

Filed: January 23, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INNOSCIENCE (ZHUHAI) TECHNOLOGY COMPANY, LTD., AND
INNOSCIENCE AMERICA, INC.,

Petitioner,

v.

EFFICIENT POWER CONVERSION CORPORATION,

Patent Owner.

IPR2023-01382

U.S. Patent 9,748,347

PETITIONER'S PRELIMINARY REPLY

TABLE OF CONTENTS

I.	Introduction: The POPR Relies on Legally and Factually Deficient Arguments.....	1
II.	<i>Shenoy</i> and <i>Ahn</i> Are Analogous Art, and Patent Owner’s Unsupported Arguments Do Not Show Otherwise.....	1
A.	Dr. Shealy’s Unrebutted Testimony Provides a Reasoned Rationale for Why <i>Shenoy</i> and <i>Ahn</i> are in the Same Field of Endeavor as and Reasonably Pertinent to the Problem of the ’347 Patent.....	2
B.	<i>Shenoy</i> and <i>Ahn</i> are each analogous art	4
1.	<i>Shenoy</i> and <i>Ahn</i> are analogous because they are from the same field of endeavor as the ’347 patent.....	4
2.	<i>Shenoy</i> and <i>Ahn</i> are analogous because they solve problems pertinent to the ’347 patent	6
III.	Conclusion: The Board Should Institute on All Grounds	8

TABLE OF AUTHORITIES

CASES

<i>Gemtron Corp. v. Saint-Gobain Corp.</i> 572 F.3d 1371 (Fed. Cir. 2009)	2, 3, 4
<i>In re Bigio</i> 381 F.3d 1320 (Fed. Cir. 2004)	4, 6, 7

P.T.A.B. CASES

<i>Cellco Partnership v. General Access Solutions, Ltd.</i> IPR2023-01147, Paper No. 14 (P.T.A.B. Jan. 9, 2024)	3, 4
<i>United Servs. Auto. Ass’n v. Auto Telematics Ltd.</i> , IPR2023-0085, Paper No. 10 (P.T.A.B. Dec. 19, 2023)	3, 4

LIST OF EXHIBITS

<u>Exhibit</u>	<u>Description</u>
Ex. 1030	Excerpt of the Declaration of Dr. Eric Fred Schubert in Support of Complainant's Opening Claim Construction Brief, <i>In the Matter of Certain Semiconductor Devices, and Methods of Manufacturing Same and Products Containing the Same</i> , ITC Investigation No. 337-TA-1366
Ex. 1031	Excerpt of Complainant's Supplemental Responses to Respondents' Supplemental Invalidity Contentions, <i>In the Matter of Certain Semiconductor Devices, and Methods of Manufacturing Same and Products Containing the Same</i> , ITC Investigation No. 337-TA-1366

TABLE OF ABBREVIATIONS

Abbreviation	Description
'347 patent	U.S. Patent No. 9,748,347
<i>Ahn</i>	Ex. 1010, U.S. Patent No. 5,905,274 to Ahn et al.
<i>Beach</i>	Ex. 1008, U.S. Patent Application Publication No. US 2007/0007547 A1 to Beach
GaN	Gallium nitride
Petition	Petition for <i>Inter Partes</i> Review of U.S. Patent No. 9,748,347 (Paper No. 1)
POPR	Patent Owner's Preliminary Response (Paper No. 7)
<i>Saxler</i>	Ex. 1007, U.S. Patent Application Publication No. US 2006/0108606 A1 to Saxler et al.
Shealy	Ex. 1003, Declaration of James Richard Shealy, Ph.D.
<i>Shenoy</i>	Ex. 1009, R.V. Shenoy and M. Datta, Effect of Mask Wall Angle on Shape Evolution during Through-Mask Electrochemical Micromachining, 143 J. Electrochemical Soc'y, pp. 544-549 (1996)
<i>Yoshida</i>	Ex. 1006, Certified Translation of Japanese Patent Publication No. JP H11-261053 to Yoshida

*All emphasis added unless otherwise indicated.

I. Introduction: The POPR Relies on Legally and Factually Deficient Arguments

Patent Owner advances unsupported attorney argument, not evidence, to contend that *Shenoy* and *Ahn* are not analogous art. POPR, 27-28, 35-36, 38, 39. Petitioner's expert thus stands un rebutted. Shealy, [087]-[098] (Ground 1, *Saxler*, *Beach*, and *Shenoy*), [150] (Ground 2, *Saxler*, *Yoshida*, *Beach*, and *Shenoy*), [169]-[176] (Ground 3, *Saxler*, *Ahn*), [203]-[209] (Ground 4, *Yoshida*, *Saxler*, *Beach*, and *Shenoy*), [238]-[244] (Ground 5, *Yoshida*, *Ahn*). Moreover, the record shows Patent Owner's attorney argument is factually incorrect. *Shenoy* and *Ahn* address the same field of endeavor and provide solutions for achieving the gate structure made by the '347 patent's claimed method. *Id.*; Petition, 29-35, 52-56, 60-64, 73-80, 95-99.

