

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,

Petitioners

v.

CHIEN-MIN SUNG,

Patent Owner

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

PATENT OWNER'S MOTION TO EXCLUDE

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Patent Trial and Appeal Board
U.S. Patent and Trademark Office
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Submitted Electronically via PTACTS

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I. INTRODUCTION

Pursuant to 37 C.F.R. § 42.64(c) and the Scheduling Order (Paper 15), Patent Owner Chien-Min Sung (“Patent Owner” or “Dr. Sung”), hereby moves to exclude Exhibits 1002, 1042-49, 1052 and 1053 submitted by Petitioners Samsung Electronics Co. Ltd., Samsung Electronics America, Inc., Samsung Semiconductor, Inc., and Samsung Austin Semiconductor, LLC (collectively, “Petitioners” or “Samsung”).

II. BACKGROUND

On February 29, 2024, Petitioners filed their Petition for *Inter Partes* Review of U.S. Patent No. 8,974,270 (Paper 1, “Petition”) in the above-captioned case, which relies on *inter alia*, the Declaration of Stanley Shanfield, Ph.D. on Behalf of Petitioners (Ex. 1002, the “Shanfield Declaration”). (See Petition at 7-12, 15-25, 28-32, 34-57.) On October 2, 2024, Patent Owner filed his Objections to Petitioners’ Pre-Institution Evidence (Paper 18), which included objections to the Shanfield Declaration (*id.* at 1).

On March 28, 2025, Petitioners filed their Reply in Support of [Their] Petition (Paper 25, the “Reply”), which relies on *inter alia*, Exs. 1042-49 (Reply at 16), Ex. 1052 (*id.* at 4), and 1053 (*id.* at 9). On April 4, 2025, Patent Owner served its Objections to Petitioners’ Reply Evidence Pursuant to 37 C.F.R. 42.64(b)(1) (Paper 24), which included objections to Exhibits 1042-53.

III. EXHIBITS 1002, 1042-49, 1052 AND 1053 SHOULD BE EXCLUDED AS INADMISSIBLE UNDER 37 C.F.R. § 42.62

A. Exhibit 1002

The offending portions of the Shanfield Declaration should be excluded because of Dr. Shanfield's lack of qualification in offering his opinions in-mechanical planarization (CMP) pad conditioning, the subject matter of U.S. Patent No. 8,974,270 (the "'270 Patent"), the lack of sufficient facts or data underlying his opinions in his declaration (which renders his opinions self-serving and wholly unreliable). *See* Fed. R. Evid. 702 and 703.

Throughout Ex. 1002, Dr. Shanfield speculates as to what a person of ordinary skill in the art ("POSITA") would have understood based on the prior art references asserted by Petitioners, including Chou (Ex. 1004) and Sung'479 (Ex. 1005). Dr. Shanfield's speculation forms the primary basis for Petitioners' contentions that the challenged claims of the '270 Patent are unpatentable.

However, as evidence of record shows, Dr. Shanfield lacks sufficient expertise and experience to qualify as a POSITA in CMP pad conditioning. Additionally, Dr. Shanfield's opinions are inadmissible because they are not based in sufficient facts and data.

1. Dr. Shanfield Lacks Experience in the Field of the Invention and Fails to Qualify as a Person of Ordinary Skill in the Art, Much Less an Expert

Dr. Shanfield's declaration should be excluded because he does not have sufficient experience to opine from the point of view of a POSITA in the technical field of the '270 patent, which is CMP pad conditioning. Dr. Shanfield's only experience is working in a lab that used "semiconductor-grade CMP systems" (Ex. 1002 at ¶ 5); he does not identify any experience in designing, manufacturing, or testing CMP pad conditioners. For example, he admits that he has never measured the number of diamonds on a CMP pad conditioner (Ex. 2003 at 91:23-92:10) or inspected a CMP pad conditioner with an electron microscope (*id.* at 93:10-20).

