networks, Inc.*, IPR2023-00446, Paper 30 at 21 (PTAB August 5, 2024) (ruling that Patent Owner was estopped from asserting that certain limitations of independent claim were not taught or suggested by a prior art reference.).

More practically, however, POR concedes that Chou discloses [1Pre] and [1D], because PO only argues against [1B] of claim 1. *See* POR, 26-33.

## **V. THE COMBINATION OF CHOU AND SUNG'479 RENDERS OBVIOUS INDEPENDENT CLAIM 1**

Patent Owner argues that the combination of Chou and Sung'479 does not render obvious independent claim 1 by focusing only on limitation [1B]. Specifically, Patent Owner argues that (1) Sung'479 does not teach [1B] because “Sung '479 is not an enabling reference,” (POR, 21); (2) “[t]here is no disclosure of this claim element” [1B] in either Chou or Sung'479, (POR, 29); and (3) “there is no motivation to combine Chou and Sung '479.” POR, 29. None of these arguments have merit.

### **A. The Combination of Chou And Sung'479 Enables Limitation [1B]**

Patent Owner argues that the Petition “rel[ies] exclusively on Sung '479” for limitation [1B]. POR, 20. That is incorrect. The Petition relied on the combination of Chou and Sung'479. Specifically, the Petition explained that Chou teaches “adjusting the height of the abrasive particles so that *all* abrasive particles can perform the machining action to increase efficiency and precision.” Petition, 29.

Petition further explained that a “POSITA would have readily recognized that in order for all of the abrasive particles to be performing the machining action, the difference in protrusion distance between the particles should be small.” Petition, 30. Sung’479 was only relied on to demonstrate that the claimed numerical range for the difference in protrusion distance between the particles were well-known in the art. The Petition then provided a detailed explanation of the reasons to combine Chou with Sung’479. *See* Petition, 30-39.

In other words, unlike the facts in *Raytheon* that relied on a single reference obviousness, Sung’479 is not ““a standalone § 103 reference [that] must enable the portions of its disclosure being relied upon.”” POR, 20 (citing *Raytheon Techs. Corp. v. GE*, 993 F.3d 1374, 1381 (Fed. Cir. 2021)). And as the Federal Circuit clarified in *Raytheon*, “to argue, as does [the patentee], that the sufficiency of each prior art teaching must be tested under the strict standard requiring an enabling disclosure is to shift the emphasis from obviousness in light of the prior art, taken as a whole, to the sufficiency of each prior art teaching separately considered.” *Id.* (citing *Minn. Mining & Mfg. Co. v. Blume*, 684 F.2d 1166, 1173 n.10 (6<sup>th</sup> Cir. 1982)). Critically, despite the fact that the Petition relied on the combination of Chou and Sung’479, POR never argues that the combination of Chou and Sung’479, taken *as a whole*, do not enable a POSITA—arguing solely against Sung’479. And because prior art patent publications are presumed enabling, it is Patent Owner’s burden to rebut this

presumption. *See, Apple Inc. v. Corephotonics, Ltd.*, 861 F. App'x 443, 450 (Fed. Cir. 2021) (nonprecedential; *inter partes* review context); *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1354 (Fed. Cir. 2003). Patent Owner has failed to do so for the combination of Chou and Sung'479.

Moreover, POR's argument that Sung'479 is not enabling is belied by Dr. Tsai's admissions. First, Dr. Tsai opined that "[t]he disclosure of Sung '479 also lacks crucial details for implementing the described 'leveling process' .... For example, it provides no description for the composition or properties of the 'leveling surface' used to level the particle tips such that it allows for the plurality of superabrasive particles *to have RA values of 'less than about 40  $\mu\text{m}$ ,*' 'less than about 30  $\mu\text{m}$ ,' 'less than about 20  $\mu\text{m}$ ,' or 'less than about 10  $\mu\text{m}$ .'" EX2004, ¶ 63 (citing to [0067] of Sung'479). However, during cross examination, he admitted that he does not even know what RA values refer to in the context of Sung'479. EX1050, 126:21-128:4 ("Q. Let's turn back to paragraph 63 [of your declaration]. ... Then you say "For example, it provides no description for the composition or properties of the levelling surface used to level the particle tips such that it allows for the plurality of superabrasive particles to have RA values of less than about 40 microns." ... Q. What's an RA value? A. (In English) I'm not sure. I need to check. (In Chinese) I need to check that '479 patent. ... "Q. I'm handing you Exhibit 1005