II. *Shenoy* and *Ahn* Are Analogous Art, and Patent Owner's Unsupported Arguments Do Not Show Otherwise

Shenoy and *Ahn* are analogous art because they are in the same field of endeavor and address the same problem as the '347 patent claims. Patent Owner contests that *Shenoy* and *Ahn* analogous with unsupported assertions and through the veil of arguing there is no motivation to combine *Shenoy* and *Ahn* with other references. POPR, 15-17, 27-28, 35-36, 38, 39. Not only is this **the incorrect test**—*Shenoy* and *Ahn* should be compared to the '347 patent, not the references it is combined with—but Patent Owner is wrong. As the Petition explains, *Shenoy* and *Ahn* fall well within the same field of endeavor as the '347 patent, and they disclose

methods pertinent to problems the patent purports to address. Shealy, [059], [061]-[062], [087]-[098], [150], [169]-[176], [203]-[209], [238]-[244]; Petition, 6, 7-8, 29-35, 52-56, 60-64, 73-80, 95-99.

The Board should give no weight to Patent Owner's unsupported attorney argument that *Shenoy* and *Ahn* are not analogous art when addressing the analysis of claim 1 in Grounds 1 and 3-5. POPR, 15-17, 27-28, 35-36, 38, 39. Patent Owner provides no authority or supporting expert testimony to contend that *Shenoy*'s electrochemical etching is somehow inoperative with the other references and not in the same field as the '347 patent. *See id.*, 27-28, 36. Nor does Patent Owner support its assertions that *Ahn* is "directed to an entirely different technology" than the '347 patent and has a gate that "substantially differs from the gate material of the '347 patent. *See id.*, 35-36, 38-39. Such attorney argument is not evidence and cannot rebut Dr. Shealy's reasoned explanation. Shealy, [087]-[098], [150], [169]-[176], [203]-[209], [238]-[244]; Petition, 29-35, 52-56, 60-64, 73-80, 95-99.

A. Dr. Shealy's Unrebutted Testimony Provides a Reasoned Rationale for Why *Shenoy* and *Ahn* are in the Same Field of Endeavor as and Reasonably Pertinent to the Problem of the '347 Patent

Unsupported attorney argument does not rebut expert testimony. *See, e.g., Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d 1371, 1380 (Fed. Cir. 2009) ("[U]nsworn attorney argument . . . is not evidence and cannot rebut . . . other admitted evidence . . ."); *United Servs. Auto. Ass'n v. Auto Telematics Ltd.*,

IPR2023-00857, Paper No. 10 at 37-38 (P.T.A.B. Dec. 19, 2023).

For example, in *Cellco Partnership v. General Access Solutions, Ltd.*, the Board granted institution on grounds where Petitioner provided expert testimony but Patent Owner presented “mere attorney argument in interpreting [a first prior art reference].” IPR2023-01147, Paper No. 14 at 23-24, 50 (P.T.A.B. Jan. 9, 2024). The Board also instituted on other grounds, finding Patent Owner’s interpretation of a second reference “unsupported attorney argument, which is not evidence.” *Id.* at 38-39, 50 (citing *Gemtron*, 572 F.3d at 1380).

Patent Owner makes only conclusory attorney argument that *Shenoy* and *Ahn* are not analogous, relying on unsupported interpretations of the references to address the Petition’s well-supported rationale. POPR, 27-28, 35-36, 38-39. Regarding *Shenoy*, Patent Owner wrongly asserts “a POSA would not have considered *Shenoy*” and proceeds to interpret its disclosure as having “little relevance” because it supposedly does not address relevant materials and would require undue experimentation to combine. *Id.* at 27-28, 36. Regarding *Ahn*, Patent Owner’s attorney argument wrongly characterizes *Ahn*’s technology as “entirely differ[ent]” from the ’347 patent. *Id.* at 35-36, 38-39.

Patent Owner’s wholly unsupported assertions fail to rebut Dr. Shealy. He provides a reasoned explanation showing *Shenoy* and *Ahn* are analogous art to the ’347 patent when he provides a motivation to combine *Shenoy* (Grounds 1, 2, 4) or

Ahn (Grounds 3, 5) with other references to address problems in transistors, the same field as the '347 patent. Shealy, [087]-[098], [150], [169]-[176], [203]-[209], [238]-[244]; Petition, 29-35, 52-56, 60-64, 73-80, 95-99. The Board should give Patent Owner's arguments no weight and grant institution for these unrebutted reasons in the Petition. *See e.g., Gemtron*, 572 F.3d at 1380; *Cellco*, IPR2023-01147, Paper No. 14 at 23-24; *United Servs. Auto. Ass'n*, IPR2023-00857, Paper No. 10 at 37-38.

B. *Shenoy* and *Ahn* are each analogous art

Both *Shenoy* and *Ahn* are analogous art. As the Federal Circuit explained when finding a prior art toothbrush reference was analogous art to a patent directed to a hairbrush, “[t]wo separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor’s endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). Patent Owner’s unsupported contentions that *Shenoy* and *Ahn* are not analogous are incorrect. POPR, 27-28, 35-36, 38, 39. Under either test, *Shenoy* and *Ahn* are analogous to the '347 patent.

