

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SYMRISE AG AND SYMRISE INC.,
Petitioner,

v.

INOLEX INVESTMENT CORPORATION,
Patent Owner.

IPR2023-01035
Patent 10,995,048 B2

Before ULRIKE W. JENKS, TINA E. HULSE, and
ROBERT A. POLLOCK, *Administrative Patent Judges*.

HULSE, *Administrative Patent Judge*.

PRELIMINARY GUIDANCE
PATENT OWNER'S MOTION TO AMEND

I. INTRODUCTION

On November 16, 2023, the Board instituted trial as to claims 1–6, 8–10, and 22–28 of U.S. Patent No. 10,995,048 B2 (Ex. 1001, “the ’048 Patent”). Paper 7 (“Decision” or “Dec.”). After institution, Patent Owner filed a Motion to Amend that is non-contingent on the patentability of claims 1–6, 8–10, and 22–28. Paper 12 (“Motion” or “Mot.”). Petitioner filed an Opposition. Paper 14 (“Opp.”).

In the Motion, Patent Owner requested that we provide preliminary guidance concerning the Motion in accordance with the Board’s pilot program concerning motion to amend practice and procedures. Mot. 4; *see also* Notice Regarding a New Pilot Program Concerning Motion to Amend Practice and Procedures in Trial Proceedings under the America Invents Act before the Patent Trial and Appeal Board, 84 Fed. Reg. 9,497 (Mar. 15, 2019) (providing a patent owner with the option to receive preliminary guidance from the Board on its motion to amend) (“Notice”). We have considered Patent Owner’s Motion and Petitioner’s Opposition.

In this Preliminary Guidance, we provide information indicating our initial, preliminary, non-binding views on whether Patent Owner has shown a reasonable likelihood that it has satisfied the statutory and regulatory requirements associated with filing a motion to amend in an *inter partes* review and whether Petitioner (or the record) establishes a reasonable likelihood that the substitute claims are unpatentable. *See* Notice, 84 Fed. Reg. at 9,497 (“The preliminary guidance . . . provides preliminary, non-binding guidance from the Board to the parties about the [motion to amend]”); *see also* 35 U.S.C. § 316(d) (statutory requirements for a motion to amend); 37 C.F.R. § 42.121 (regulatory requirements and burdens for a motion to amend); *Lectrosonics, Inc. v Zaxcom, Inc.*, IPR2018-

01129, Paper 15 (PTAB Feb. 25, 2019) (precedential) (providing information and guidance regarding motions to amend).

For purposes of this Preliminary Guidance, we focus on the proposed substitute claims, and specifically on the amendments proposed in the Motion. *See* Notice, 84 Fed. Reg. at 9,497. We do not address the patentability of the originally challenged claims. *Id.* Moreover, in formulating our preliminary views on the Motion and Opposition, we have not considered the parties' other substantive papers on the underlying merits of Petitioner's challenges. We emphasize that the views expressed in this Preliminary Guidance are subject to change upon consideration of the complete record, including any revision to the Motion filed by Patent Owner. Thus, this Preliminary Guidance is not binding on the Board when rendering a final written decision. *See id.* at 9,500.

II. PRELIMINARY GUIDANCE

A. Statutory and Regulatory Requirements

For the reasons discussed below, at this stage of the proceeding, and based on the current record, it appears that Patent Owner has shown a reasonable likelihood that it has satisfied the statutory and regulatory requirements associated with filing a motion to amend.

1. Reasonable Number of Substitute Claims

Does Patent Owner propose a reasonable number of substitute claims? (35 U.S.C. § 316(d)(1)(B))
Yes. Patent Owner proposes no more than 1 substitute claim for each challenged claim. Mot. 5. Petitioner does not argue otherwise. <i>See generally</i> Opp.

2. Respond to Ground of Unpatentability

Does the Motion respond to a ground of unpatentability involved in the trial? (37 C.F.R. § 42.121(a)(2)(i))

Yes. Patent Owner responds to the grounds of unpatentability. Mot. 11–24. At least one amendment presented is responsive to a ground of unpatentability. Petitioner does not argue otherwise. *See generally* Opp.

3. Scope of Amended Claims

Does the amendment seek to enlarge the scope of the claims? (35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii))

No. Each of the proposed substitute claims includes all limitations of the original claims, plus narrowing limitations. Mot. 12–13. Petitioner does not argue otherwise. *See generally* Opp.

