UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FAVORED TECH CORPORATION,

Petitioner,

v.

P2I LTD.,

Patent Owner.

CASE: IPR2020-00478

Patent No. 8,389,070

PETITIONER'S NOTICE OF APPEAL

Office of the General Counsel
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

January 24, 2022

Petitioner Favored Tech Corporation (Favored) gives notice under 37 C.F.R. § 90.2(a)(1) and timely appeals under 35 U.S.C. §§ 141, 142, and 319 to the United States Court of Appeals for the Federal Circuit from the final written decision entered on August 23, 2021 (Paper 31), from the order entered denying Favored's request for review by the Director entered on November 22, 2021 (Paper 33), and from all underlying orders, decisions, rulings, and opinions. Copies of the final written decision and the order denying Favored's request for Director review are attached.

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), Favored appeals whether the Board erred in holding that Favored failed to meet its burden of proving, by a preponderance of the evidence, that claims 1-3, 6, and 10-14 of U.S. Patent 8,389,070 are unpatentable under 35 U.S.C. § 102 as anticipated by Baalmann, that claims 1-3, 6, and 10-14 are unpatentable under 35 U.S.C. § 103 as obvious over Baalmann, that claims 1-15 are unpatentable are under 35 U.S.C. § 103 as obvious over Baalmann and Coulson, and that claims 16 and 17 are unpatentable under 35 U.S.C. § 103 as obvious over Baalmann, Coulson, and Hillman. That includes the Board's construction or refusal to construe terms used in the challenged claims, the Board's application of the claim language, the Board's use and interpretation of the prior art, the Board's use and interpretation of expert evidence, whether the petition relied on impermissible "picking and choosing" among features disclosed in the

prior art, and whether the Board violated the Administrative Procedure Act. The issues on appeal further include wither the Commissioner of Patents, Andrew Hirshfeld, as the official Performing the Function and Duties of the Under Secretary of Commerce for Intellectual Property and the Director of the USPTO, was precluded from exercising the Director's review authority as to Favored's request for review by the Director of the USPTO by the Appointments Clause, *United States v. Arthrex*, 141 S. Ct. 1970 (2021), or the Federal Vacancies Reform Act of 1998, 5 U.S.C. §§ 3345-3349c. As stated above, the appeal also extends to all underlying findings or determinations and all other issues decided adversely to Favored in this proceeding.

Simultaneously with this submission, a copy of this notice of appeal is being filed with the Patent Trial and Appeal Board, and a copy is being electronically filed with the United States Court of Appeals for the Federal Circuit with the required fee.

Dated: January 24, 2021

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that on this date, in addition to being filed electronically with the Patent Trial and Appeal Board through the PTAB E2E system, a true copy of this notice of appeal is being provided by USPS Priority Mail Express to the Office of the Director of the USPTO at the following address:

Office of the General Counsel
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

The undersigned also certifies that a true and correct copy of this notice of appeal, and the docketing fee of $500, are being electronically filed on this date via CM/ECF and Pay.gov, respectively, with the Clerk's Office of the United States Court of Appeals for the Federal Circuit.

A true and correct copy of this notice of appeal is being electronically served in its entirety on counsel for patent owner on this date as follows:

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Dated: January 24, 2022

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Paper 31
Date: August 23, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FAVORED TECH CORPORATION,
Petitioner,

v.

P2I LTD,
Patent Owner.

IPR2020-00478
Patent 8,389,070 B2

Before KRISTINA M. KALAN, JEFFREY W. ABRAHAM, and SHELDON M. McGEE, *Administrative Patent Judges.*

ABRAHAM, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)
Dismissing Petitioner's Motion to Exclude
37 C.F.R. § 42.64

I. INTRODUCTION

Favored Tech Corporation ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting *inter partes* review of claims 1–17 of U.S. Patent No. 8,389,070 B2 (Ex. 1001, "the '070 patent"). P2i Ltd ("Patent Owner") filed a Preliminary Response to the Petition (Paper 7). After receiving authorization from the Board (Paper 8), Petitioner filed a Reply to Patent Owner's Preliminary Response (Paper 9), and Patent Owner filed a Sur-reply (Paper 10).

On August 25, 2020, we instituted *inter partes* review of all of the challenged claims based on all of the grounds identified in the Petition. Paper 11 ("Inst. Dec."). Subsequently, Patent Owner filed a Request for Rehearing (Paper 13), which we denied (Paper 16). Patent Owner next filed a Response (Paper 17, "PO Resp."), Petitioner filed a Reply (Paper 20, "Reply"), and Patent Owner filed a Sur-reply (Paper 23, "Sur-reply").

Petitioner filed a Motion to Exclude several of Patent Owner's exhibits (Paper 26), Patent Owner filed an Opposition to Petitioner's Motion to Exclude (Paper 28), and Petitioner filed a Reply in Support of its Motion to Exclude (Paper 29).

We held an oral hearing on June 2, 2021, and a transcript of the hearing has been entered into the record. Paper 30 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner has not shown by a preponderance of the evidence that claims 1–17 of the '070 patent are unpatentable.

A. Related Proceedings

The parties indicate that they are not aware of any related matters. Pet. 2; Paper 4, 1.

B. The '070 Patent

The '070 patent, titled "Coating of a Polymer Layer Using Low Power Pulsed Plasma in a Plasma Chamber of a Large Volume," issued on March 5, 2013. Ex. 1001, codes (45), (54). The '070 patent is directed to a method for depositing a polymeric material onto a substrate, and "is particularly suitable for producing oil and water repellent coatings." Ex. 1001, code (57). The method of the '070 patent comprises

> introducing [a] monomeric material in a gaseous state into a plasma deposition chamber, igniting a glow discharge within said chamber, and applying a voltage as a pulsed field, at a power of from 0.001 to 500 w/m^3 for a sufficient period of time to allow a polymeric layer to form on the surface of the substrate.

Ex. 1001, 2:10–15. The '070 patent discusses prior art plasma deposition processes that use small scale production units of 470 cm^3, and explains that most commercial applications require much larger-scale production units, but "initial trials revealed that replication of the conditions used in the small-scale unit in larger chambers did not produce satisfactory results." Ex. 1001, 2:1–7. The '070 patent indicates that its method is suitable for use in large chambers, such as those "where the plasma zone has a volume of greater than 500 cm^3, for instance 0.5 m^3 or more, such as from 0.5 m^3–10 m^3 and suitably at about 1 m^3," and produces layers that have good properties at power density levels that are unexpectedly lower than those conventionally used in plasma deposition processes. Ex. 1001, 2:19–31.

C. Illustrative Claim

Petitioner challenges claims 1–17 of the '070 patent. Pet. 1. Claim 1 is the only independent claim, and is reproduced below:

> 1. A method for depositing a polymeric material onto a substrate, the method comprising introducing a monomeric material in a gaseous state into a plasma deposition chamber in which a plasma zone has a volume of at least 0.5 m^3, igniting a glow discharge within said chamber, and applying a voltage as a pulsed field, at a power of from 0.001 to 500 w/m^3 for a sufficient period of time to allow a polymeric layer to form on the surface of the substrate.

Ex. 1001, 10:22–29.

