

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

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

PATENT OWNER'S MOTION TO EXCLUDE

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Patent Trial and Appeal Board
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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, 1059 and 1060 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. 9,724,802 (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 7-12, 21-29, 31-37, 39-48, 50-80.) On October 2, 2024, Patent Owner filed his Objections to Petitioners’ Pre-Institution Evidence (Paper 16), which included objections to the Shanfield Declaration (*id.* at 2).

On March 5, 2025, Petitioners filed their Reply in Support of [Their] Petition (Paper 23, the “Reply”), which relies on *inter alia*, Ex. 1059 (Reply at 14-15) and Ex. 1060 (Reply at 14-15). 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 1059 and 1060.

III. EXHIBITS 1002, 1059 AND 1060 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. 9,724,802 (the "'802 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 Tsai (Ex. 1004) and Sung '026. Dr. Shanfield's speculation forms the primary, and in many instances, the sole basis for Petitioners' contentions that the challenged claims of the '802 patent are unpatentable.

However, as evidence of record shows, Dr. Shanfield's lacks sufficient expertise and experience to qualify as a POSITA in CMP pad conditioning. 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 does not have sufficient experience to opine from the point of view of a POSITA in the technical field of the '802 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. 2004 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 17 at 5), the proper level of experience of a POSITA for purposes of the '802 patent includes at least two years of experience in developing CMP technology including 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 23; Ex. 1002 at ¶ 79), 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 at 22.)

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 121-124.) 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 "microscopic structures on a CMP pad conditioner are manufactured and the factors that affect diamond tip height and distribution and pad conditioning [which] is necessary to evaluate the teachings of the '802 patent and the references asserted by Samsung." (Ex. 2011 at ¶ 16.)

As Patent Owner's expert Dr. Ming-Yi Tsai confirmed in un rebutted testimony, understanding issues such as the number of cutters compared to the overall number of diamond grits on a pad conditioner is "difficult" and requires "a lot of experience"—experience that Dr. Shanfield does not possess. (*See* Ex. 1056 at 167:19-168:4 ("Q. Would a POSITA recognize that the number of cutters would change depending on the number of diamond grits? A. It's quite difficult. Q. Why difficult? A. Because it would take a lot of experience and measurements in order to get the precise value.").)

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 as to the structural characteristics of various types of pad conditioners, and in particular, the concept of a "designated profile" for diamond particles arranged across a pad conditioner as well as, for example, the total number of diamonds on a pad conditioner and the total number of cutters on the ODD disclosed in the Tsai reference. (*See* Ex. 1002 at ¶¶ 187-89, 190-203.)

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 be excluded because they are not the product of reliable principles and methods. 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 determine the total number of diamond particles on the disks disclosed in the purported prior art and the numbers of diamonds that cut into a CMP pad, and the profile created by diamond particles arranged across the face of a pad conditioner. 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 partial images or representations of portions of a pad conditioner in the Tsai reference (Ex. 1004), Dr. Shanfield purported to determine from the perspective of a POSITA:

- whether a particular arrangement of diamonds across a substrate has a designated profile, such as a flat profile (Ex. 1002 ¶¶ 127-38, 139-46);
- the total number of diamonds on the pad conditioners disclosed in the Tsai and Sung '026 references asserted by Petitioners (*id.* at ¶¶ 151-61, 164-67);
- the total number of working superabrasive diamond particles on pad conditioners disclosed in the Tsai and Sung '026 references asserted by Petitioners (*id.* at 180, 187-200, 203).

For each of these opinions, Dr. Shanfield relies entirely on speculation and guesswork to cover the gaps between the actual disclosures of Tsai (Ex. 1004) and Sung '026 (Ex. 1005) and the claims of the '802 patent. In particular, regarding the “designated profile,” Dr. Shanfield contends that the partial image of a pad conditioner in Fig. 2e of Tsai (Ex. 1004) “designates a flat profile above the epoxy resin” and therefore teaches the “designated profile” of claim element [1D] of the '802 patent, even when the diamond tips shown in Fig. 2e are representative of the entire pad conditioner, or whether Fig. 2e was drawn to scale. (See POR at 38.) 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.