4. New Matter

Does the amendment seek to add new subject matter? (35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii))

No. Patent Owner argues that the proposed substitute claims 29–44 have written description support. Mot. 5–11.

The '048 Patent issued from U.S. Application No. 16/682,059 (“the '059 Application”). Ex. 1001, code (21). The '059 Application is a continuation of U.S. Application No. 16/262,902 (“the '902 Application”) and claims priority to provisional Application No. 62/623,985 (“the '985 Application”). *Id.* at codes (60), (63).

Except for proposed substitute claims 34, 37, 40, and 43,¹ Patent Owner asserts that the '059 Application, the '902 Application, and the '985 Application provide written description support for the proposed substitute claims. Mot. 5–11. To support this argument, Patent Owner cites Exhibits

¹ Patent Owner states “Provisional Application No. 62/623,985, filed on January 30, 2018, does not include explicit written support for the limitations of substitute claims 34, 37, 40, and 43.” Mot. 6.

1003, 1004, and 1005. *Id.* at 6–11. Exhibit 1005 is the file history for the '059 Application and Exhibit 1003 is the file history for the '985 Application. Although the Motion purports to cite the file history for the '902 Application as Exhibit 1004 (Mot. 6), Exhibit 1004 is the file history for U.S. Application No. 16/262,898, which is not included in the '048 Patent's priority chain. *See, e.g.,* Ex. 1004, 84; Ex. 1001, codes (21), (60), (63), 1:9–19.

The Federal Circuit has stated: “to gain the benefit of the filing date of an earlier application under 35 U.S.C. § 120, each application in the chain leading back to the earlier application must comply with the written description requirement of 35 U.S.C. § 112.” *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1571 (Fed. Cir. 1997). Because Patent Owner has not cited to the intermediate '902 Application to show written description support, we do not consider whether Patent Owner has demonstrated written description support for the proposed substitute claims in the '902 Application or the '985 Application. Therefore, we limit our analysis in this Preliminary Guidance to support in the '059 Application.²

The test for sufficiency of a written description is whether the disclosure ‘clearly allow[s] persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.’ *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (citation omitted). The disclosure must “reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id.* at 1351. Possession means “possession as shown in the disclosure” and “requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art.” *Id.*

We find, on this record, that Patent Owner's citations to the '059 Application appear to sufficiently support the proposed substitute claims. Mot. 7 (citing Ex. 1005 ¶¶ 40, 42, 71, 76, 77, 84, 125–127, Table 1, Table 2). For example, paragraphs 42, 71, 76, 77, 125 and 126 the '059

² Patent Owner may file a revised Motion to Amend with the '902 Application file history as an exhibit and with citations to that file history to correct this error. If, however, that is the only issue Patent Owner intends to address in a revised Motion to Amend, Patent Owner may request a conference call with the Board to discuss the most efficient way to correct the record without the need for a Revised Scheduling Order.

Application appear to indicate possession of the claimed “base-treated and calcined γ -alumina catalyst” of proposed substitute claim 29.

With regard to the negative limitation “wherein the catalyst has not been silanized” of proposed substitute claim 29, Patent Owner argues that paragraph 27 of the ’059 Application provides sufficient support. *Id.* (citing Ex. 1005 ¶ 27).

Paragraph 27 of the ’059 Application states that the catalytic support “*may be* further treated with an organosilane,” suggesting that silanization is not required. Ex. 1005 ¶ 27. Moreover, “[n]egative claim limitations are adequately supported when the specification describes a reason to exclude the relevant limitation.” *Santarus, Inc. v. Par Pharm., Inc.*, 694 F.3d 1344, 1351 (Fed. Cir. 2012). A reason to exclude an element could be found in “statements in the specification expressly listing the disadvantages of using” that element. *Id.* Paragraph 27 of the ’059 Application further states that “silanization of the catalyst leads to a *loss* of regioselectivity for the dehydration chemistry of 1-octanol.” Ex. 1005 ¶ 27. On this record, we agree that this appears to be sufficient support for this negative limitation.