1. *Shenoy* and *Ahn* are analogous because they are from the same field of endeavor as the '347 patent

The '347 patent broadly defines the pertinent field as “layered semiconductors

that include various field effect transistors.” ’347 patent, 1:20-58 The patent “generally relates to transistors,” including “heterojunction field effect transistors (HFET), high electron mobility transistors (HEMT), or modulation doped field effect transistors (MODFET).” *Id.* *Shenoy* and *Ahn* fall into this same field of endeavor as the patent. It provides conventional etching techniques for fabricating semiconductor devices that were well known at the time. Shealy, [059], [062], [153]; Petition, 6-7, 58. The ’347 patent describes using known masking and etching techniques. ’347 patent, 2:48-52, 4:8-25, 4:46-57, Fig. 6A-6C; Shealy, [044]-[047], [059]; Petition, 6-11.

The Petition likewise defined a POSITA as having experience in the broad field of “semiconductor device design and/or fabrication, including the processing of semiconductor materials, analysis of device operation, or the development of new device topologies.” Petition, 19; Shealy, [053]. Patent Owner did not dispute this definition. *See generally*, POPR. Indeed, in parallel proceedings, Patent Owner and its expert similarly defined the relevant field of a POSITA’s experience as generally relating to semiconductors, covering “epitaxial growth, design, and fabrication of semiconductor electronic devices, including those of GaN.” Ex. 1030 at 2; Ex. 1031 at 3. Under either definition, a POSITA would have general experience with semiconductor devices, including those described in *Shenoy* and *Ahn*, which proves *Shenoy* and *Ahn* are indisputably analogous. *See* Shealy, [059], [061]-[062], [087]-

[098], [150], [169]-[176], [203]-[209], [238]-[244].

2. *Shenoy* and *Ahn* are analogous because they solve problems pertinent to the '347 patent

The '347 patent's claimed invention includes a method of making a stepped gate structure having a gate-metal layer, which was known at the time. Shealy, [057]-[063]; Petition, 3-8. The patent asserts this structure solves problems with gate leakage. Shealy, [044]-[045]; Petition, 9-10; '347 patent, 2:29-53, 3:60-4:7, 4:40-51.

As the Petition explained, *Shenoy* provides an efficient and effective etching approach that, when used in combination, would improve gate metal positioning relative to the underlying layer and would reduce manufacturing steps for creating the structure resulting from the claimed method, which would reduce costs. Shealy, [087]-[098], [150], [203]-[209]; Petition, 29-35, 56, 76-80. *Shenoy* thus is "reasonably pertinent" to the problem the '347 patent purports to solve. *See In re Bigio*, 381 F.3d at 1325.

The Petition also explains that *Ahn*'s efficient and effective etching approach for transistors offers the same benefits of simplifying manufacturing, reducing costs, and improving accuracy in positioning. Shealy, [169]-[176], [238]-[244]; Petition, 60-64, 95-99. *Ahn* thus is "reasonably pertinent" to the problem the '347 patent purports to solve with its claimed method of making its stepped gate structure. *See In re Bigio*, 381 F.3d at 1325.

In addition to the conclusory attorney argument asserting *Shenoy* and *Ahn* are not analogous discussed above, Patent Owner attempts to rebut Dr. Shealy's testimony with attorney argument that *Shenoy* and *Ahn* are not analogous art because they would not be used to solve problems faced by *Saxler* and *Yoshida*. POPR, 27-28, 35-36, 38, 39. **That uses the wrong test for analogous art.** The test is whether *Shenoy* and *Ahn* are "reasonably pertinent to the particular problem" of the '347 patent, not problems of other prior art. *In re Bigio*, 381 F.3d at 1325.

Regardless, Patent Owner is wrong. The Petition shows *Shenoy* and *Ahn* help make the claimed gate more efficiently and accurately. It shows a POSITA would have made a simple substitution and used *Beach* and *Shenoy*'s techniques (Grounds 1-2, 4) or *Ahn*'s techniques (Grounds 3 and 5) with predictable results for good reasons—to simplify manufacturing, to reduce costs, and to improve positioning. *See* Shealy, [059], [061]-[062], [087]-[098], [150], [169]-[176], [203]-[209], [238]-[244]; Petition, 6, 7-8, 29-35, 52-56, 60-64, 73-80, 95-99. The Petition thereby shows *Shenoy* and *Ahn* reasonably pertinent to the problem of gate leakage—the problem purportedly addressed by the '347 patent—and are thus analogous.

III. Conclusion: The Board Should Institute on All Grounds

For the foregoing reasons, *Shenoy* and *Ahn* are analogous art. The Board should institute on all grounds in the Petition.

Dated: January 23, 2024

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CERTIFICATE OF SERVICE

The undersigned certifies that a copy of the foregoing **Petitioner's Preliminary Reply** was served electronically via email on January 23, 2024, in its entirety on the following counsel of record for the Patent Owner:

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