As Patent Owner has contended in his Patent Owner's Response (Paper 20 at 3), the proper level of experience of a POSITA for purposes of the '270 Patent includes at least two years of experience in developing CMP technology including some specific experience with the design and development of CMP pad dressers. Petitioners' and Dr. Shanfield's alternative requirement of "two to three years of experience in the field of integrated circuit processing and fabrication techniques" (Petition at 19; Ex. 1002 at ¶ 63), is exceedingly broad and generic, and requires no experience specific to CMP pad conditioning. Under that requirement, even Patent Owner's lead counsel of record would qualify as a POSITA. (Paper 27 ("Sur-reply"))

at 25.) While it is undisputed that CMP is ubiquitous in semiconductor manufacturing, mere experience using a multi-component CMP tool does not qualify someone as an expert in designing or developing a component within that multi-component CMP tool. (See Sur-reply at 25-26 (citing Ex. 1051 at 171:7-172:3).)

Tellingly, Dr. Shanfield's CV (Ex. 1002) submitted to this Board is unequivocal that he has no experience in CMP or CMP pad conditioning. (See *id.* at 70-75.) Specifically, while Dr. Shanfield purports to have general experience in semiconductor fabrication, his CV is devoid of any evidence that he has ever designed, developed, tested, or meaningfully analyzed CMP pad conditioners, which are the specific focus of the '802 patent. For example, ***not once*** does Dr. Shanfield identify CMP or CMP pad conditioning in his CV, including "Hands-On Professional Expertise," "Specialized Training," "Professional Expertise," "Publications," "Patents" or "Expert Witness Experience." This omission is not a minor deficiency—it is a fundamental disqualification.

This explains why Dr. Shanfield and Petitioners attempt to fabricate out of thin air a generic definition of a POSITA in order to qualify Dr. Shanfield as an expert in this case. But without the requisite experience in designing or developing CMP technology, Dr. Shanfield lacks even a rudimentary level of understanding of the context in which the '270 patented invention was developed, which is CMP

technology, a specialized branch of semiconductor manufacturing. (Ex. 2004 at ¶ 28.) As Patent Owner's expert Dr. Ming-Yi Tsai confirmed in un rebutted testimony, understanding issues such as whether it was practically achievable to manufacture a BDD CMP pad dresser having superabrasive particle tip height variation of less than 50 microns in the 2005-2007 timeframe depends on a knowledge of CMP pad design and measurement during the relevant period (Ex. 2004 at ¶¶ 31-32), not simply knowledge of semiconductor manufacturing writ large.

It is undisputed that Dr. Shanfield lacks such experience, yet he nevertheless attempts to offer expert opinions and opinions from the vantage point of a POSITA regarding, for example, whether a "POSITA at the time of the earliest claimed priority date of the '270 Patent would have known that the difference in the protrusion distance of the particles should be as small as possible to ensure that all of the abrasive particles actually participate in the polishing process." (See Ex. 1002 at ¶ 109.)

While Dr. Shanfield may have experience in semiconductor fabrication, that does not offer him qualification in CMP or CMP pad conditioning. To be clear, while broad expertise may suffice in some contexts, it cannot substitute for the particularized knowledge needed to evaluate a highly specialized technology, such as CMP and CMP pad conditioners. *See Hirata v. S. Nev. Health Dist.*, Case No.

2:13-cv-2302-LDG-VCF, 2016 U.S. Dist. LEXIS 185235, at *7 (D. Nev. May 31, 2016) (“An expert’s general expertise in a subject area however will not automatically qualify the expert to testify on a specific sub-category within that subject area.”).