On this record, we further agree that paragraphs 31 and 66 of the ’059 Application appear to provide written description support for a resulting bio-alkene having a carbon chain of 6 to 14 carbon atoms, as proposed substitute claim 29 recites. Mot. 7–8 (citing Ex. 1005 ¶¶ 31, 66). With regard to proposed substitute claim 29’s regioselectivity of 92% to about 99%, Patent Owner cites paragraph 33 of the ’059 Application. *Id.* at 8 (citing Ex. 1005 ¶ 33). On this record, we agree that this paragraph appears to support the claimed regioselectivity. We also agree that paragraph 33’s discussion of a process that “yields at least about 92% to about 99% of the bio-1,2-alkanediol” appears to support proposed substitute claim 29’s “conversion of at least 95%.” *Id.*

With regard to the proposed substitute dependent claims, we agree on this record that paragraphs 31, 66, and 67 of the ’059 Application appear to support the carbon chain lengths and bio-octene of claims 30–32; paragraph 74 appears to support the reactor temperatures of claims 33, 36, 39, and 42; paragraph 76 appears to support the calcination temperatures of claims 34, 37, 40, and 43; and paragraph 33 appears to support the claimed regioselectivities of claims 35, 38, 41, and 44. *Id.* (citing Ex. 1005 ¶¶ 31, 33, 66, 67, 74, 76).

Therefore, on this record, we find Patent Owner has shown a reasonable likelihood that proposed substitute claims 29–44 do not add new matter.

B. Patentability

For the reasons discussed below, at this stage of the proceeding, and based on the current record,³ it appears that Petitioner (or the record) has shown a reasonable likelihood that proposed substitute claims 29–44 are unpatentable.

Does the record establish a reasonable likelihood that the proposed substitute claims are unpatentable?

I. Claim Construction

As an initial matter, we address Petitioner’s claim construction assertions.

“base-treated and calcined γ -alumina catalyst”

In an *inter partes* review, the Board applies the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 100(b). Under that standard, claim terms “are generally given their ordinary and customary meaning” as understood by a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

Petitioner asserts that this phrase only requires that the two steps take place, but there is no restriction on the order in which they occur. Opp. 3. Patent Owner does not propose a construction for this phrase. *See generally* Mot.

“Claim construction must begin with the words of the claims themselves.” *In re Power Integrations, Inc.*, 884 F.3d 1370, 1376 (Fed. Cir. 2018) (internal quotation marks, brackets, and citation omitted); *see Phillips*, 415

³ We express no view on the patentability of original claims 1–6, 8–10, and 22–28 in this Preliminary Guidance. Instead, we focus on limitations added to those claims in the Patent Owner’s Motion to Amend.

F.3d at 1314 (“[T]he claims themselves provide substantial guidance as to the meaning of particular claim terms.”).

The express language of proposed substitute claim 29 merely requires that the γ -alumina catalyst is both base-treated and calcined without requiring any particular order. *See Mformation Techs., Inc. v. Research in Motion Ltd.*, 764 F.3d 1392, 1398 (Fed. Cir. 2014) (“As a general rule, ‘[u]nless the steps of a method [claim] actually recite an order, the steps are not ordinarily construed to require one.’”) (citation omitted). Therefore, on this record, we agree that the phrase “base-treated and calcined γ -alumina catalyst” does not require any particular order for the base-treatment and calcination of the γ -alumina catalyst.

“calcined”

Petitioner argues that Dr. Wright stated “‘calcined’ is ‘heating to a sufficient temperature that chemical changes result into the catalyst itself.’” Opp. 4 (citing Ex. 2001 ¶ 19). Petitioner asserts that “[c]alcined should be interpreted to be sufficient heating to complete the chemical change to the catalyst.” *Id.* (citing Ex. 1038 ¶ 20). Patent Owner does not propose a construction for this term. *See generally* Mot.

“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy.’” *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). We decline to construe “calcined” at this stage because, in light of the teachings of the asserted references, such a construction appears to be unnecessary to resolve the patentability arguments discussed below.

“catalyst has not been silanized”

Petitioner contends Dr. Wright “testified that ‘silanized’ requires an affirmative step during the catalyst preparation” and therefore “silanization requires an affirmative preparation step.” Opp. 4 (citing Ex. 1040, 23:14–24:2; *In re Kollar*, 286 F.3d 1326, 1332 (Fed. Cir.2002)). Patent Owner does not propose a construction for this phrase. *See generally* Mot.

