

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SYMRISE AG and SYMRISE INC.,¹
Petitioner,

v.

INOLEX INVESTMENT CORPORATION,
Patent Owner.

IPR2023-01439
Patent 10,882,803 B2

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

HULSE, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

¹ The Petition identifies Symrise AG and Symrise Inc. collectively as the Petitioner in this proceeding. Pet. 1. We, therefore, add Symrise Inc. to the caption as Petitioner. The parties are to use this caption going forward in this proceeding.

I. INTRODUCTION

Symrise AG and Symrise Inc. (collectively, “Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–7, 9–11, 24–26, 28, 29, 35, and 36 of U.S. Patent No. 10,882,803 B2 (Ex. 1001, “the ’803 Patent”). Paper 1 (“Pet.”). Inolex Investment Corp. (“Patent Owner”) did not file a Preliminary Response to the Petition.

We have authority under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Upon considering the argument and evidence presented in the Petition, we determine that Petitioner has established a reasonable likelihood that it would prevail in showing the unpatentability of at least one claim challenged in the Petition. Accordingly, we institute an *inter partes* review of the challenged claims of the ’803 Patent.

A. *Real Parties-in-Interest*

Petitioner identifies itself as the real party-in-interest. Pet. 3.

Patent Owner identifies itself as the real party-in-interest. Paper 5, 1.

B. *Related Proceedings*

Both parties state that they are not aware of any judicial or administrative proceedings involving the ’803 Patent. Pet. 3; Paper 5, 1.

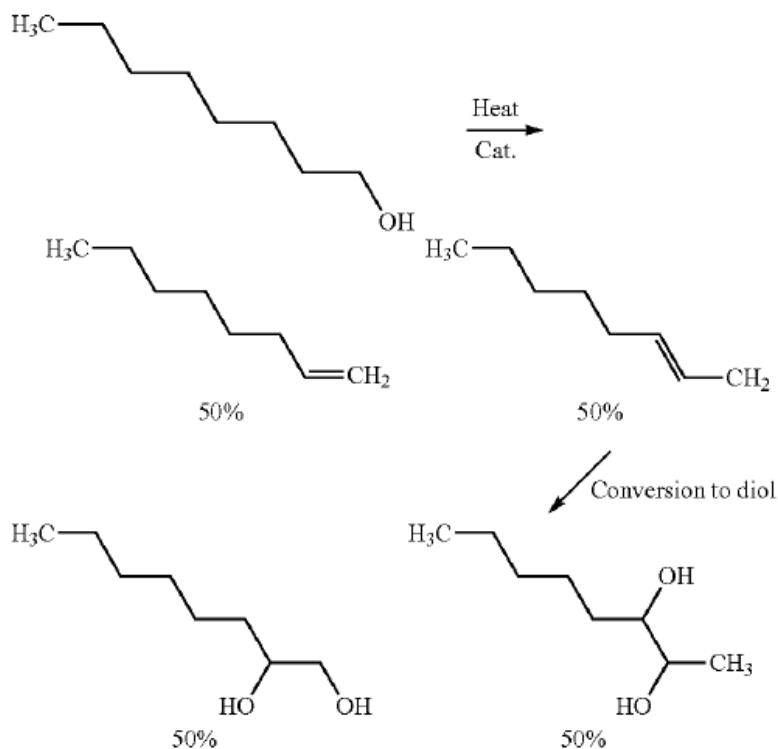
We note that IPR2023-01035 (“the -1035 IPR”), which was instituted on November 16, 2023, involves U.S. Patent No. 10,995,048 B2, which also claims the benefit of U.S. Provisional Application No. 62/623,985 and which shares a substantially identical specification as the ’803 Patent. IPR2023-01035, Paper 7; Ex. 1005, 1, 4–44.

C. The '803 Patent

The '803 Patent, entitled “Natural 1,2-Alkanediols, Compositions Having Natural 1,2-Alkanediols and Processes for Making the Same,” was filed as U.S. Application No. 16/262,898 on January 30, 2019, and claims the benefit of U.S. Provisional Application No. 62/623,985 (“the '985 Provisional”), filed on January 30, 2018. Ex. 1001, codes (54), (22), (60); 1:9–14.

The '803 Patent relates to natural and renewable antimicrobial compounds for use in alternative preservation systems for consumer products, such as personal care products. *Id.* at 1:20–26. Personal care products, like cosmetics, are packaged in clean but not sterile conditions. *Id.* at 1:34–37. As such, small amounts of microbes may be in products which, over time, may grow to a level significant enough to result in discoloration or a foul odor. *Id.* at 1:38–51. To address microbial growth, manufacturers add chemical preservatives, which are typically petrochemically based and derived from fossil fuels. *Id.* at 1:56–59. The Specification states there is a desire to develop alternatives to traditional preservation and to use chemical components that are derived from sustainable and renewable resources (“feedstocks”). *Id.* at 2:9–12. Such “natural” and “renewable” products are formed by “new” carbon (versus “old” carbon from fossil fuels) and are known in the art as non-petrochemically derived or “bio” products. *Id.* at 3:29–34.