which is a copy of Sung'479. ... A. I don't quite remember this RA value. Q. Okay. And you have a copy of the Sung'479 in front of you, correct? A. Yes.”).

Moreover, the same portion of Sung'479 that Dr. Tsai contends is not enabled is claimed in claim 28 of Sung'479 itself. *See also* EX1050, 132:5-8 (“Q. Is the subject matter that you're discussing in paragraph 63 of your declaration related to claim 28 of Sung'479? A. Yes. They are related.”).

| Sung'479, [0067]                                                                                                                                                                                   | Sung'479, claim 28                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| [0067] “... upon the formation of the superabrasive tool, the plurality of superabrasive particles have been leveled by the leveling surface to an RA value of less than about 40 $\mu\text{m}$ .” | 28. “... said plurality of coated superabrasive particles having tips leveled to an RA value of less than about 40 $\mu\text{m}$ .” |

Dr. Tsai was not aware of the principle that the claims of a patent must be enabled. EX1050, 132:19-24 (“Q. Are you aware of a key requirement under U.S. patent law that in order for you to have a patent claim, the patent claim has to be enabled? A. I'm not sure.”). And when pressed about the fact that Dr. Sung filed claim 28 directed to the same subject matter Dr. Tsai contends is not enabled, Dr. Tsai admitted that he is not sure whether a POSITA would have been able to practice claim 28 of Sung'479. EX1050, 133:25-134:4 (“Q. So who is more right? Is Dr. Sung correct that he believes this claim – that claim 28 is enabled or your opinion that claim 28 is not enabled? A. I don't know.”).

Indeed, POR's argument that Sung'479 is not enabling is belied by the positions Patent Owner has taken in IPR2024-00535 directed to U.S. Patent No. 9,724,802 ("'802 Patent"). For example, as shown below, paragraph [0072] of Sung'479 was relied upon in the instant Petition as teaching one example of the difference in protrusion distance that falls within the claimed range of limitation [1B]. For limitation [1E] of the '802 Patent—which is identical to limitation [1B] of the '270 Patent—Patent Owner relied on the nearly identical passage from U.S. Patent Application No. 11/223,786 ("'786 Application")(EX1053).<sup>1</sup>

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<sup>1</sup> However, the '802 Patent cannot claim priority to the '786 application, because the co-pending applications requirement was not met. *See* IPR2024-00535, Paper 23 [Petitioner's Reply], 6-9.

| IPR2024-00533 ('270 Patent)                                                                                                                                                                                                                                                                                                                                                                                                    | IPR2024-00535 ('802 Patent)                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1B] wherein the difference in protrusion distance between the highest protruding tip and the second highest protruding tip of the monolayer of superabrasive particles is less than or equal to about 50 microns;                                                                                                                                                                                                             | [1E] wherein the difference in protrusion distance between the highest protruding tip and the second highest protruding tip of the monolayer of superabrasive particles is less than or equal to about 50 microns,                                                                                                                                                                                                                                           |
| <p><u>Sung'479, [0072]:</u></p> <p>“Also, when referring to the designated profile, it should be noted that the term ‘tip’ is intended to include the highest protruding point of a superabrasive particle ...”</p> <p><u>Sung'479, [0072]:</u></p> <p>“In yet another aspect, the plurality of superabrasive particles is arranged such that their tips vary from the designated profile by less than about 1 microns...”</p> | <p><u>'786 Application, 12:20-22:</u></p> <p>“Also, when referring to the designated profile, it should be noted that the term ‘tip’ is intended to include the highest protruding point of a superabrasive particle, ....”</p> <p><u>'786 Application, 13:3-4</u></p> <p>“In another aspect, the plurality of superabrasive particles are arranged such that their tips vary from the designated profile by from about 20 microns to about 40 microns.”</p> |