D. The Asserted Unpatentability Challenges

Petitioner contends claims 1–17 of the '070 patent are unpatentable based on the following challenges:

Claims Challenged	35 U.S.C. §[1]	Reference(s)/Basis
1–3, 6, 10–14	102	Baalmann[2]
1–15	103	Baalmann, Coulson[3]
16, 17	103	Baalmann, Coulson, Hillman[4]

[1] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), which amended 35 U.S.C. §§ 102 and 103, became effective March 16, 2013. Because the application from which the '070 patent issued was filed before this date, the pre-AIA version of §§ 102 and 103 applies.

[2] US 2001/0015284 A1, published Aug. 23, 2001 (Ex. 1004).

[3] Coulson et al., *Ultralow Surface Energy Plasma Polymer Films*, Chem. Mater. Vol. 12, No. 7, 2031–2038 (2000) (Ex. 1003).

[4] US 5,451,258, issued Sept. 19, 1995 (Ex. 1005).

Petitioner also relies on declarations from Karen Gleason, Ph.D. (Ex. 1002, "the Gleason Declaration"; Ex. 1022). Patent Owner relies on a declaration from Gregory N. Parsons, Ph.D. (Ex. 2010, "the Parsons Declaration").

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, we construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b). Under *Phillips*, claim terms are afforded "their ordinary and customary meaning." *Phillips*, 415 F.3d at 1312. "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Id.* at 1313. "Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

Petitioner proposes constructions for the terms "plasma zone" and "between 1 m^3 and 10 m^3." Pet. 15–18. Petitioner also contends that the term "1H, 1H, 2H, 3H-heptadecafluorodecylacylate" in claim 9 contains two typographical errors (indicated by underlining), and should be construed to correctly recite HDFDA (1H, 1H, 2H, 2H-heptadecafluorodecylacrylate). Pet. 18. Petitioner's argument is based on the language of claim 8 and the remaining language in claim 9, which identify the specified compounds as acrylates. Pet. 18–19 (citing Ex. 1001, 10:60–61, 10:66–67). Petitioner also relies on the language in the Specification that repeatedly identifies 1H, 1H,

2H, 2H-heptadecafluorodecylacrylate as a preferred monomer, and notes the Specification never mentions 1H, 1H, 2H, 3H-heptadecafluorodecylacrylate. Pet. 19.

Patent Owner disputes Petitioner's proposed construction of "plasma zone." PO Resp. 9–16. Patent Owner, however, also argues that we do not need to construe this term to determine the outcome of this proceeding. Sur-reply 1. Patent Owner does not address the alleged error in claim 9.

After considering Petitioner's arguments regarding claim 9, Patent Owner's silence regarding claim 9, and the language in the '070 patent itself (e.g., Ex. 1001, 11:45–52, 12:60–61), we agree with Petitioner that the term "1H, 1H, 2H, 3H-heptadecafluorodecylacylate" in claim 9 should be construed to correctly recite HDFDA (1H, 1H, 2H, 2H-heptadecafluorodecylacrylate). The error Petitioner identifies is conspicuous and undisputed, and the intrinsic record does not suggest a different interpretation. *Fitbit, Inc. v. Valencell, Inc.*, 964 F.3d 1112, 1119–20 (Fed. Cir. 2020); *Novo Industries, L.P. v. Micro Molds Corp.*, 350 F.3d 1348, 1357 (Fed. Cir. 2003).

Additionally, after reviewing the parties' remaining claim construction arguments and evidence, we determine that we do not need to expressly construe any other terms for purposes of this Decision because, as addressed in detail below, we find Petitioner's showings deficient for reasons that do not depend on the construction of any claim term. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.")).

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art in the field of the '070 patent would have had "at least a bachelor's degree in a field such as chemistry, physics, or chemical engineering, as well as at least two years of experience with plasma-polymerization techniques." Pet. 14 (citing Ex. 1002 ¶¶ 26–31).

Patent Owner agrees with this proposed definition "with the understanding that 'experience with plasma-polymerization techniques' includes plasma-enhanced chemical vapor deposition (PECVD) techniques." PO Resp. 9 (citing Ex. 2010 ¶ 20; Ex. 1002 ¶¶ 12, 63).

In light of the record before us, we adopt Petitioner's proposal regarding the level of one of ordinary skill in the art. As Patent Owner points out, Dr. Gleason states that PECVD is a form of plasma polymerization, and thus the parties agree that experience with plasma-polymerization techniques would include PECVD. PO Resp. 9; Ex. 1002 ¶ 63. The level of ordinary skill in the art is also reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

C. *Legal Principles*

1. Anticipation

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. Inc., v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Moreover, "[b]ecause the hallmark of anticipation is prior invention, the prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements 'arranged as

in the claim.'" *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)). Whether a reference anticipates is assessed from the perspective of an ordinarily skilled artisan. *See Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368 (Fed. Cir. 2003) ("'[T]he dispositive question regarding anticipation [i]s whether *one skilled in the art* would reasonably understand or infer from the [prior art reference's] teaching' that every claim element was disclosed in that single reference.") (quoting *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991) (emphasis added)).

2. Obviousness

In *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), the Supreme Court set out a four-factor framework for assessing obviousness under § 103: (1) the "level of ordinary skill in the pertinent art," (2) the "scope and content of the prior art," (3) the "differences between the prior art and the claims at issue," and (4) "secondary considerations" of non-obviousness such as "commercial success, long-felt but unsolved needs, failure of others, etc." *Id.* at 17–18. "While the sequence of these questions might be reordered in any particular case," *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007), the Federal Circuit has "repeatedly emphasized that an obviousness inquiry requires examination of all four *Graham* factors and that an obviousness determination can be made only after consideration of each factor." *Nike, Inc. v. Adidas AG*, 812 F.3d 1326, 1335 (Fed. Cir. 2016).

D. Claims 1–3, 6, 10–14 — Alleged Anticipation by Baalmann

Petitioner contends Baalmann anticipates claims 1–3, 6, and 10–14. Pet. 22–31; Reply 25. Petitioner directs us to portions of Baalmann that purportedly disclose all the limitations of the challenged claims, and also relies on the Gleason Declaration to support its arguments.

1. Baalmann (Ex. 1004)

Baalmann discloses methods for applying a plasma-polymer coating to an insulator. Ex. 1004, code (57). Baalmann's method includes, *inter alia*, introducing part of an insulator into a vacuum chamber of a plasma reactor, evacuating the chamber, admitting a working gas into the chamber, and forming a plasma from the working gas by generating an electrical field in the chamber, wherein an electrical power input per chamber volume is set to between 0.5 kW/m^3 and 5 kW/m^3. Ex. 1004 ¶¶ 14–20. Baalmann states that "[t]he ignition of the plasma by generating an electric field can take place in a way known" to one of ordinary skill in the art, including "by applying a voltage to electrodes arranged on the chamber." Ex. 1004 ¶ 35. Baalmann discloses various electrode arrangements, including having one electrode in the form of a rod while the other electrode is formed by the chamber wall itself, or using two opposite rod-shaped electrodes. Ex. 1004 ¶ 35. Baalmann also provides specific examples of its process that use a plasma reactor having an evacuable chamber with a volume of 1 m^3. Ex. 1004 ¶¶ 47–48.

2. Analysis

Independent claim 1 of the '070 patent requires, *inter alia*, introducing a monomeric material in a gaseous state into a plasma deposition chamber in

which a plasma zone has a volume of at least 0.5 m^3, and applying a voltage as a pulsed field at a power of from 0.001 to 500 w/m^3. Ex. 1001, 10:22–29.