On this record, we agree that “catalyst has not been silanized” means that “no affirmative step is taken to silanize the catalyst.” Opp. 4.

II. Written Description

Yes. On this record, it appears that Petitioner has shown a reasonable likelihood that proposed substitute claims 29–44 fail to comply with the written description requirement under 35 U.S.C. § 112.

Petitioner asserts two bases for lack of written description support, which we discuss below.

“base-treated”

Petitioner argues that “the ‘048 patent does not indicate possession of all base-treated γ -alumina catalysts that achieve a 95% conversion and a 92–99% regioselectivity,” as proposed substitute claim 29 recites. Opp. 5–6. According to Petitioner, proposed substitute claim 29 identifies a problem to be solved (“i.e., how to create a ‘bioalkene [that] has a carbon chain of 6 to 14 carbon atoms and is produced in a conversion of at least 95%, and has a bio-1-alkene regioselectivity of 92% to about 99%’”) and attempts to claim all solutions to that problem. *Id.* at 6. Petitioner asserts that “[t]he plain and ordinary meaning of a ‘base’ is a substance that can accept protons and the specification specifically references ‘a Group I or Group II metal.’” *Id.* at 7 (citing Ex. 1001, 8:32–35; Ex. 1038 ¶ 35).

Petitioner contends that the ‘048 patent discusses only one potential solution (i.e., treatment with calcium acetate) “without further base treatment details.” *Id.* at 6–9 (citing Ex. 1038 ¶¶ 35–36, 42–44; Ex. 1001, 8:32–35, 15:45–49, 16:5–8, 17:13–14, 26:40–51, 27:13–35, 28:55–58; Mot. 7). Petitioner asserts that experimentation would be required for one of ordinary skill in the art due to unpredictable outcomes when treating a catalyst with a different base, as Dr. Wright acknowledges. *Id.* at 7–8 (citing Ex. 1040, 42:2–22, 43:18–44:15, 61:9–63:16, 139:1–140:20, 141:11–142:22, 144:18–145:14; Ex. 1038 ¶ 36–41).

“[T]he level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology.” *Ariad*, 598 F.3d at 1351. Generally, a genus can be sufficiently disclosed by “either a representative number of species falling within the scope of the genus or structural features common to the members of the genus so that one of skill in the art can ‘visualize or recognize’ the members of the genus.” *Id.* at 1350 (citation omitted).

On this record, on the one hand, we note Dr. Wright's deposition testimony that one would not know the performance of a catalyst until the catalyst has been used. Ex. 1040, 42:2–22, 44:2–15, 139:1–140:20, 144:18–145:14. On the other hand, we also note that Patent Owner's citations to support the claimed "base-treated and calcined γ -alumina catalyst" also describe treatments with calcium, sodium hydroxide, and potassium hydroxide, in addition to treatments with calcium acetate. Mot. 7 (citing, e.g., Ex. 1005 ¶¶ 40, 42, 76). Therefore, notwithstanding Petitioner's argument to the contrary, Opp. 6–9, the '048 Patent describes more than just one species. The question is whether that is sufficient for a person of ordinary skill in the art to recognize the members of the genus.

In view of these considerations, and without the benefit of Patent Owner's response, we view this as a close issue. When considering the cited evidence and parties' arguments on this record, however, it appears Petitioner has shown a reasonable likelihood that proposed substitute claims 29–44 lack written description support for the claimed genus.

"base-treated and calcined" catalyst

As discussed above, we agree the phrase "base-treated and calcined γ -alumina catalyst" does not require any particular order for the base-treatment and calcination of the γ -alumina catalyst. Petitioner contends that the '048 Patent does not support first calcining and then base-treating a catalyst because it is silent with regard to this order of steps. Opp. 9–10 (citing Ex. 1001, 15:45–58, 16:4–22, 26:40–29:42; Ex. 1038 ¶¶ 31–32). Petitioner further argues that "Dr. Wright agrees without an order, the claims are not supported in the '048 Patent specification" and "since the inventor of the '048 Patent doesn't know the dehydration reaction outcome using a calcined and then base-treated γ -alumina catalyst, it is not possible for the inventor to possess such an invention when the '048 Patent was filed." *Id.* at 10 (citing Ex. 1040, 20:6–10; Ex. 1038 ¶¶ 33–34).