Here, CMP pad conditioning is not merely a subset of semiconductor manufacturing—it is a distinct technical domain requiring specialized knowledge of abrasive materials, mechanical wear mechanisms, pad/wafer interaction physics, and the performance optimization of pad conditioner designs. That Dr. Shanfield has not used, studied, designed, developed or even tested a CMP pad conditioner eliminates any basis for treating him as a qualified expert on the subject. Indeed, he offers no indication that he has ever reviewed technical specifications or scientific literature specific to pad conditioning, nor has he rebutted any of the testimony or analysis offered by Dr. Tsai—who is, by contrast, demonstrably qualified in this precise field. Dr. Shanfield’s decision not to submit a rebuttal declaration addressing Dr. Tsai’s deposition testimony—is telling. It either reflects a tacit concession that Dr. Tsai is correct (which would summarily reject Petitioners’ arguments) or it confirms that Dr. Shanfield lacks the necessary technical competence to even engage with the analysis. In either case, Dr. Shanfield’s failure to rebut Dr. Tsai’s opinion testimony, coupled with Dr. Shanfield’s lack of foundational qualifications in CMP pad

conditioning, renders Dr. Shanfield's opinions, which will be discussed in detail below, not merely unpersuasive, but inadmissible. *See Abbott Vascular, Inc. v. Flexstent*, IPR2019-00882, Paper 48 at 45 (P.T.A.B. Oct. 20, 2020) (excluding testimony where "neither Dr. Solar nor Dr. Jang actually tested a stent disclosed by Fischell '114, nor do they point to any work by others testing the Fischell '114 stents.").

2. Dr. Shanfield's Opinions Are Not the Product of Reliable Principles and Methods

In addition to Dr. Shanfield's lack of qualifications, his opinions should also be excluded because they are not based on sufficient facts or data. Fed. R. Evid. 703. Much of Dr. Shanfield's declaration, which is relied on by Petitioners to support all three grounds of unpatentability asserted in the Petition, relies on *guesswork* to fill gaps between the actual disclosures of its asserted references and the claimed inventions of the '270 Patent. This is not surprising because Dr. Shanfield has never studied nor conducted any research or experiment specific to CMP pad conditioners.

For example, based on the disclosures of the two primary references asserted by Petitioners, Dr. Shanfield purported to determine:

- that "a POSITA would at least have found it obvious to control the protrusion distance of the diamond particles such that the protrusion

distance between the highest protruding tip and the second highest protruding tip of the monolayer of superabrasive particles to be less than or equal to about 50 microns in view of Chou and Sung '479" (Ex. 1002 at ¶ 115);

- that "a POSITA would have considered levelling the heights of the Chou's abrasive tool to levels disclosed by Sung'479 to be a trivial modification, because Sung'479 provides specific numeric values that were well-known to be achievable and suitable for various grinding applications, such as CMP" (*id.* at ¶ 123);
- that "a POSITA would have known from Chou that the deformation of the abrasive tool could be reduced by having superabrasive particles with substantially the same distribution on both the working and non-working surfaces and a POSITA would have been motivated to make such an arrangement." (*id.* at ¶ 137);
- that "a POSITA would have been motivated to achieve tip height variations in superabrasive tools that are as small as possible (e.g., to be within the 2-micron variation that Sung'479 teaches) to improve performance of the tool." (*id.* at ¶ 115);

However, as Patent Owner's expert Prof. Ming-Yi Tsai has shown in un rebutted testimony, Dr. Shanfield's opinions depend on an incorrect understanding of what was known to a POSITA during the relevant timeframe. As Dr. Tsai has explained, the level of precision in aligning tip heights on a CMP pad dresser presumed by Dr. Shanfield was not practically achievable circa 2011 for brazed diamond disk (BDD) pad conditioners. (Ex. 2004 at ¶ 31.) Moreover, circa 2011, even a person of extraordinary skill in the art would not have been able to predict the expected cutting depth and effect on performance of a CMP pad based on variation in the tip heights of superabrasive particles without substantial experimentation. (*Id.* at ¶ 41.) Similarly, Dr. Shanfield fails to consider or account for absence of numerous teachings in Sung '479 that would be necessary for achieving the claimed variations in protrusion distance between tips of superabrasive particles in the '270 patent, such as brazing conditions (*id.* at ¶ 62), leveling process (*id.* at ¶ 63), alignment along a so-called "designated profile" (*id.* at ¶ 64), and removal of a "spacer layer" and "temporary spacer layer" to expose superabrasive particles (*id.* at ¶ 65). Dr. Shanfield's opinions, which have been squarely rejected by Dr. Tsai as not grounded on experience or research, are primarily driven by, or largely contributed to, Dr. Shanfield's lack of experience and understanding in CMP.