With regard to plasma zone volume, Petitioner argues that in Example 1, Baalmann discloses using an evacuable chamber having a volume of 1 m^3 as its plasma chamber, which means the chamber has an internal volume of 1 m^3 that can be occupied by a gas. Pet. 25 (citing Ex. 1002 ¶¶ 49, 102). Petitioner acknowledges that Baalmann does not explicitly identify the electrode configuration used for the plasma chamber of Example 1, but contends a person of ordinary skill in the art would have understood that the plasma chamber for Example 1 "would be configured as described throughout the rest of the specification: with the chamber wall serving as one of the electrodes," because, according to Petitioner, Baalmann "emphasized using plasma chambers in which one electrode was 'formed by the chamber wall itself.'" Pet. 24 (citing Ex. 1004 ¶¶ 35, 61).

In view of this, Petitioner asserts that a person of ordinary skill in the art would have recognized that introducing a working gas into the plasma chamber in Example 1 of Baalmann would have resulted in a gas, either alone or in combination with any substrate in the chamber, occupying the full 1 m^3 chamber volume, and that applying electrical power to the chamber with the outer wall serving as one of the electrodes would have generated plasma throughout the full 1 m^3 volume of the chamber. Pet. 25. Petitioner concludes that a person of ordinary skill in the art would have understood Baalmann as disclosing a plasma chamber having a plasma zone of at least 0.5 m^3, as claim 1 requires. Pet. 24.

With regard to power density, Petitioner argues that Baalmann discloses forming plasma using "a power of from 0.001 to 500 w/m^3"

because Baalmann generally identified 0.5 kW/m^3 to 5 kW/m^3 as "the applicable power-density range, without any limitations based on chamber size." Pet. 27–28 (noting that 0.5 kW/m^3 equals 500 W/m^3). Petitioner acknowledges that Baalmann used a power density of 2 kW/m^3, which exceeds the upper end of the range in claim 1, with the 1 m^3 plasma chamber in Example 1,[5] but argues that a person of ordinary skill in the art "would not have limited all use of a 1 m^3 chamber in the disclosed methods to that single point within the disclosed power-density range." Pet. 28. Instead, according to Petitioner, a person of ordinary skill in the art "would have immediately envisaged using Baalmann's 1 m^3 plasma chamber to perform plasma polymerization at other power densities within the disclosed range of 0.5 kW/m^3 to 5 kW/m^3, including at 0.5 kW/m^3 (500 W/m^3)." Pet. 28 (citing *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381–83 (Fed. Cir. 2015) in support of its argument that incorporating every claim limitation into a single working example is not required for anticipation).

Patent Owner argues that Petitioner fails to establish Baalmann discloses each limitation of claim 1 combined in the same way as recited in claim 1. PO Resp. 17. In particular, Patent Owner argues that Petitioner "attempt[s] to cobble together unrelated disclosures of Baalmann" to demonstrate anticipation. PO Resp. 18–20. These allegedly cobbled-together disclosures include: Baalmann's general disclosure of reactors that use the chamber wall as one electrode; Baalmann's general disclosure of a power density between 0.5 kW/m^3 and 5 kW/m^3; and Baalmann's specific disclosure of a 1 m^3 reactor in Example 1.

[5] Based on Petitioner's argument that the reactor in Example 1 had a plasma zone volume of 1 m^3. Pet. 25.

With regard to power density, Patent Owner contends that although Baalmann generally discloses the use of a power density between 0.5 kW/m^3 and 5 kW/m^3, Baalmann does not "link its power per chamber volume range with any particular reactor size or plasma zone size." PO Resp. 19. Patent Owner notes that Baalmann's only disclosure of power requirements for a particular reactor size are in Examples 1 and 2, which apply a power density of 2 kW/m^3 and 3.4 kW/m^3, respectively, and that these power density values are much higher than the upper limit of the claimed plasma power density range of 500 W/m^3. PO Resp. 18–19.

As to plasma zone volume, Patent Owner argues that Baalmann does not expressly disclose the plasma zone volume of the reactor in Example 1, or provide the details of the electrode configuration in the reactor used in Example 1. PO Resp. 22–24. Patent Owner asserts that, as a result, Petitioner and Dr. Gleason can only speculate that the reactor in Example 1 uses the chamber wall as one electrode, and that such a reactor would form a plasma zone filling the entire reactor. PO Resp. 23–24. According to Patent Owner, these assumptions, combined with the assumption that a person of ordinary skill in the art would have used a power density at the lower endpoint of the range disclosed in Baalmann for the reactor in Example 1, form the basis of Petitioner's anticipation challenge. Patent Owner contends not only that such assumptions are incorrect and unfounded, but also that relying on such unfounded assumptions and speculation about the reactor in Example 1 is insufficient to demonstrate Baalmann anticipates claim 1. PO Resp. 22–24.

We agree with Patent Owner. Petitioner has failed to demonstrate adequately that each and every element in claim 1, arranged as recited in the

claim, is found in a single prior art reference. *NetMoneyIN*, 545 F.3d at 1369; *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). Here, Petitioner combines several different teachings from Baalmann to support its anticipation argument. For example, Petitioner relies on the "evacuable chamber with a volume of 1 m^3" from Baalmann's Example 1, but not the power (2kW) expressly disclosed as being used with that reactor of Example 1. Ex. 1004 ¶ 47. With regard to power density, Petitioner relies on Baalmann's general disclosure that "[t]he electrical power input per chamber volume is set between 0.5 kilowatt/m^3 and 5 kilowatt/m^3." Ex. 1004 ¶ 20. As Patent Owner points out, however, that power density range is not tied to any particular reactor volume or plasma zone volume. PO Resp. 19.

Baalmann also fails to expressly disclose the plasma zone volume of the reactor in Example 1. *See* Ex. 1004 ¶¶ 47–48. To attempt to overcome this absence of an express disclosure, Petitioner argues that, for the reactor used in Example 1, the plasma zone volume and reactor volume are the same based on the configuration of the electrodes in the reactor. Pet. 24–25. Baalmann, however, does not expressly disclose the electrode configuration of the reactor in Example 1. *See* Ex. 1004 ¶¶ 47–48. Instead, Petitioner relies on Baalmann's general disclosure of an embodiment wherein one electrode is formed by the chamber wall itself. Pet. 24–25; Ex. 1004 ¶¶ 35, 61. In so doing, Petitioner ignores the fact that Baalmann also states that "[t]wo opposite rod-shaped electrodes may also be used." Ex. 1004 ¶ 35. In view of this, we disagree with Petitioner's conclusion that a person of ordinary skill in the art "would have understood that chamber to be

configured as described throughout the rest of the specification: with the chamber wall serving as one of the electrodes." Pet. 24.

Even if we were persuaded by Petitioner's argument, the fact remains that Petitioner's anticipation challenge is based on the combination of different features disclosed in separate portions of Baalmann. "Such picking and choosing . . . has no place in the making of a 102, anticipation rejection." *In re Arkley*, 455 F.2d 586, 587–88 (CCPA 1972) (cited with approval in *Sanofi-Synthelabo v. Apotex, Inc.*, 550 F.3d 1075, 1083 (Fed. Cir. 2008)); *see also Microsoft Corp. v. Biscotti, Inc.,* 878 F.3d 1052, 1069 (Fed. Cir. 2017) (stating that anticipation is not proven by multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention).