"[I]t is unnecessary to spell out every detail of the invention in the specification; only enough must be included to convince a person of skill in the art that the inventor possessed the invention and to enable such a person to make and use the invention without undue experimentation." *LizardTech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005). Although certain of Patent Owner's citations to support the phrase "base-treated and calcined γ -alumina catalyst" discuss base treating and then calcining the catalyst (*see, e.g.*, Ex. 1005 ¶ 84), Patent Owner also cites a passage that generically describes "providing a γ -

alumina catalyst; treating the γ -alumina catalyst with a base. . .; and heating the γ -alumina catalyst to a temperature of about 400°C to about 500°C” (*id.* ¶ 42). On this record, this passage appears to sufficiently demonstrate possession of the claimed “base-treated and calcined γ -alumina catalyst,” regardless of the order of steps.

II. Obviousness

Yes. On this record, it appears that Petitioner has shown a reasonable likelihood that at least proposed substitute claims 29–44 would have been obvious. Petitioner asserts several grounds of obviousness, which we comment on below.

Obviousness over Wright ’451

Petitioner contends that proposed substitute claims 29–44 would have been obvious over Wright et al., WO 2015/130451 A1, published September 3, 2015 (Ex. 1039 (“Wright ’451”)). Opp. 13–18.

On this record, it appears that Petitioner has shown a reasonable likelihood that Wright ’451 teaches or suggests the limitations of proposed substitute claim 29. For instance, Petitioner argues that Wright ’451 teaches a dehydration process in which the starting alcohol can be a bio-1-alcohol, using a γ -alumina catalyst that has been modified with calcium ions, and calcining the catalyst. *Id.* at 13–14 (citing Ex. 1039 ¶¶ 14, 20, 67). Petitioner argues that Wright ’451 does not undertake silanization as an affirmative step, Wright ’451 teaches a regiochemical selectivity of about 90% to 99%, a conversion of greater than about 95%, and a general formula for alcohols that may include alkyl radicals having 1–20 carbon atoms. *Id.* at 14–15 (citing Ex. 1038 ¶ 64; Ex. 1039 ¶¶ 13, 22, 78).

Wright ’451’s conversion and regioselectivity ranges overlap those recited by proposed substitute claim 29. “Where a claimed range overlaps with a range disclosed in the prior art, there is a presumption of obviousness.” *Ormco Corp. v. Align Tech.*, 463 F.3d 1299, 1311 (Fed. Cir. 2006). Therefore, at this preliminary stage of the proceeding, it appears that Petitioner has shown a reasonable likelihood that proposed substitute claim 29 is unpatentable over Wright ’451.

We further agree on this record that Wright ’451 appears to teach the bio-alkenes recited in proposed substitute claims 30–32; an overlapping range for the reactor temperatures of proposed substitute claims 33, 36, 39, and 42; an overlapping range for the calcination temperatures of proposed

substitute claims 34, 37, 40, and 43; and an overlapping range for the regioselectivities of proposed substitute claims 35, 38, 41, and 44. Opp. 15–18 (citing Ex. 1039 ¶¶ 13, 67, 78 82).

We acknowledge that Patent Owner has not yet had the opportunity to address Wright '451 in this proceeding (which Petitioner first made of record in support of its Opposition). Patent Owner will have the opportunity to do so in its Reply to Petitioner's Opposition (or in a revised motion to amend). *See Notice, passim.*

Obviousness over Wu and Chokkaram

Petitioner contends that proposed substitute claims 29–44 would have been obvious over Wu et al., US 4,234,752, issued November 18, 1980 (Ex. 1025, “Wu”) in view of Chokkaram et al., *Conversion of 2-octanol over nickel-alumina, cobalt-alumina, and alumina catalysts*, 121 J. OF MOLECULAR CATALYSIS A: CHEMICAL 157–69 (1997) (Ex. 1041, “Chokkaram”). Opp. 18–25.

On this record, it appears that Petitioner has shown a reasonable likelihood that Wu teaches dehydration of alcohols that may include 2 to 20 carbon atoms, including n-octanol, in the presence of a γ -alumina catalyst that may be treated with potassium hydroxide or sodium hydroxide. *Id.* at 19–20 (citing Ex. 1025, 1:59–2:4, 2:23–36). Petitioner contends that Wu does not silanize its catalyst and Wu teaches a reaction yield “well in excess of 90%” and “a regioselectivity of 97.7%.” *Id.* at 21 (citing Ex. 1038 ¶ 103; Ex. 1025, Abstract, 4:5–21).