And this assertion highlights the inconsistencies with the Patent Owner's arguments against Sung'479. **First**, it is well-established that in order provide § 112 support, the priority document must be enabling. *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*) (“Since its inception, this court has consistently held that § 112, first paragraph, contains a written description requirement separate from enablement, and we have articulated a ‘fairly uniform standard,’ which we now affirm.”). Patent Owner cannot argue that the nearly identical passages in the '786 Application provide an enabling disclosure for the

identical limitation but at the same time argue that Sung'479 is not enabling as a matter of law. ***Second***, Patent Owner cannot simultaneously claim that the '786 Application, filed on September 9, 2005—over a year prior to the filing date of Sung'479—contains an enabling disclosure, while also asserting that Sung'479 requires undue experimentation. Both the '786 Application and Sung'479 teach that the CMP pad dresser can be produced using the same reverse casting methods, as shown by the nearly identical passages below. Indeed, Dr. Tsai provided no opinion whether the “various reverse casting methods,” such as described in Sung'479's paragraph [0082], would have enabled a POSITA to practice limitation [1B]—which are taught, for example in paragraphs [0067] through [0072] of Sung'479—without undue experimentation. *See EX2004 generally.*

| EX1005 (Sung'479)                                                                                                                                                                                                                            | <u>EX1053 ('786 Application)</u>                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [0082] Various reverse casting methods may be utilized to manufacture the superabrasive tools, and particularly the CMP pad dressers according to aspects of the present invention.<br><br><i>See also</i> EX1005 (Sung'479), [0083]-[0089]. | 22:18-19: Various reverse casting methods may be utilized to manufacture the CMP pad dresser of the present invention.<br><br><i>See also</i> EX1053 ( <u>'786 Application</u> ), <u>22:19-26:14</u> . |

**B. The Combination of Chou And Sung'479 Renders Obvious Limitation [1B]**

Patent Owner largely repeats the same arguments the Board already considered in instituting trial. *Compare* POR, 26-29 with POPR, 28-30.<sup>2</sup> Namely, Patent Owner's argument appears to be centered around the fact that "Chou and Sung '479 [d]o [n]ot [d]isclose" limitation [1B]. *See* POR, 26-29. But Patent Owner again appears to misapprehend the arguments outlined in the Petition.

As the Institution Decision recognized, the Petition relied on the explicit teachings of Chou, such as "the importance of adjusting the height of the abrasive particles to ensure performance of all abrasive particles in machining." DI, 16 (citing EX1004, [0017]); *see also* Petition, 29-30. Figure 5D of Chou is merely an illustration explaining what a POSITA would have recognized in light of this explicit teaching of Chou—"that in order for all of the abrasive particles to be performing the machining action, the difference in protrusion distance between the particles should be small." Petition, 30. *See also* IPR2014-01423, Paper 26, 19 (citing *In re*

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<sup>2</sup> Patent Owner waives a number of additional arguments made in pages 30- 35 of the POPR that the Board already rejected. *See* DI, 15-21. Patent Owner, however, adds (1) certain testimony from Dr. Tsai and (2) incorporates its "non-enablement" argument directed to Sung'479. *See* POR, 26-29.

*Mraz*, 455 F.2d 1069, 1072 (CCPA 1972)); *see also In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979) (“a drawing in a utility patent can be cited against the claims of a utility patent application even though the feature shown in the drawing was unintended or unexplained in the specification of the reference”).