Additionally, we are not persuaded that the holding in *Kennametal* warrants a different outcome here. *See* Pet. 27–28. In *Kennametal*, the prior art specification expressly disclosed all of the claim limitations. *Kennametal*, 780 F.3d at 1382. Here, however, Baalmann does not expressly disclose the use of its entire power density range in combination with a reactor having a particular overall volume or plasma zone volume. Thus, unlike *Kennametal*, the question for purposes of anticipation here is more than determining "whether the number of categories and components" disclosed in the prior art is so large that the combination of limitations "would not be immediately apparent to one of ordinary skill in the art." *Id.* As a result, we are not persuaded that a person of ordinary skill in the art would at once envisage using a power input of 0.5 kW/m^3 with a reactor having a plasma zone volume of at least 0.5 m^3, sufficient for purposes of establishing anticipation, based on Baalmann's general disclosure of using a

power density in the range of 0.5 to 5 kW/m^3, Baalmann's disclosure of one example using a plasma chamber having a volume of 1 m^3, and Baalmann's general disclosure of various possible electrode configurations.

Petitioner bears the burden of demonstrating that the prior art discloses all the elements of claim 1 within the four corners of the document, and arranged as in the claim. *NetMoneyIN,* 545 F.3d at 1369. Petitioner has not presented evidence sufficient to satisfy that burden. As a result, Petitioner has not shown a by a preponderance of evidence that Baalmann anticipates claim 1.

Claims 2, 3, 6, and 10–14 depend from claim 1, and, therefore, include all of the limitations of claim 1. Ex. 1001, 10:29–12:3; *see* 37 C.F.R. § 1.75(c) ("Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim."). In view of our determination that Petitioner fails to establish that Baalmann anticipates claim 1, we reach the same result for claims 2, 3, 6, and 10–14.

E. Obviousness Challenges Based on Baalmann and Coulson

Petitioner contends claims 1–15 are unpatentable as obvious in view of Baalmann and Coulson. Pet. 31–58; Reply 15–25. Petitioner also contends that claims 16 and 17 are unpatentable as obvious in view of Baalmann, Coulson, and Hillman. Pet. 58–61. Petitioner directs us to portions of the references that purportedly teach or suggest all the limitations of the challenged claims, and also relies on the testimony of Dr. Gleason to support its arguments.

1. Coulson (Ex. 1003)

Coulson discloses plasma polymerization experiments in an "inductively coupled cylindrical glow discharge reactor" having a diameter of 5 cm and a volume of 470 cm^3. Ex. 1003, 2032. Coulson discloses using 1*H*, 1*H*, 2*H*, 2*H*-heptadecafluorodecylacrylate monomer (HDFDA) in its experiments, and applying a voltage at 13.56 MHz at a power of 40W in a pulsed manner at 20 μs on and 20000 μs off to generate plasma. Ex. 1003, 2032, 2034–35. Coulson describes its method as effective and capable of yielding "low surface energy coatings which display no polar contribution and exhibit excellent repellency toward low surface tension liquids." Ex. 1003, 2038.

2. Analysis

a. Claim 1

As noted above, claim 1 requires a plasma deposition chamber having a plasma zone volume of at least 0.5 m^3, and applying a voltage at a power of from 0.001 to 500 w/m^3. Ex. 1001, 10:22–28.

Petitioner argues that Baalmann describes plasma coating methods for large substrates in large plasma chambers. Pet. 34. Petitioner points to the reactor used in Baalmann Example 1 as one example of a large scale system, arguing that a person of ordinary skill in the art would have recognized the 1 m^3 chamber used in Example 1 as a "relatively large chamber suited for plasma coating large substrates." Pet. 34. Additionally, Petitioner argues that a person of ordinary skill in the art

> would have been motivated to use Baalmann's disclosed outer-wall electrode configuration with large-scale chambers like Baalmann's 1 m^3 chamber to maximize the plasma zone to cover the full chamber volume because doing so would have

> maximized the effective chamber capacity at any given chamber size by allowing the reactive plasma to reach all substrate surfaces, even for large substrates or large batches of smaller substrates extending near the outer limits of the chamber.

Pet. 35 (citing Ex. 1002 ¶ 125). Accordingly, Petitioner argues that Baalmann disclosed the use of a chamber having a plasma zone volume of 1 m^3, and thus at least 0.5 m^3. Pet. 35.

Petitioner argues that Baalmann discloses applying power to the plasma chamber at power densities "between 0.5 kW/m^3 and 5 kW/m^3," and notes that 0.5 kW/m^3 equals 500 W/m^3, as recited in claim 1. Pet. 37 (citing Ex. 1004 ¶ 18; Ex. 1002 ¶ 106).

Petitioner asserts Coulson describes "similar power densities," and argues that a person of ordinary skill in the art would have calculated the applied power density used in Coulson's methods by dividing the average power by the plasma zone volume. Pet. 37–38. Based on the "optimum pulsed-plasma conditions" reported in Coulson, including the use of 40 W pulses at intervals of 20 µs on and 20,000 µs off, Petitioner contends a person of ordinary skill in the art would have calculated an average power of approximately 0.04 W. Pet. 37–38. With regard to plasma zone volume, Petitioner notes that Coulson discloses using a glow discharge reactor having a volume of 470 cm^3. Pet. 38. Petitioner states that a person of ordinary skill in the art "would have known [that] the plasma zone volume was where plasma was present and thus where polymer deposition could take place, and contends that "[s]killed artisans . . . routinely reported reaction volumes in terms of plasma-zone volume 'because that was the operative value of primary interest to other [persons of ordinary skill in the art].'" Pet. 38 (quoting Ex. 1002 ¶ 133). Accordingly, Petitioner argues

that, under its own construction of the term plasma zone, a person of ordinary skill in the art "would have understood Coulson's 470 cm^3 'glow discharge reactor' volume as the volume that contained plasma during operation." Pet. 38. Petitioner thus argues that a person of ordinary skill in the art would have concluded that Coulson's 0.04 W average power was applied over a 470 cm^3 plasma zone, resulting in a power density of 85.1 W/m^3. Pet. 37–38 (citing Ex. 1003, 2032, 2034–35; Ex. 1002 ¶¶ 132–134).

Petitioner next argues that a person of ordinary skill in the art "desiring to prepare plasma-polymer coatings would have been aware of both Baalmann and Coulson and would have been motivated to combine Baalmann's large-scale coating methods with Coulson's HDFDA-based coating methods." Pet. 39. Petitioner contends that Coulson describes optimum pulsed plasma conditions to obtain advantageous results with HDFDA, and, as a result, a person of ordinary skill in the art would have been motivated to use Coulson's pulsed-field protocol and optimum power density in Baalmann's larger plasma chamber to replicate Coulson's reported optimum coating conditions. Pet. 39–48; *see also* Pet. 48 ("A [person of ordinary skill in the art] would have been motivated to maintain the same or similar reaction conditions within a larger reaction chamber that were present in Coulson's chamber during Coulson's reported plasma polymerization reactions, including power density and pressure, to preserve the same effective results."), 48–49 ("That would have included motivation to maintain Coulson's disclosed power density when scaling up to a larger reaction volume to preserve the beneficial results Coulson reported at that optimized power density."). Petitioner also argues that a person of ordinary skill in the art would have expected to succeed in incorporating Coulson's

use of HDFDA monomer and its optimized reaction conditions into Baalmann's larger-scale coating methods. Pet. 42–44.