Similarly, Dr. Shanfield speculates as to the exact number of particles on Tsai's ODD pad conditioner by multiplying the number of diamond tips on an image of a section of an ODD pad conditioner. (Ex. 1002 at ¶¶ 152-58.) However, as confirmed by Dr. Tsai, the lead author of the Tsai reference (Ex. 1004) and a recognized expert in CMP pad conditioners (Sur-Reply at 24), it would not be possible to determine the total number of diamonds on the ODD disclosed in Ex. 1004 based solely on the number of diamonds appearing an image of a single portion of that disk. (See Ex. 2011 at ¶¶ 37-42.) This is particularly true where, as here, Dr. Tsai has opined that the diamond particles shown in the Tsai reference were sprinkled onto the pad conditioner manually "through a mesh in a 'shaking' motion" (by him), leading to randomized and uneven distribution of diamonds across the conditioner. (Sur-Reply at 26.) Dr. Shanfield's lack of qualification and experience in CMP pad conditioners is particularly prejudicial here.

Nor would a POSITA have assumed, as Dr. Shanfield does, that all diamond particles are cutters or cutters that share an equal dressing load without performing any research or measurement. (See Ex. 2011 at ¶¶ 43-55; *see also* Ex. 1055 at 169:8-

14 (“In order to know the actual detail quantity . . . we need to do many, many experiments . . . in order to define the number of working particles.”).) Dr. Tsai was unequivocal that the method relied upon by Dr. Shanfield would not result in an accurate calculation of either the total number of diamond grits on a CMP pad conditioner or the number of working particles:

Q. When you said the phrase "common sense," are you referring to common sense as being that a POSITA would need to measure the diamonds to determine the percentage of diamond grits, or that every disk would contain less than or over 10,000 grits?

MR. HA: Same objections.

THE WITNESS: A POSITA generally would know this is just a general description. In order to know the actual detail quantity or to quantify that, we need to do many, many experiments in order to also know how many diamond grits. Then we need to do a lot of measurements in order to define the number of working particles. Then we can get the answer.

So if a POSITA just look at these information, then they say they already know the answer. ***Then I don't think this person is qualified to be a POSITA.***

(Ex. 1056 at 169:2-17.)

Dr. Tsai also explained that a POSITA would not have relied on approximate numbers of grits to determine the total number of grits on the ODD pad conditioner disclosed in Tsai (Ex. 1004), or that it would be possible to deduce the number of working particles based on the total number of diamond grits. (See Ex. 1055 at 64:6-23 (“THE WITNESS: If this POSITA is a true actual professional POSITA, then he

should know that where it says over 10,000, and this person should know or try to understand how many total grits there are. This person should know this first. And then regarding the working grits, it could be anywhere from zero to 10 percent. Then if this POSITA is very sharp, very smart, then he can actually precisely to quantify this percentage.”.) Yet, that is exactly what Dr. Shanfield did. (See Ex. 1002 at ¶ 180.)

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 127-38, 139-46, 151-61, 164-67, 180, 187-200, and 203 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. Ex. 1059 and Ex. 1060

The Board should exclude Exhibit 1059, Plaintiff's Answering Brief from *Chien-Min Sung v. Kinik Co.*, 1:20-cv-00247-RGA, and Exhibit 1060, Declaration of Alex Chan from *Chien-Min Sung v. Kinik Co.*, 1:20-cv-00247-RGA. Both of these exhibits were submitted by Petitioners only with their Reply to bolster the argument that Dr. Sung disclaimed any priority dates earlier than the filing date of

the '802 patent. (Reply at 14-15.) There is no reason why Petitioners could not have submitted these exhibits with the Petition and cited to them there. As such, both Ex. 1059 and 1060 have been filed belatedly without proper authorization under 37 C.F.R. § 42.123(b).

Exhibits 1059 and 1060 are also inadmissible under Fed. R. Evid. 401 and 402 because they were submitted for the purpose of arguing that the existence of an earlier priority date for any of the claims of the '802 patent “would require finding that the '802 Patent was subject to joint ownership between Dr. Sung and Kinik—a finding which was vehemently opposed by Dr. Sung and recognized by Judge Andrews in the Kinik litigation” (Reply at 14), which is irrelevant to the issue of whether Dr. Sung disclaimed earlier priority dates as Petitioners allege.

Finally, to the extent Petitioners rely on Exhibits 1059 and 1060 to prove an alleged disclaimer by Dr. Sung during the Kinik litigation, both exhibits should be excluded as needlessly cumulative of Ex. 1011, the declaration of Dr. Sung which Petitioners claim contains the purportedly disclaiming statements.

IV. CONCLUSION

For all of the foregoing reasons, the Board should exclude paragraphs 127-38, 139-46, 151-61, 164-67, 180, 187-200, and 203 of the Shanfield Declaration (Ex. 1002) and exclude Exhibits 1059 and 1060 in their entirety.

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Patent Owner's Motion to Exclude

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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