Petition further explained that based on this explicit teaching of Chou, the claimed range of the difference in protrusion distance between the highest and the second highest protruding tip would have been obvious, as taught (explicitly or inherently) or at minimum rendered obvious by Sung’479. *See* Petition, 30-34. These arguments were correctly understood by the Board, crediting Dr. Shanfield’s explanation of the teachings of Sung’479, as it appears in paragraph 113 of his declaration. *See* DI, 17-18.

In the POR, Patent Owner now additionally relies on paragraphs 32, 34-36, 63-64, 69-70 of Dr. Tsai’s declaration (EX2004) as alleged support for its arguments. *See* POR, 26-29. But these paragraphs recite mere conclusory statements that parrot back the language found in the POR. Dr. Tsai provides no objective evidence—other than his say-so about a reference that was not even made of record (*see, e.g.*, EX2004, ¶36), Chou (*see, e.g.*, EX2004, ¶¶69-70), and Sung’479 (*see, e.g.*, EX2004, ¶¶63-64)—that would change anything about what Chou or Sung’479 discloses. *See Peloton Interactive Inc. v. Johnson Health Tech Co., Ltd.*, IPR2023-01164, Paper 38 at 30 (PTAB November 20, 2024) citing 37 C.F.R. §

42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

Finally, in the POR, Patent Owner additionally cites back to Section VII.A.2 of the POR. *See* POR, 29. These arguments again fail for the same reasons articulated in Section V.A above.

In short, nothing in the POR—either old or new arguments—alter the findings articulated by the Board in its Institution Decision.

**C. A POSITA Would Have Been Motivated To Combine Chou and Sung’479 That Recognize Benefits Of Having Leveled Height Of Abrasive Particles**

Patent Owner largely repeats verbatim the same arguments the Board already rejected in instituting trial. *Compare* POR, 29-33 with POPR, 35-39.<sup>3</sup> Petitioner addresses four newly raised arguments in the POR.

**1. Person Of Ordinary Skill In the Art (“POSITA”)**

*First*, Patent Owner’s attempts to discredit Dr. Shanfield is without merit. *See* POR, 29-30. Patent Owner argues Dr. Shanfield’s opinions lack credibility because he does not have personal experience in designing and developing CMP pad dressers. But as explained in Section III, Petitioner’s definition of POSITA should be adopted and Dr. Tsai’s opinion lacks credibility.

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<sup>3</sup> Patent Owner waives the argument that Chou and Sung’479 are not analogous art.

## 2. Credibility Of Experts

**Second**, it is Dr. Tsai's opinions that are less than credible given his lack of understanding of the law, lack of requisite diligence, and bias towards Dr. Sung. Specifically, Dr. Tsai admitted:

- ***He does not understand the legal principles in his Declaration*** (EX1050, 18:14-18: Q. "So you don't understand the legal understanding sections in your declarations, correct?" A. "For those, indeed, I don't have much understanding.").
- ***He did not closely review the claims of the '270 Patent to accurately determine the meaning of the claims*** (EX1050, 76:19-77:5: Q. "My question is very simple. Did you review columns 17 and 18 of the '270 patent before rendering your opinion?" A. "I was only ***generally roughly*** looked at it." Q. "Can you answer my question with a "yes" or a "no"? Did you review columns 17 and 18 of the '270 patent before rendering your opinion?" A. "I had answered already." Q. "Was that a "yes" or a "no"? A. "***I did not very seriously looking at that in detail*** but I was just ***generally*** look at it.")
- ***He did not review the Petition filed in this proceeding to properly formulate an understanding of Petitioner's positions*** (EX1050, 20:7-16: Q. "Let me hand you a copy of the petition that we filed directed to the

'270 patent. Do you recognize this document?" A. "No." Q. "You did not read the petition prior to drafting your '270 declaration?" A. "No." Q. "This is the first time you've seen the '270 petition, is that correct?" A. "Yes, I see this the first time.").