Patent Owner argues, *inter alia*, that Petitioner's calculation of power density is flawed because Coulson discloses 470 cm^3 as the volume of the flow discharge reactor, not the plasma zone volume of the reactor. PO Resp. 43. Patent Owner argues that plasma zone volume is distinct from reactor volume, and disagrees that a person of ordinary skill in the art would have understood the plasma zone volume in Coulson's reactor to be 470 cm^3 based on Coulson's disclosure of a glow discharge reactor having a volume of 470 cm^3. PO Resp. 42–43. Patent Owner contends that two references Dr. Gleason relies upon (Lee[6] and Felts[7]) actually undermine her testimony and show that "the established convention" is the volume of a plasma zone is distinct from the reactor volume. PO Resp. 43. Patent Owner also directs us to an additional reference (Yasuda[8]) that purportedly shows a tubular reactor wherein plasma did not extend throughout the entire reactor volume. PO Resp. 43–44.

In its Reply, Petitioner does not dispute that Coulson fails to expressly disclose a plasma zone volume, but asserts that a person of ordinary skill would have *inferred* that Coulson's plasma zone volume encompasses the full volume of the 470 cm^3 reactor. Reply 16. Petitioner argues that in an obviousness analysis, "a court can take account of the inferences and

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[6] US 4,827,870, issued May 9, 1989 (Ex. 1006).

[7] Felts and Grubb, "*Commercial-scale application of plasma processing for polymeric substrates: From laboratory to production*," J. Vac. Sci. Technol. A 10(4), July/Aug 1992 (Ex. 1015).

[8] Yasuda, PLASMA POLYMERIZATION, Academic Press, Inc., 1985 (Ex. 2015).

creative steps that a person of ordinary skill in the art would employ." Reply 15–16 (quoting *KSR*, 550 U.S. at 418). Petitioner also argues that "the obviousness analysis includes 'logic, judgment, and common sense available to the [person of ordinary skill in the art] that do not necessarily require explication in any reference or expert opinion.'" Reply 16 (quoting *Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009)).

Petitioner maintains that Felts and Lee support its position because they "show only that when the plasma volume is distinct from the reactor volume, [persons of ordinary skill in the art] generally point out and report the plasma volume because that is most pertinent." Reply 17. According to Petitioner, "[w]hen chamber volume and plasma volume are the same, however, no distinction is necessary." Reply 17 (citing Ex. 2010 ¶ 53; Ex. 1002 ¶ 133). Petitioner also argues that Patent Owner's own exhibits support Petitioner's arguments because they report that plasma "could be extended to both ends" of a tubular reaction chamber (Ex. 2015) and plasma extending "throughout the discharge tube" of a glass-tube reactor (Ex. 2007, 362). Reply 18–19. According to Petitioner, these references support an inference that plasma fills Coulson's reactor tube, which was operated under similar conditions, such that Coulson's plasma zone extends throughout the full volume of the plasma chamber. Reply 18–20.

In its Sur-reply, Patent Owner argues that Petitioner improperly attempts to "backfill missing details regarding Coulson's plasma zone" through expert testimony about what a person of ordinary skill in the art would have understood about the plasma zone of Coulson. Sur-reply 18–19 (distinguishing *KSR* and *Perfect Web*). Patent Owner also argues its declarant, Dr. Parsons, did not agree with Dr. Gleason's conclusions

regarding what a person of ordinary skill in the art would have understood from Coulson, and testified that Coulson's disclosure does not permit a person of ordinary skill in the art to determine plasma zone size (and therefore power density). Sur-reply 19 (citing PO Resp. 8; Ex. 2010 ¶ 72). Patent Owner notes that Dr. Gleason testified only that Felts and Lee suggest persons of ordinary skill in the art "*typically* specify plasma zone volume" (Ex. 1022 ¶ 25), and therefore there is no support for Petitioner's argument that when a plasma zone volume is not reported, it is necessarily the same as reactor volume. Sur-reply 19–20.

Patent Owner also argues that Petitioner's attempt to compare Coulson's plasma zone to those in other prior art experiments fails because the size of a plasma zone depends on several variables, including, but not limited to reactor and electrode configuration. Sur-reply 20 (citing Ex. 2010 ¶¶ 55, 77; Ex. 2004, 293; Ex. 2011, 27:20–28:4). According to Patent Owner, "Coulson does not specify any details regarding the configuration of the reactor (other than volume and an unspecific diameter (Ex. 2017, 79:2–7)) or electrode(s) used." Sur-reply 21. Finally, Patent Owner notes that Dr. Gleason did not perform any experiments to verify her opinions regarding Coulson's plasma zone. Sur-reply 21.

After considering the parties' arguments and evidence developed during the full trial, we are not persuaded by Petitioner's arguments that a person of ordinary skill in the art would have inferred that Coulson's plasma zone volume was coextensive with the reactor volume. Reply 15–16; Pet. 38. Petitioner's primary support for this argument is Dr. Gleason's testimony that skilled artisans "routinely reported reaction volumes in terms of plasma-zone volume because that was the operative value of primary

interest to other [persons of ordinary skill in the art].'" Pet. 38; Ex. 1002 ¶ 133. As noted in our Institution Decision, Petitioner and Dr. Gleason attempt to correlate "plasma-zone volume" with "reaction volumes" reported by persons of ordinary skill in the prior art. Inst. Dec. 25. Coulson, however, reports a "reactor" volume, not a "reaction" volume. Ex. 1003, 2032.

In our Institution Decision, we indicated that this distinction between "reactor" and "reaction" volume is significant because our review of the references Dr. Gleason relies upon show that the "reaction" volume is not necessarily coextensive with "reactor" volume. Inst. Dec. 25. For example, Dr. Gleason cites Lee and Felts in support of her opinion that skilled artisans "routinely reported *reaction* volumes in terms of plasma-zone volume." Ex. 1002 ¶ 133 (emphasis added). With regard to Lee, Dr. Gleason states that the inventors used the term "reactor zone" at column 4, lines 39–48 to describe the area where the plasma and film-forming process occurred, i.e., the reaction volume. Ex. 1002 ¶ 133. Although this may be true, it appears to us from Lee that the "reactor zone" refers to "zone 44," which occupies only the space between two electrodes inside reaction chamber 18. Ex. 1006, 2:50, 4:1–2 ("Electrostatic side shields 48 serve to confine the plasma in gap zone 44 between electrodes 28 and 34."); Fig. 2 (depicting zone 44 with an arrow pointing between electrodes 28 and 34 inside reaction chamber 18). Therefore, the volume of the "reactor zone" where the plasma and film forming process occurs in Lee is not coextensive with the volume of the reactor (reaction chamber 18) itself.

With regard to Felts, Dr. Gleason states that the authors described the plasma chamber size in terms of "process plasma volume," which a person

of ordinary skill in the art would have understood to be the volume of the plasma zone. Ex. 1002 ¶ 133. First, we note that Felts uses the term "plasma zone" (Ex. 1015, 1677), but neither Petitioner nor Dr. Gleason address the meaning of that term or its comparative size in relation to either the "process plasma volume" or the reactor volume. Next, even assuming that a person of ordinary skill in the art would have understood "process plasma volume" to refer to the volume of the plasma zone, the reactor shown in Figure 1 of Felts depicts a "process plasma volume" that appears to be smaller than the volume of the entire reactor.