It also appears Petitioner has shown a reasonable likelihood that Chokkaram teaches calcination temperature affects conversion and selectivity rates. Specifically, Petitioner appears to show on this record that calcination temperature optimizes dehydration reactions of n-octanol using metal oxide catalysts, such as γ -alumina, to provide a high conversion and high regioselectivity. *Id.* (citing Ex. 1041, 157, 164–165). Therefore, it appears Petitioner has shown a reasonable likelihood that one of ordinary skill in the art would have had a reason to modify Wu to use Chokkaram's calcination to achieve high conversion rates and high regioselectivity. *Id.* at 18–19 (citing Ex. 1038 ¶¶ 22–28).

We further agree on this record that Wu appears to teach the bio-alkenes recited in proposed substitute claims 30–32; Wu teaches an overlapping range for the reactor temperatures of proposed substitute claims 33, 36, 39, and 42; Chokkaram teaches a calcination temperature (400°C) falling

within the ranges of proposed substitute claims 34, 37, 40, and 43; and Wu and Chokkaram teach regioselectivities that fall within, or overlap with, the regioselectivities of proposed substitute claims 35, 38, 41, and 44. *Id.* at 22–25 (citing Ex. 1025, 1:59–2:4, 2:51–54, 4:5–21; Ex. 1041, 165).

We acknowledge that Patent Owner has not yet had the opportunity to address Wu and Chokkaram (which Petitioner first made of record in support of its Opposition) and Petitioner’s asserted combination of Wu and Chokkaram. Patent Owner will have the opportunity to do so in its Reply to Petitioner’s Opposition (or in a revised motion to amend). *See* Notice, *passim*.

Obviousness over Le and De Bruyn

Petitioner argues that proposed substitute claims 29–44 would have been obvious over Le et al., US 2011/0196114 A1, published Aug. 11, 2011. Ex. 1007 (“Le”) and De Bruyn et al., US 2005/0065389 A1, published Mar. 24, 2005. Ex. 1008 (“De Bruyn”). Opp. 10–12.

Patent Owner asserts that Le and De Bruyn are each silent as to whether its catalyst is chemically modified or calcined. Mot. 16 (citing Ex. 1008 ¶¶ 37, 53, 81; Ex. 2001 ¶¶ 44, 56; Ex. 2005, 79–80). According to Patent Owner, one of ordinary skill in the art “reading De Bruyn, optionally in view of Le would understand that a commercially available γ -alumina catalyst could be used to dehydrate a C₆ to C₈ alcohol to provide a 1-alkene regioselectivity of 96-97% at a conversion of about 60% to 77%.” *Id.* at 16–17 (citing Ex. 1008 ¶¶ 67–68, 80–83, Tables 10, 14, Fig. 2; Ex. 2001 ¶¶ 42–43, 45–47). Patent Owner contends that Le and De Bruyn would not have provided “any reasonable expectation that a base-treated and calcined γ -alumina catalyst could be used to dehydrate a C₆ to C₁₄ bio-1-alcohol, wherein the resulting bio-alkene is produced in a conversion of at least 95%, and has a bio-1-alkene regioselectivity of 92% to about 99%.” *Id.* at 17 (citing Ex. 2001 ¶¶ 55–56).

On this record, it appears that Petitioner has shown a reasonable likelihood that the combination of Le and De Bruyn teach or suggest the limitations of proposed substitute claim 29. For instance, Petitioner argues that Le teaches barium doped γ -alumina and a regioselectivity greater than 95%. Opp. 11 (citing Ex. 1007 ¶¶ 46, 64). Petitioner further asserts that De Bruyn teaches a calcium-modified γ -alumina catalyst and a reaction in which 94% of 1-hexanol is converted to alkenes with a selectivity of 97.5% for 1-hexene. *Id.* (citing Ex. 1008 ¶¶ 37, 53).

Petitioner further cites our findings made in the Decision regarding Le and De Bruyn. *Id.* at 12. In the Decision, we found that Le teaches the dehydration of an alcohol in a temperature range of 250 to 400°C to produce a bio-alkene having a carbon chain of about 5 to about 20 carbon atoms. Dec. 13–14.