Strikingly, Dr. Shanfield does not even acknowledge that Sung '479 reflected an understanding that reduced particle tip variation would result in superior performance of a CMP pad (*id.* at ¶ 53), an understanding that had been overcome in the field by the time of the '270 patent (*id.* at ¶¶ 38-47.). Dr. Shanfield's failure to address this point is indicative of his lack of knowledge and experience in the design and development of CMP pad conditioners and undermines, at a minimum, his opinions as to what a POSITA would have known or been motivated to do in light of Petitioners' asserted references. (*See, e.g.*, Ex. 1002 at ¶¶ 109, 120, 123-125, 139, 148, 154.)

For all of the foregoing reasons, Dr. Shanfield's understanding of the claimed subject matter, including the designated profile and other structural characteristics of the claimed conditioner, is essentially that of a layman, which cannot be used to substitute the opinions of a POSITA or an expert. Hence, Dr. Shanfield's opinions set forth in paragraphs 91-92, 109-125, 132-56, and 159-60 of the Shanfield Declaration should be excluded as inadmissible under Fed. R. Evid. 702 and 703, or in the alternative, be afforded no weight.

B. Exs. 1042-49

The Board should exclude Exhibits 1042-49, all of which are publications by Dr. Tsai which were submitted by Petitioners in support of their erroneous

argument that Dr. Tsai “worked closely with Dr. Sung over many years.” (Reply at 16.) All of these publications were available to Petitioners at the time the Petition was filed, and therefore there is no excuse for its belated filing of these exhibits. *See* 37 C.F.R. § 42.123(b). Moreover, in light of Dr. Tsai’s extensive testimony on his working methods and relationships with Dr. Sung and Kinik (Sur-reply at 28), all of these exhibits are needlessly cumulative and should be excluded under Fed. R. Evid. 403.

C. Ex. 1052

The Board should also exclude Exhibit 1052, U.S. Patent Application Publication No. 2010/0248595 (“Dinh-Ngoc”). This exhibit was submitted by Petitioners only with their Reply to bolster Petitioners’ broader definition of a POSITA. (Reply at 4.) As Petitioners have the burden to prove unpatentability, which includes the appropriate level of skill in the art, they should have submitted this evidence at the outset. As such, Ex. 1052 has been filed belatedly without proper authorization under 37 C.F.R. § 42.123(b). Ex. 1052 should also be excluded as irrelevant under Fed. R. Evid. 403 because no party disputes that CMP is a common technique for fabricating electronic devices, which is the sole proposition for which Petitioners rely on this Exhibit. (Reply at 4.) The issue is not whether CMP is common but rather whether a general specialist in

semiconductor manufacturing is capable of understanding the specific context of CMP technology and CMP pad conditioners in particular.

D. Ex. 1053

The Board should also exclude Ex. 1053, U.S. Application No. 11/223,786 ('786 Application). The '786 Application was publicly available and known to Petitioners at the time of the filing of the Petition, and to the extent they viewed it as necessary to meet their burden of proof, they could and should have submitted it at that time. As such, Ex. 1053 has been filed belatedly without proper authorization under 37 C.F.R. § 42.123(b).

IV. CONCLUSION

For all of the foregoing reasons, the Board should exclude at least paragraphs 91-92, 109-125, 132-56, and 159-60, if not the entirety, of the Shanfield Declaration (Ex. 1002) and exclude Exhibits 1042-49, 1052 and 1053 in their entireties.

Dated: May 28, 2025

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies that on May 28, 2025, the foregoing document is being served via electronic mail upon the following counsel of record for Petitioners:

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