For example, Figure 1 of Felts is reproduced below:

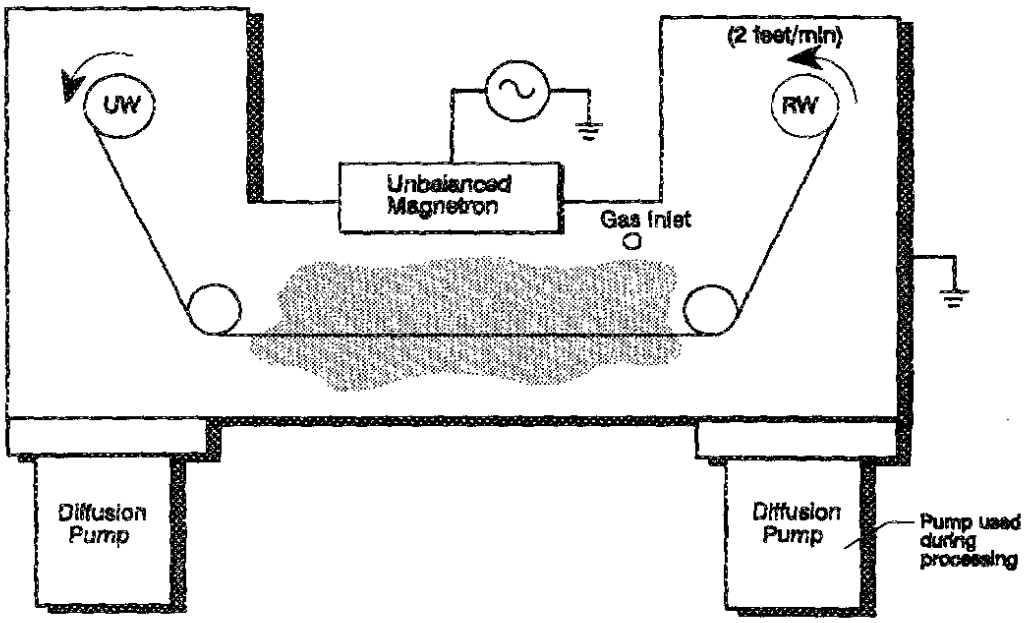

Figure 1 of Felts provides a schematic depiction of the R-9 coater used in certain experiments. Ex. 1015, 1675–1676. In describing the coater shown in Figure 1, Exhibit 1015 states: "The roll-to-roll configuration allowed free-spanning of thin polymeric substrates *through the process plasma* with a source to substrate distance of 2 in." Ex. 1015, 1676 (emphasis added).

Based on this description, it would appear that the shaded portion of Figure 1 corresponds to the "process plasma," and, therefore, Figure 1 illustrates that the process plasma volume is smaller than the volume of the entire reactor.

Testimony from Patent Owner's declarant Dr. Parsons further supports our finding that Lee and Felts disclose reactor chambers wherein the volume of the plasma zone is less than the volume of the reactor chamber itself. Ex. 2010 ¶ 54 (discussing Felts), ¶ 60 (discussing Lee). Notably, Petitioner's own arguments in the Reply suggest that the plasma volume in Lee and Felts is distinct from the reactor volume. *See* Reply 17 (arguing that Lee and Felts "show only that *when the plasma volume is distinct from the reactor volume*, [persons of ordinary skill in the art] generally point out and report the plasma volume" (emphasis added)). Thus, even if we were to agree with Dr. Gleason's statement that, based on Lee and Felts, persons of ordinary skill in the art routinely reported *reaction* volumes in terms of plasma zone volumes (Ex. 1002 ¶ 133), the evidence of record shows that reaction volume/plasma zone volume and the volume of the reactor itself are not necessarily coextensive. This undermines Petitioner and Dr. Gleason's assertion that a person of ordinary skill in the art would have inferred Coulson's plasma zone had a volume of 470 cm^3 based on Coulson's disclosure that its reactor had a volume of 470 cm^3. Pet. 38; Reply 16; Ex. 1002 ¶ 133.

Nor are we persuaded by Petitioner's assertion that "[w]hen chamber volume and plasma volume are the same, . . . no distinction is necessary." Reply 17. Petitioner cites to paragraph 133 of the Gleason Declaration and paragraph 53 of the Parsons Declaration to support this statement. Reply 17.

Dr. Gleason, however, does not refer to "chamber volume" in paragraph 133, and only discusses references having plasma zones that are different from reactor volumes. Further, as Patent Owner points out, Dr. Gleason testified that these references show only that persons of ordinary skill in the art *typically* specify the more relevant plasma zone when it is smaller than the chamber volume. Sur-reply 19–20. This suggests that persons of ordinary skill in the art do not always specify plasma zone volume when the plasma zone volume is smaller than the chamber volume. Thus, although a distinction may not be necessary in all scenarios, the evidence of record fails to establish that the absence of a distinction between chamber volume and plasma zone volume means that it would have been obvious that chamber volume and plasma volume are coextensive.

Petitioner's other purported support for its assertion is Dr. Parsons's statement: "If the plasma region or zone encompassed the whole plasma reactor, then no distinction between these regions would be necessary." Ex. 2010 ¶ 53. This statement, however, was made in reference to different regions of a specific reactor discussed in one of Dr. Gleason's patents, in the context of supporting Patent Owner's construction of the term "plasma zone," where Patent Owner and Dr. Parsons contend that "[i]nvestigators commonly identify a plasma zone as a "plasma region" or "glow region" as the region designed and controlled for deposition or polymerization within a plasma reactor." Ex. 2010 ¶ 53. In view of this, we do not consider Dr. Parsons's statement to demonstrate a universal understanding by persons of skill in the art that when a plasma zone volume is not reported, it must be the same as the reactor volume. Indeed, such an understanding is further contravened by Dr. Parson's statement in the same paragraph that a person

of ordinary skill in the art "would know that the volume of the plasma zone is commonly less than the volume of the reactor." Ex. 2010 ¶ 53.

Petitioner's attempts to establish what a person of ordinary skill in the art would have inferred about the size of the plasma zone in Coulson's reactor based on different reactors used in the experiments described in other references[9] is equally unavailing. Reply 17–20 (discussing Ex. 2007 and 2015). It is undisputed that the plasma zone volume of a reactor depends on several variables, including, but not limited to, reactor configuration and electrode configuration. Ex. 2010 ¶¶ 55, 77; Ex. 2011 27:20–28:12. As Patent Owner points out, and we agree, Coulson does not provide sufficient specific details regarding the configuration of its reactor or electrodes used. Reply 21; Ex. 1003, 2032; Ex. 2010 ¶ 72; Ex. 2017, 78:6–15; 79:2–7.

For all of the foregoing reasons, we are not persuaded by Petitioner's argument that a person of ordinary skill in the art would have inferred the volume of the plasma zone[10] in Coulson is 470 cm^3 based on Coulson's disclosure of a "glow discharge reactor" having a volume of 470 cm^3. Pet. 38; Reply 15–16. In view of this, we are likewise not persuaded that Coulson discloses a power density of 85.1 W/m^3, because Petitioner's

[9] Dr. Gleason confirmed that she did not perform any experiments to verify her opinions regarding Coulson's plasma zone. Ex. 2017, 80:10–18.