- ***He has worked closely with Dr. Sung over many years, having received funding from Dr. Sung, which in turn allowed him to advance his career.***

*See generally* EX1042-1049, EX2007 (showing papers Dr. Tsai published with Dr. Sung as co-authors); EX2006, p. 104 ("The authors would like to thank ... Dr. J. S[u]ng of Kinik Company, Taiwan, for providing the financial support, and the conditioners used in this study."); *see also* EX1051, 184:13-185:25; EX1051, 226:21-25 ("Q. And without Kinik's funding and tools, you could not have published many of your papers, correct? A. Well, then, it would be pretty difficult for me to do so."); EX1051, 227:9-17 ("Q. And you testified – and this is your own words – 'In academic field, you need to publish papers in order to be promoted.' Correct? A. That's correct, generally we need to publish papers in order to be promoted. Q. So these papers did in fact help you get promoted, correct? A. Some papers offered the help, but some not."); EX1050, 60:13-23 ("Q. So by thanking Dr. Sung, you were hoping that Kinik will provide more future financial support? A. That's a typical Chinese way to

do so in the hope that the company can give us further support in the future.”).

### **3. No Hindsight**

*Third*, Patent Owner does not explain why Dr. Shanfield is utilizing impermissible hindsight other than Dr. Tsai's conclusory say-so. POR, 32, 33 (citing EX2004, ¶¶71-72). *See Peloton Interactive Inc. v. Johnson Health Tech Co., Ltd.*, IPR2023-01164, Paper 38 at 30 (PTAB November 20, 2024) citing 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

### **4. Temperature Of Brazes Is Irrelevant**

*Fourth*, Patent Owner's contention that “the brazing of Sung '479 is completely different from that of the '270 Patent” because “Sung '479 is expressly limited to brazes having melting point temperatures under 700 degree while the '270 patent uses brazes having melting point temperatures of 700-1200 degrees,” (POR, 31, 33), is wrong for two reasons: (1) Patent Owner is attempting to read in a limitation into the claims that simply does not exist; and (2) the proposed Ground is the combination of Chou with Sung'479—not Sung'479 with the '270 Patent. None of the newly raised arguments have any merit.

**VI. THE COMBINATION OF CHOU WITH SUNG'479 AND SUNGECS  
RENDERS OBVIOUS DEPENDENT CLAIMS 6 AND 7**

Patent Owner alleges that the Petitioner made conclusory statements regarding what is “allegedly shown in SungECS.” *See* POR, 34-35 (citing Petition, 50-52). Not so. The Petition articulated with particularity what SungECS teaches and the reasons to combine SungECS with Chou and Sung'479. Petition, 50-53. It is the POR that makes these conclusory attorney arguments without providing any reasoned explanation to support its arguments. *See* POR, 34-35. *See Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017) (“Attorney argument is not evidence.”).

**VII. THE COMBINATION OF CHOU WITH SUNG'479 AND GOERS  
RENDERS OBVIOUS DEPENDENT CLAIM 2**

Patent Owner again alleges that the Petitioner made conclusory statements regarding why “it would have been obvious to combine Goers with Chou and Sung'479.” *See* POR, 35 (citing Petition, 53-54). Not so. The Petition articulated with particularity what Goers teaches and the reasons to combine Goers with Chou and Sung'479. Petition, 53-57. It is the POR that makes these conclusory attorney arguments without providing any reasoned explanation to support its arguments. *See* POR, 35. *See Icon Health*, 849 F.3d at 1043 (“Attorney argument is not evidence.”).

## VIII. CONCLUSION

For the reasons stated above and in the Petition, Samsung respectfully requests that the Board cancel the challenged claims.

Dated: March 28, 2025

Respectfully submitted,

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**CERTIFICATION UNDER 37 C.F.R. § 42.24(d)**

I hereby certify that this paper, excluding the portions exempted under 37 C.F.R. § 42.24(c), has 4,024 words as counted by Microsoft Word, the word-processing program used to prepare this paper.

Dated: March 28, 2025

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**CERTIFICATE OF SERVICE**

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies that on March 28, 2025, a complete copy of Petitioner's Reply in Support of Its Petition and corresponding exhibits 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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