According to the Specification, caprylyl glycol (i.e., 1,2-octanediol) is one of the fastest growing alternative preservation components in the world. *Id.* at 2:51–58. One known way to prepare caprylyl glycol is shown by the chemical reaction below:



Id. at 5:30–50. The chemical reaction above shows the conversion of 1-octanol using heat and an acid catalyst to form a mixture of 1-octene and 2-octene regioisomers. *Id.* at 5:53–57. The Specification states that using a mixture of alkenes ultimately provides a mixture of diols upon dihydroxylation, providing a low yield of the desired terminal 1,2-octanediol material and producing unwanted contaminants. *Id.* at 6:3–6. Separating 2-, 3-, and 4-octene regioisomers from the desired 1-octene, however, is difficult and causes a lower net chemical yield of 1-octene. *Id.* at 5:57–60.

Thus, according to the Specification, “[t]here is a strong need in the art for a highly regioselective, and high-chemical conversion rate process for creating a bio-1-octene from a bio-1-octanol.” *Id.* at 6:21–24. Moreover, the Specification states that “[t]here is more particularly a need for a natural, and prefer[ably] renewable/sustainable feedstock source to create a natural,

bio-caprylyl glycol (i.e., a natural or bio-1,2-octanediol) and the associated bio-1-alkene intermediate.” *Id.* at 7:56–60.

D. Illustrative Claim

Petitioner challenges claims 1–7, 9–11, 24–26, 28, 29, 35, and 36 of the ’803 Patent, of which claim 1 is the only independent claim. Claim 1 is illustrative and reproduced below:

1. A process for the synthesis of bio-1,2-alkanediols, comprising:
providing a bio-alkene having a carbon chain of about 5 to about 20 carbon atoms and a bio-1-alkene regioselectivity of at least about 80%; and
converting the bio-alkene to a bio-1,2-alkanediol having a carbon chain length of about 5 to about 20 carbon atoms.

Ex. 1001, claim 1.

E. The Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–7, 9–11, 24–26, 28, 29, 35, and 36 are unpatentable on the following grounds:

Claims Challenged	32 U.S.C. § ²	Reference(s)
1–7, 9–11, 24–26, 28, and 29	103	Cheng ³ and Le ⁴
1–7, 9–11, 24–26, 28, and 29	103	Cheng and Wright ⁵

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the ’803 Patent has an effective filing date after March 16, 2013, the AIA version of § 103 applies. Our decision, however, would be the same under either version.

³ Cheng et al., US 6,528,665 B1, issued Mar. 4, 2003. Ex. 1010 (“Cheng”).

⁴ Le et al., US 2011/0196114 A1, published Aug. 11, 2011. Ex. 1007 (“Le”).

⁵ Michael E. Wright, US 2012/0238788 A1, published Sept. 20, 2012. Ex. 1009 (“Wright”).

Claims Challenged	32 U.S.C. § ²	Reference(s)
1–7, 9–11, 24–26, 28, 29, 35, and 36	103	Furuya ⁶ and Le
1–7, 9–11, 24–26, 28, 29, 35, and 36	103	Furuya and Wright

Petitioner also relies on the Declaration of Douglass F. Taber, Ph.D. Ex. 1002.

II. ANALYSIS

A. *Person of Ordinary Skill in the Art*

Petitioner contends that a person of ordinary skill in the art at the time of the invention (“POSITA”) would have had “a bachelor’s degree and two or more years of experience or a master’s degree in organic synthesis or chemical engineering, with education substituting for experience and *vice versa*.” Pet. 17 (citing Ex. 1002 ¶¶ 15–16).

We adopt Petitioner’s definition as it appears to be consistent with the prior art’s demonstration of the level of ordinary skill in the art at the time of the invention. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining that specific findings regarding ordinary skill level are not required “where the prior art itself reflects an appropriate level and a need for testimony is not shown” (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985))).

Moreover, we find on this record that Dr. Taber is qualified to opine from the perspective of a skilled artisan as he is a person of at least ordinary skill in the art. *See* Ex. 1002 ¶¶ 2–4, App’x A.

⁶ Furuya et al., US 8,173,850 B2, issued May 8, 2012. Ex. 1013 (“Furuya”).