With regard to calcination of a catalyst, Patent Owner argues that this was widely known. *Id.* (citing Ex. 1038 ¶¶ 22–28, 51). As discussed above, Wright '451 and Chokkaram each demonstrate that calcining an alumina catalyst was known, including at temperatures recited by the proposed substitute claims. *See* Ex. 1038 ¶ 51 (citing Ex. 1039 ¶ 67; Chokkaram). Further, it appears on this record that one of ordinary skill in the art would have had a reason to use Chokkaram's calcination for the reasons discussed above with regard to the combination of Wu and Chokkaram. As a result, on this record at this stage, it appears that Petitioner has demonstrated a reasonable likelihood that one of ordinary skill in the art would have had a sufficient reason to combine Le and De Bruyn.

With regard to proposed substitute claims 30–44, it appears Petitioner has demonstrated a reasonable likelihood that the combination of Le and De Bruyn teach or suggest the limitations of these claims, such as when using the calcination temperatures taught by Wright '451 or Chokkaram.

Obviousness over Wright '788

Petitioner argues that proposed substitute claims 29–44 would have been obvious over Wright, US 2012/0238788 A1, published Sept. 20, 2012 (Ex. 1009, “Wright '788”). Opp. 12–13.

Patent Owner argues that Wright '788 prefers a catalyst that has been reacted with at least one chlorosilane and “teaches that silanized catalysts can improve the regioselectivity for the dehydration of 1-alkanols (and preferably 1-butanol) to 1-alkenes.” Mot. 18–19 (citing Ex. 1009 ¶¶ 20, 34, Table 1; Ex. 2001 ¶¶ 50, 58). Patent Owner further contends that Wright '788 “is silent as to whether base-treatment and calcination can improve regioselectivity and yield for the dehydration of C₆ to C₁₄ alcohols.” *Id.* at 21 (citing Ex. 2001 ¶¶ 60–61).

Petitioner contends that “[t]he only distinction alleged by [Patent Owner] is that Wright '788 requires silanization.” Opp. at 12 (citing Mot. 20–21). Petitioner asserts that “Wright '788 does not require silanization,” “[s]ilanization is only advantageous under specific circumstances,” and Wright '788 teaches a catalyst without silanization “and, therefore, teaches

each of the Substitute Claims, including temperatures, conversion, and regioselectivity.” *Id.* at 12–13 (citing Ex. 1009 ¶ 8, claims 1, 5; Ex. 1038 ¶¶ 53–55). Petitioner further cites our findings in the Decision and contends that Wright ’788 teaches 92–99% regioselectivity for a single pass over a catalyst to afford a conversion greater than 95% at temperatures of 300–420°C. *Id.* at 13 (citing Dec. 19–22; Ex. 1009 ¶¶ 8, 22; Ex. 1038 ¶ 55).

On this record at this stage, it appears Petitioner has demonstrated a reasonable likelihood that Wright ’788 suggests the use of a catalyst that has been prepared without the affirmative step of silanization. Ex. 1009 ¶ 22 (discussing embodiments in which “the catalyst is an alumina-based catalyst specifically washed with base solutions” and other embodiments in which “an alumina-based catalyst [is] modified with an organosilane”). Further, Wright ’788 teaches the conversion of a bio-alcohol with 92–99% regiochemical selectivity at a conversion rate of greater than 95%. *Id.* ¶ 8. As noted in our Decision, Wright ’788 relates to dehydrating bio-1-alcohols to bio-1-alkenes, wherein these compounds may include alkyl radicals of C1–C20. Dec. 19–20 (citing Ex. 1009, Abstract, ¶ 17). Therefore, Wright ’788 suggests the limitations of proposed substitute claim 29 (except for the catalyst being calcined) and proposed substitute claims 30–32, 35, 38, 41, and 44. Cited paragraph 8 of Wright ’788 also describes a reaction temperature of 200°C to 400°C, which overlaps with the ranges recited in proposed substitute claims 33, 36, 37, 40, and 43.

Petitioner addresses calcining a catalyst by asserting that “[c]alcination at specific temperatures was well-known in the art after a base wash and would be obvious considering the teachings of Wright ’788.” Opp. 13 (citing Ex. 1039⁴ ¶¶ 20, 67; Ex. 1040, 110:3–117:11; Ex. 1038 ¶¶ 22–28, 57–59).