[10] As noted above, Petitioner presented its argument in the context of its proposed construction of plasma zone. Petitioner did not present an alternative argument supported by sufficient evidence addressing the volume of Coulson's plasma zone based on Patent Owner's proposed construction of plasma zone. Accordingly, we agree with Patent Owner's assertion that we do not need to expressly construe the term plasma zone to resolve this issue. Sur-reply 1.

argument that Coulson discloses this power density is based on its assertion that Coulson has a plasma zone volume of 470 cm^3. Pet. 38.

This finding is fatal to Petitioner's obviousness challenge of claim 1 based on the combined teachings of Baalmann and Coulson because Coulson's purported disclosure of using a power density of 85.1 W/m^3 is an essential component of Petitioner's obviousness challenge. An obviousness determination requires finding both "that a skilled artisan would have been motivated to combine the teachings of the prior art . . . and that the skilled artisan would have had a reasonable expectation of success in doing so." *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.,* 821 F.3d 1359, 1367-68 (Fed. Cir. 2016). In attempting to establish a person of ordinary skill in the art would have had reason to combine the teachings of Baalmann and Coulson, and would have had a reasonable expectation of success in doing so, Petitioner repeatedly refers to using Coulson's optimized reaction conditions, including power density, in Baalmann's larger reactor. Pet. 48 (stating that a person of ordinary skill in the art "would have been motivated to maintain the same or similar reaction conditions within a larger reaction chamber that were present in Coulson's chamber during Coulson's reported plasma polymerization reactions, including power density and pressure, to preserve the same effective results."), 48–49 ("That would have included motivation to maintain Coulson's disclosed power density when scaling up to a larger reaction volume to preserve the beneficial results Coulson reported at that optimized power density."); Reply 23 (referring to the "straightforward, compelling obviousness case set forth in the petition" that a person of ordinary skill in the art "would have expected to succeed performing Coulson's reactions on a larger scale in view of Baalmann");

23 ("The petition explained why a POSA would have modified Baalmann to use Coulson's HDFDA monomer and reaction conditions to produce coatings with a reasonable expectation of success"), 24 (stating the Petition "explained why a POSA would have expected success using known parameters from Coulson in an established large-scale apparatus"). During the oral hearing, counsel for Petitioner confirmed its obviousness positions depend on using Coulson's power density. Tr. 20:10–21:16. Accordingly, Petitioner's failure to demonstrate adequately that Coulson discloses or suggests a power density of 85.1 W/m^3 undermines its reason to combine and reasonable expectation of success arguments.

Petitioner's argument that Baalmann discloses the claimed power density (Pet. 37), even if we were to agree with it, does not cure the deficiency in Petitioner's obviousness challenges based on Baalmann and Coulson. As the Supreme Court held in *KSR*, "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR*, 550 U.S. at 418; *see also* Section II.F., *infra* (discussing obviousness in view of Baalmann alone).

For all of the foregoing reasons, we find Petitioner has not demonstrated, by a preponderance of evidence, that claim 1 is unpatentable as obvious in view of the combined teachings of Baalmann and Coulson.

b. Claims 2–17

Claims 2–17 depend from claim 1, and therefore contain all of the limitations of claim 1. For these claims, Petitioner relies on its analysis of claim 1. Pet. 51–61. Thus, for the reasons discussed above in connection with claim 1, we find Petitioner has not demonstrated, by a preponderance of

evidence, that claims 2–17 are unpatentable as obvious in view of the combined teachings of Baalmann and Coulson, or Baalmann, Coulson, and Hillman.

F. Obviousness Based on Baalmann Alone

In the Institution Decision, we determined that even though Petitioner's arguments regarding its obviousness challenge are included in the section titled "Claims 1–15 would have been obvious over the combined teachings of Baalmann and Coulson," Petitioner presented evidence demonstrating that Baalmann alone discloses or suggests the limitations of claim 1, and evidence that a person of ordinary skill in the art would have had reason to combine the various disclosures within Baalmann to arrive at the claimed invention. Inst. Dec. 18–23. We reached a similar determination for claims 2, 3, 6, and 10–14, which depend from claim 1. Inst. Dec. 23.

Patent Owner argues Petitioner never asserted a ground of obviousness based on Baalmann alone in the Petition, and that the Board does not have the authority to invalidate claims based on Baalmann alone. PO Resp. 29–31; Sur-reply 6–7. Patent Owner further argues that even if Petitioner had asserted a ground of obviousness based on Baalmann alone, Baalmann does not disclose a plasma zone or power density range within the range of claim 1, and Petitioner fails to show a person of ordinary skill in the art would have been motivated to combine the distinct disclosures of Baalmann with a reasonable expectation of success. PO Resp. 31–42; Sur-reply 13–18.

Petitioner argues that its obviousness grounds in the Petition included an obviousness argument based on Baalmann alone, and that it established

that Baalmann provided a motivation to perform the claimed methods with a reasonable expectation of success. Reply 11–15 (citing Pet. 9–10, 31–39, 43–44).

After considering the parties' arguments and evidence, we agree with Patent Owner that Petitioner fails to show a person of ordinary skill in the art would have been motivated to combine the distinct disclosures of Baalmann with a reasonable expectation of success.[11]

First, we note that when Dr. Gleason was asked about whether she addressed the issue of a person of ordinary skill in the art having a reasonable expectation of success in combining the distinct disclosures of Baalmann, she stated: "I don't believe we gave that statement, so I can't point you to it." Ex. 2011, 120:1–9; PO Resp. 41. This lack of testimony is relevant because, according to the Federal Circuit's decision in *In re Stepan,* even a single-reference obviousness determination "requires finding both 'that a skilled artisan would have been motivated to combine the teachings of the prior art . . . and that the skilled artisan would have had a reasonable expectation of success in doing so.'" *In re Stepan*, 868 F.3d 1342, 1346 (Fed. Cir. 2017) (quoting *Intelligent Bio-Sys.,* 821 F.3d at 1367–68). We consider the *Stepan* holding to be especially pertinent here, where, as discussed above in Section II.D.2, we consider Baalmann to disclose different features in separate portions of Baalmann. *See* Section II.D.2, *supra*.

[11] Because we find in Patent Owner's favor on this issue, and because we already considered similar arguments regarding whether we have the authority to invalidate claims based on Baalmann alone in Patent Owner's Request for Rehearing (Paper 13), which we denied (Paper 16), we decline to address the issue again here.

Petitioner contends that despite the lack of testimony from its own expert, the Petition demonstrated a person of ordinary skill in the art would have had a reasonable expectation of success "when working within Baalmann's expressly disclosed parameters" because the Petition "emphasized that Baalmann itself taught its methods were flexible for coating substrates of 'any desired size' and that a [person of ordinary skill in the art] would have understood those methods would work in various chamber sizes." Reply 14 (citing Pet. 34, 46–47, 49–50).

We disagree. As noted above, claim 1 requires both a particular power density and a particular plasma zone volume. Ex. 1001, 10:24–28. One of the "expressly disclosed parameters" of Baalmann's method is setting the electrical power input per chamber volume, i.e., power density, to between 500 W/m^3 and 5000 W/m^3. Ex. 1004 ¶¶ 18, 20. Baalmann, however, does not expressly discuss plasma zone volume or link that entire range of power density to any particular chamber size or plasma zone volume.