B. Claim Construction

In an *inter partes* review, the Board applies the same claim construction standard that would be used to construe claims 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 proposes a construction of the phrase bio-alkene “having a carbon chain length of about 5 to about 20 carbon atoms” in claim 1. According to Petitioner, because the term “about” is a “term of degree,” the phrase should be construed to mean “a carbon chain length with a minimum of 4 carbon atoms and a maximum of 21 carbon atoms.” Pet. 6, 9. Petitioner asserts that “about 5” must include a carbon chain length of 4 carbon atoms, as 6 carbon atoms is already covered by the range of “about 5 to about 20 carbon atoms.” *Id.* at 6–7. Moreover, Petitioner notes that during prosecution of related U.S. Application No. 16/262,902 (“’902 Application”), Patent Owner filed an amendment after allowance, replacing the phrase “having a carbon chain length of about 8” with the phrase “having a carbon chain length of 7.” *Id.* at 7 (quoting Ex. 1006, 335). Finally, Petitioner contends that because carbon atoms are not divisible, “about 5” necessarily includes 4 carbon atoms. Pet. 8.

At this stage of the proceeding—and without a substantive response from Patent Owner—we determine Petitioner’s construction is consistent with the plain ordinary meaning of “about” and the intrinsic evidence. The claim recites that the carbon chain length of the bio-alkene is “*about 5 to about 20 carbons atoms.*” Ex. 1001, claim 1 (emphasis added). We agree

with Petitioner that use of the term “about” indicates a lack of specificity with respect to the claimed range. *See Cohesive Techs., Inc. v. Waters. Corp.*, 543 F.3d 1351, 1368 (Fed. Cir. 2008) (“When ‘about’ is used as part of a numeric range, the use of the word ‘about,’ avoids a strict numeric boundary to the specified parameter.”) (internal quotations omitted). In other words, the claim term “about 5 to about 20 carbon atoms” does not require precisely 5 to 20 carbon atoms. Moreover, we agree that a carbon atom in a compound is not divisible. Keeping these principles in mind, we find “about 5” at the lower end of the range encompasses a carbon chain length of 4 carbon atoms, and “about 20” at the upper end of the range encompasses a carbon chain length of 21.

We also agree with Petitioner that the prosecution history of the related ’902 Application—which also claims the benefit of the ’985 Provisional and shares a virtually identical specification as the ’803 Patent—supports construing “about” to encompass one additional carbon atom, as evidenced by the amendment after allowance amending the term “carbon chain length of about 8 to about 20” to “carbon chain length of 7 to 20.” *See* Ex. 1006, 335 *see also id.* at 16, 23–63. Thus, the intrinsic evidence supports Petitioner’s construction and the plain ordinary meaning of “about.”

Finally, we note that we construed the same claim phrase in the -1035 IPR involving the related ’048 Patent and reached the same preliminary claim construction. IPR2023-01035, Paper 7 at 7–10.

Thus, at this stage of the proceeding, we construe the phrase “a carbon chain length of about 5 to about 20 carbon atoms” to mean “a carbon chain length with a minimum of 4 carbon atoms and a maximum of 21 carbon

atoms,” as it is consistent with the plain and ordinary meaning of the term and the intrinsic evidence.

C. Alleged Obviousness over Cheng and Le or Wright

Petitioner asserts that claims 1–7, 9–11, 24–26, 28, and 29 are unpatentable as obvious over the combination of Cheng and Le. Pet. 21–35. Petitioner also asserts that those claims are unpatentable as obvious over the combination of Cheng and Wright. *Id.* at 35–45.

On this record, we determine that Petitioner has established a reasonable likelihood that it would prevail in showing the challenged claims are unpatentable over both combinations of cited references.

1. Cheng (Ex. 1010)

Cheng is a U.S. patent entitled, “Preventing Undesired Odor in and/or Purifying Alkanediols,” which was filed on April 3, 2002, and issued on March 4, 2003. Ex. 1010, codes (54), (22), (45). Cheng states that alkanediols, especially vicinal alkanediols, such as 1,2-alkanediols, are typically produced by hydrolysis of epoxyalkanes. *Id.* at 1:6–9. One commercial method of producing epoxyalkane starting materials involves reacting an alkene with hydrogen peroxide in the presence of a heavy metal catalyst. *Id.* at 1:11–14. Although effective, Cheng explains that the process can produce small amounts of impurities that produce commercially unacceptable odors in the resulting alkanediols. *Id.* at 1:15–19. Thus, Cheng describes “commercially attractive ways of preventing undesired odors in alkanediols . . . and most especially in vicinal alkanediols such as 1,2-alkanediols.” *Id.* at 1:40–45.