⁴ Petitioner cites “Ex. 1009 at [0067].” Opp. 13. Exhibit 1009, however, has only 38 paragraphs. *See generally* Ex. 1009. In view of Dr. Wright’s testimony regarding paragraph 67 of Wright ’451, which is also cited by Petitioner (Pet. 13 (citing Ex. 1040, 110:3–117:11); *see also* Ex. 1040 at 104:14–105:2 (identifying exhibit as Wright ’451)), it appears that Petitioner’s citation to paragraph 67 of Exhibit 1009 is a typographical error and Petitioner intended to cite Exhibit 1039, i.e., Wright ’451, instead. We, therefore, treat this as a citation to “Ex. 1039 at [0067],” but we caution Petitioner that the Board will generally not be archaeologists of the record to decipher correct citations from typographical errors.

As discussed above, Wright '451 teaches that it was known to calcine a base-treated γ -alumina catalyst at a temperature of about 100°C to about 900°C. Ex. 1039 ¶ 67. Mr. Taber also cites Chokkaram in his testimony regarding the calcination of alumina catalyst as a known process. Ex. 1038 ¶ 57. Therefore, it appears on this record that one of ordinary skill in the art would have had a reason to calcine a base-treated alumina catalyst for the reasons discussed above with regard to the combination of Wu and Chokkaram.

With regard to proposed substitute claims 30–44, it appears Petitioner has demonstrated a reasonable likelihood that Wright '788 teaches or suggests the limitations of these claims, such as when using the calcination temperatures taught by Wright '451 or Chokkaram.

In addition, Patent Owner asserts that the claimed invention achieves unexpected results. Mot. 19–21, 23. Specifically, Patent Owner argues that Wright '788 teaches silanized catalysts, Wright '788 is the closest prior art, the '048 Patent describes silanized catalysts (such as Wright '788's) as achieving lower regioselectivity when converting 1-octanol to 1-octene, and results for the '048 Patent's Example 10 (which used a silanized catalyst) are reported in Exhibit 2004 to show that Wright's silanized catalyst would achieve a bio-1-octene regioselectivity of 92% or higher but only a conversion of 89%. *Id.* at 19–20. Patent Owner asserts the latter results are unexpected. *Id.* at 20–21.

The burden of establishing unexpected results rests upon the party asserting them. *See E.I. DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1011 (Fed. Cir. 2018). Patent Owner, however, does not cite to evidence demonstrating that their invention achieves an unexpected result (e.g., high conversion and high regioselectivity). Instead, Patent Owner argues that the failure of a silanized catalyst to achieve the claimed conversion and regioselectivity provides unexpected results.

Further, “when unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared with the closest prior art.” *Kao Corp. v. Unilever United States, Inc.*, 441 F.3d 963, 970 (Fed. Cir. 2006). Patent Owner argues that Wright '788 is the closest prior art. Mot. 19. And Patent Owner notes that Wright '788 does not teach or suggest a “base-treated and calcined γ -alumina catalyst.” *Id.* at 21. As explained above, Wright '451 does teach such a catalyst with the claimed conversion and regioselectivity of substituted claim 29. Thus, it appears Wright '451 is the closest prior art. Further, to the extent that

Wright '451 may evidence a strong showing of obviousness at this stage and on this record, we note that evidence regarding unexpected results may be insufficient to overcome the strong evidence of obviousness. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1372 (Fed. Cir. 2007).

At this stage and on this record, Patent Owner's asserted evidence of unexpected results appears to be entitled to little weight. Having weighed all of the evidence before us, it appears Petitioner has shown a reasonable likelihood that proposed substitute claims 29–44 would have been unpatentable in view of Wright '788.

III. CONCLUSION

This concludes the Preliminary Guidance, which is Patent Owner's first option under the Board's pilot program. Notice, 84 Fed. Reg. at 9,497. Patent Owner has an additional option under the Board's pilot program to file a revised MTA by DUE DATE 3. Paper 8.

In addition to those two options under the Board's pilot program, Patent Owner is reminded that amendments of the challenged claims may also be pursued in a separate reissue or reexamination proceeding before, during, or after an AIA trial proceeding, including subsequent to the issuance of the Final Written Decision. We draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

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