Instead, Petitioner's argument that a person of ordinary skill in the art would understand Baalmann's methods would work in various *chamber* sizes is based on Baalmann's disclosure that its methods are flexible for coating *substrates* of any size. Pet. 34. In this regard, Petitioner argues a person of ordinary skill in the art would have understood Baalmann's methods could have been used to treat "large substrates" in "large plasma chambers." Pet. 34. Additionally, Petitioner contends that the reactor used in Baalmann Example 1 is a "large-scale" reactor based on its description of having an evacuable chamber with a volume of 1 m^3. Pet. 34.

It is undisputed, however, that Baalmann used a power of 2kW in Example 1. In Example 1, the volume of the reactor is 1 m^3. Thus, the power input per chamber volume applied to the 1 m^3 reactor of Example 1 is 2 kW/m^3. Petitioner argues that the plasma zone volume is coextensive with the reactor volume such that the 1 m^3 reactor of Example 1 would have a 1 m^3 plasma zone. Pet. 34–35. Thus, the power input per chamber volume would be equal to the power input per plasma zone volume, making it four times higher (i.e., 2 kW/m^3) than the upper limit of the claimed plasma power density range of 500 W/m^3.

Therefore, even though Baalmann generally discloses a broad range of power densities, Baalmann only expressly teaches the use of a power density outside the claimed range for a chamber that purportedly has a plasma zone volume within the claimed range. Ex. 1004 ¶ 48. Petitioner would have us overlook this express, specific disclosure in Example 1 of Baalmann in favor of Baalmann's more general disclosure of using a broad range of power densities, and Baalmann's general flexibility regarding substrates of any desired size. Pet. 34; Ex. 1002 ¶ 107. But following Petitioner's logic that Baalmann's flexibility in treating substrates of any desired size would have led a person of ordinary skill in the art to understand that Baalmann's methods could be used in chambers having various sizes, a person of ordinary skill in the art would have understood Baalmann to disclose a range of power densities associated with *any* chamber that could hold these substrates. And, in view of Baalmann's disclosure that substrates of "any desired size" includes "insulators of microelectronics up to high-voltage insulators of several meters in length," the number of chambers that could hold such substrates is extremely large. Ex. 1004 ¶ 13; *see also* Ex. 1004 ¶

42 ("A high-voltage insulator may have dimensions from just a few centimeters up to several meters.").

According to the Federal Circuit's holding in *Stepan*, "to have a reasonable expectation of success, one must be motivated to do more than . . . try each of numerous possible choices until one possibly arrived at a successful result." *Stepan*, 868 F.3d at 1347 (quoting *Pfizer, Inc. v. Apotex, Inc.,* 480 F.3d 1348, 1365 (Fed. Cir. 2007)). Absent some additional guidance from Baalmann regarding a correlation between power density and chamber volume/plasma zone volume, a person of ordinary skill in the art would have had to try numerous possible choices of power density and chamber volume/plasma zone volume to successfully arrive at the specific combination of power density and plasma zone volume recited in the challenged claims. *Id.* Petitioner, however, does not direct us to such guidance in Baalmann, or to sufficiently persuasive expert testimony on this matter in the context of an obviousness challenge based on Baalmann alone. *See* PO Resp. 40 (Patent Owner arguing that there is no "indication from Baalmann that 500 W/m^3 would be suitable in connection with larger chambers"); Reply 14 (citing Pet. 34, 46–47, 49–50); *see also KSR,* 550 U.S. at 421, 127 S.Ct. 1727 ("A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.").

Petitioner directs us to pages 46–47 and 49–50 of the Petition in support of its argument regarding a reasonable expectation of success. Reply 14. These pages, however, appear as part of Petitioner's arguments regarding the reasons why a person of ordinary skill in the art would have combined the teachings of Coulson and Baalmann, and appear intertwined

with Petitioner's discussion of scaling up Coulson's methods in view of Baalmann's disclosures. *See* Pet. 39–50. We decline to consider these arguments when addressing whether the Petition provided a reasonable expectation of success based on Baalmann alone. We instituted *inter partes* review based on obviousness over Baalmann alone because we determined that Petitioner demonstrated, in the Petition, that Baalmann alone disclosed the limitations of claim 1. *See Realtime Data LLC v. Iancu*, 912 F.3d 1368, 1371–73 (Fed. Cir. 2019). We cannot apply Petitioner's Baalmann-Coulson obviousness reasoning to a ground based on obviousness over Baalmann alone. *See Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1335 (Fed. Cir. 2020) (holding "the Board erred by instituting inter partes review based on a combination of prior art references not advanced in [the] petition."). The same is true for Petitioner's arguments regarding Patent Owner's statements made during prosecution of a foreign application. Reply 14–15; Pet. 43–44.

For all of the foregoing reasons, we find Petitioner has failed to establish by a preponderance of evidence that a person of ordinary skill in the art would have been motivated to combine the distinct disclosures of Baalmann with a reasonable expectation of success. Accordingly, Petitioner has failed to establish by a preponderance of evidence that claim 1 is unpatentable as obvious over Baalmann alone.

Claims 2, 3, 6, and 10–14 depend from claim 1, and, therefore, include all of the limitations of claim 1. Ex. 1001, 10:30–12:3. In view of our determination that Petitioner fails to establish that claim 1 is unpatentable as obvious over Baalmann alone, we reach the same result for claims 2, 3, 6, and 10–14.

III. PETITIONER'S MOTION TO EXCLUDE

Petitioner filed a Motion to Exclude Exhibits 2005, 2006, 2008, and 2009 in their entirety, and the portions of Exhibits 2010 and 2016 that discuss or rely on those exhibits. Paper 26.

Because we do not rely on Exhibits 2005, 2006, 2008, 2009 or the portions of Exhibits 2010 or 2016 that rely on those exhibits in this Final Written Decision, we dismiss Petitioner's motion as moot. *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide 79–80 (Nov. 2019) ("In the Board's experience, consideration of the objected-to evidence is often unnecessary to resolve the patentability of the challenged claims, and the motion to exclude is moot.").

IV. CONCLUSION

For the foregoing reasons, we determine Petitioner has failed to show, by a preponderance of the evidence, that claims 1–17 of the '070 patent are unpatentable over the prior art of record.

We also dismiss as moot Petitioner's Motion to Exclude.

In summary:

Claim(s) Challenged	35 U.S.C. §	Reference(s)	Claims Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–3, 6, 10–14	102	Baalmann		1–3, 6, 10–14
1–15	103	Baalmann, Coulson		1–15
16, 17	103	Baalmann, Coulson, Hillman		16, 17
Overall Outcome				1–17

V. ORDER

It is hereby

ORDERED that, Petitioner has not shown, by a preponderance of the evidence, that claims 1–17 of the '070 patent are unpatentable; and

FURTHER ORDERED that, because this is a final written decision, parties to this proceeding seeking judicial review of our Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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Paper 33
Entered: November 22, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE OFFICE OF THE UNDERSECRETARY AND DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

FAVORED TECH CORPORATION,
Petitioner,

v.

P2I LTD,
Patent Owner.

IPR2020-00478
Patent 8,389,070 B2

Before ANDREW HIRSHFELD, *Commissioner for Patents, Performing the Functions and Duties of the Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office.*

ORDER

The Office has received a request for Director review of the Final Written Decision in this case. Ex. 3100. The request was referred to Mr. Hirshfeld, Commissioner for Patents, Performing the Functions and Duties of the Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office.

It is ORDERED that the request for Director review is denied; and

FURTHER ORDERED that the Patent Trial and Appeal Board's Final Written Decision is the final decision of the agency.

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