

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

IPR2024-00534
U.S. Patent No. 9,138,862

PATENT OWNER'S MOTION TO EXCLUDE

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Patent Trial and Appeal Board
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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 and 1050-59 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. 9,138,862 (Paper 1, “Pet.”) in the above-captioned case, which relies on *inter alia*, the Declaration of Stanley Shanfield, Ph.D. on Behalf of Petitioner (Ex. 1002, the “Shanfield Declaration”). (See Paper 1 at 8-16, 18-42, 45-71.) On October 2, 2024, Patent Owner filed his Objections to Petitioner’s Pre-Institution Evidence (Paper 16), which included objections to the Shanfield Declaration (*id.* at 1).

On March 5, 2025, Petitioners filed their Reply in Support of [Their] Petition (Paper 23, the “Reply”), which relies on *inter alia*, Exs. 1050-57 (Reply at 24), Ex. 1058 (*id.* at 3), and 1059 (*id.* at 15-18). On March 12, 2025, Patent Owner served his Objections to Petitioners’ Reply Evidence Pursuant to 37 C.F.R. 42.64(b)(1) (Paper 24), which included objections to Exhibits 1050-59.

III. EXHIBITS 1002 AND 1050-59 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 chemical-mechanical planarization (CMP) pad conditioning, the subject matter of U.S. Patent No. 9,138,862 (the "'862 Patent"), and 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 & 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 relied-upon by Petitioners, including Sung '026 (Ex. 1004) and SungICPT (Ex. 1005). Dr. Shanfield's non-expert speculation forms the foundation for Petitioners' contentions that the challenged claims of the '862 Patent are unpatentable.

However, as unrebutted record evidence shows, Dr. Shanfield lacks sufficient expertise and experience to qualify as a POSITA in the design of CMP pad conditioners. Additionally, Dr. Shanfield's opinions are inadmissible because they are derived from unreliable principles and methods.

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 lacks sufficient appropriate experience to opine from the point of view of a POSITA in the technical field of the '862 Patent, which is CMP pad conditioning. Dr. Shanfield's only experience is working in a lab that merely *used* "semiconductor-grade CMP systems" (Ex. 1002 at ¶ 5); he does not identify any experience in designing, manufacturing, or testing the conditioners for those CMP pads used in the lab where he happened to work.

As Patent Owner has contended in his Patent Owner's Response (Paper 17 at 3), the proper level of experience of a POSITA for purposes of the '862 Patent includes at least two years of experience in not merely using CMP pads, but actually developing CMP technology—including specific experience with the design and development of CMP pad dressers. Petitioners' and Dr. Shanfield's alternative requirement of "of two to three years of experience in the field of integrated circuit processing and fabrication techniques" (Pet. at 22; Ex. 1002 at ¶ 61), 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 25 ("Sur-Reply") at 16.) While it is undisputed that CMP

usage is ubiquitous in semiconductor manufacturing, mere experience using CMP as part of an overall semiconductor process flow does not qualify someone as an expert in designing or developing a different CMP conditioning pad or on CMP pad conditioners in general. (See Ex. 1049, 85:15-7:24.) Petitioners' argument is analogous to claiming that any man who has shaved for a few years is sufficiently qualified as an expert in the field of tools for sharpening razor blades.

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 86-91.) 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 '862 patented invention was developed, which is CMP technology, a specialized branch of semiconductor manufacturing. (Ex. 2011 at ¶ 29.) As Patent Owner's expert Dr. Ming-Yi Tsai confirmed in unrebutted testimony, understanding issues such whether perfect alignment of diamond tip heights was practically achievable in the 2011 timeframe depends on specific knowledge of CMP pad design and measurement during the relevant period (Ex. 2011 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 point of view of a POSITA regarding, among other things, whether in Figure 1 of SungICPT “substantially all diamond particles of the dresser are located in the part of the dresser from the outer rim towards the center for about 50% of the radius of the dresser.” (See Ex. 1002 at ¶ 152.) So too regarding whether “a POSITA would have been able to prepare a CMP pad dresser having a tip-to-tip variation of less than about 2 microns, with a reasonable expectation of success, and find it trivial,” or whether “[i]t would be at least obvious to try to level the tips to th[at] variation.” (*Id.* ¶ 177; *see also id.* ¶¶ 193, 197 (similarly opining on what would have allegedly been “obvious to try”).)

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, relied on by Petitioners to support all grounds of unpatentability asserted in the Petition, relies on guesswork to fill gaps between the actual disclosures of Sung '026 and SungICPT and the claimed inventions of the '862 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:

- whether a POSITA would have understood '862 claim element [1A] “pressing a CMP dresser against a CMP pad” from Sung '026 (Ex. 1002 at ¶¶ 87-91);
- whether a POSITA would have understood the ranges of protrusion distances in claim element [1C] to have been disclosed “as recited” based on the disparate “aspects” of Sung '026 (*id.* at ¶¶ 97-108);
- whether a POSITA would have known the particular cutting depths claimed in element [1D] based on Sung '026's disclosure of a range of predetermined tip heights (*id.* at ¶¶ 109-11);
- whether radius a in Figure 1 of SungICPT shows an area with no superabrasive particles (*id.* at ¶¶ 149-53);

For each of these opinions, Dr. Shanfield relies entirely on his non-expert speculation and guesswork to cover the gaps between the actual disclosures of Sung '026 and SungICPT and the claims of the '862 Patent.

For claim element [1A], Dr. Shanfield opines in conclusory fashion that “Sung '026 discloses pressing a CMP pad dresser against a CMP pad” because the frictional forces described in Sung '026 “can only be the result” of such pressing. (See Ex.

1002 at ¶ 90), but fails to consider a scenario in which pressure is applied to the CMP pad; as Dr. Tsai confirmed in un rebutted testimony, this would not meet claim element [1A]. (See POR at 17-19.) Similarly, for claim element [1C], Dr. Shanfield argues that Sung '026 discloses ranges of protrusion distances that are cobbled together from distinct and separate teachings in Sung '026, thereby making a series of logical leaps that are not warranted by the reference. (POR at 22-23.) At best, Sung '026 teaches what a POSITA could have been able to create, but that is not a subject on which Dr. Shanfield is qualified to opine. (*Id.* at 23.)

Regarding claim element [1D], Dr. Shanfield's argument that a range of predetermined tip heights anticipates an equivalent or smaller range of cutting depths (Ex. 1002 at ¶¶ 109-11) fails account for multiple pieces of evidence showing that the performance of CMP dressers and diamond grits was known to be unpredictable as of 2011. (See POR at 38 (citing Ex. 2001 at ¶¶ 22, 25-29; Ex. 2011 at ¶¶ 146-147, 153-159; *see also* Ex. 2002 at 3-4, Ex. 2003 at 1).) Not even a person of **extra**ordinary skill in the art, such as Dr. Tsai, would have been able to determine the cutting depth produced by a pad dresser based on its tip heights without substantial experimentation. (See Ex. 2011 at ¶ 149.) Petitioners offered no rebuttal.

Similarly, for Ground II of the Petition, Dr. Shanfield speculates that Figure 1 of SungICPT "shows that substantially all diamond particles of the dresser are

located in the part of the dresser from the outer rim toward the center for about 50% of the radius of the dresser.” (Ex. 1002 at ¶ 152.) But as Dr. Tsai testified, only a POSITA could accurately assess the image in Figure 1 of SungICPT. (See Ex. 1049, 54:23:55-3 & 55:14-20.) Dr. Shanfield once again strays far from his general and limited expertise when rendering this unsupported opinion.

For all of the foregoing reasons, Dr. Shanfield's understanding of the claimed subject matter, including protrusion distances 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 87-91, 97-108, 109-11, and 149-53 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. 1050-57

The Board should exclude Exhibits 1050-57, all of which are publications by Dr. Tsai submitted by Petitioners in support of their erroneous argument that Dr. Tsai worked closely with Dr. Sung “over many years.” (Reply at 24.) All of these publications were available to Petitioners at the time the Petition was filed, and therefore there is no excuse for their belated filing. 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 24-25), all of these exhibits are needlessly cumulative and should be excluded under Fed. R. Evid. 403.

C. Ex. 1058

The Board should also exclude Exhibit 1058, 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 3.) As Petitioner has the burden to prove unpatentability, which includes the appropriate level of skill in the art, it should have submitted this evidence at the outset. As such, Ex. 1058 has been filed belatedly without proper authorization under 37 C.F.R. § 42.123(b). Ex. 1058 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. But the issue is not whether CMP is common but rather whether general experience in semiconductor manufacturing provides sufficient understanding for the specific context of CMP technology and the development and performance of CMP pad conditioners in particular.

D. Ex. 1059

The Board should also exclude Ex. 1059, 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 it viewed it as

necessary to meet its burden of proof, it could and should have submitted it at that time. As such, Ex. 1059 has been filed belatedly without proper authorization under 37 C.F.R. § 42.123(b). Moreover, as Petitioner has already submitted Sung '026, the publication of the '786 Application, Ex. 1059 is needlessly cumulative and should be excluded under Fed. R. Evid. 403.

IV. CONCLUSION

For all of the foregoing reasons, the Board should exclude paragraphs 87-91, 97-108, 109-11, and 149-53 of the Shanfield Declaration (Ex. 1002) and exclude Exhibits 1050-59 in their entirety.

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 Petitioner:

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