Cheng discloses preferred embodiments of a process of forming an epoxide comprising a first step of feeding aqueous hydrogen peroxide solution into a reaction mixture comprising 1-alkene, a linear olefin. *Id.* at

2:44–67, 6:29–67, 7:1–40, 7:47–8:9. According to Cheng, “[t]he alkene typically contains 2 to about 12 carbons, but can contain even more carbon atoms.” *Id.* at 11:33–34. Cheng further discloses that “[p]referred alkenes are 1-pentene, 1-hexene, 1-heptene, and 1-octene; highly preferred is 1-hexene.” *Id.* at 11:39–41.

2. *Le (Ex. 1007)*

Le is a U.S. patent application published on August 11, 2011, entitled “Polyolefin Derived from Renewable Resources, and Method for Producing Same.” Ex. 1007, codes (43), (54). Le relates to “a polymer obtained by polymerization of an olefin, derived from renewable materials, having a number of carbon atoms included in the range of from 6 to 9.” *Id.* ¶ 2. Le explains that although polyolefins can be derived from oil products, the exploitation of fossil resources is problematic for various reasons. *Id.* ¶ 13. As such, Le states that “there has, over the past few years, been an increasing interest in polymers derived from renewable starting materials.” *Id.*

Le describes a two-step process for producing the polymer according to the invention, comprising:

- A. treatment of said fatty substance [e.g., plant oil or animal fat] so as to form an olefin (a) comprising a number of carbon atoms included in the range of from 6 to 9;
- B. polymerization of the constitutive monomers, at least one of which is the olefin (a).

Id. ¶¶ 50, 59. Le explains that Step A of the process is a dehydration step that can be carried out in the presence of a dehydration catalyst, such as a γ -alumina-based catalyst, in the presence of the alcohols obtained from renewable sources at temperatures ranging from 250 to 400°C. *Id.* ¶¶ 63, 65.

“When a saturated alcohol of which the only alcohol function is in the alpha-position is dehydrated, a single isomer (an alpha-olefin) is obtained.” *Id.*

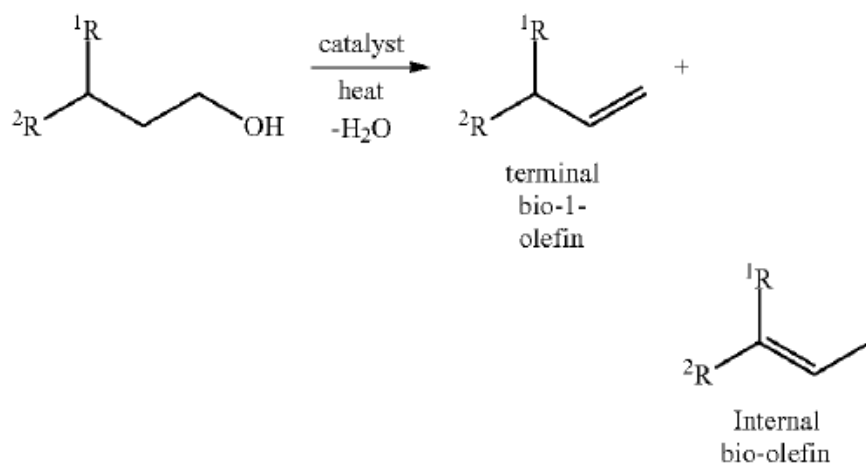
¶ 68. As an example of Step A, Le describes obtaining and dehydrating hexan-1-ol to form 1-hexene (i.e., a bio-1-alkene with 6 carbons). *Id.*

¶¶ 94–100.

3. *Wright (Ex. 1009)*

Wright is a U.S. patent application published September 20, 2012, entitled “Process for the Dehydration of Aqueous Bio-Derived Terminal Alcohols to Terminal Alkenes.” Ex. 1009, codes (43), (54). Inventor Michael E. Wright is also an inventor on the ’803 Patent. *Compare id.*, code (76) with Ex. 1001, code (72).

Wright relates to a method for dehydrating bio-1-alcohols to bio-1-alkenes with high selectivity (>95%). *Id.*, Abstract, ¶ 18. Wright depicts the reaction as follows:



Id. ¶ 16. The chemical reaction above shows a bio-1-alcohol converting to a terminal bio-1-olefin and an internal bio-olefin, all with ¹R and ²R branching from the third carbon in the compound. According to Wright, “¹R and ²R

can be hydrogen, an alkyl radical of C1 to C20, and any combination thereof.” *Id.* ¶ 17.

Wright also states that in some embodiments, “the bio-1-alcohol is 1-pentanol and/or 1-hexanol.” *Id.* ¶ 22. In Example 1, Wright teaches the dehydration of bio-1-butanol to bio-1-butene with a regioselectivity for bio-1-butene of 94–95%. *Id.* ¶ 34, Table 1.

4. Analysis

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. 35 U.S.C. § 103; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“[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. “[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *Id.* Moreover, a person of ordinary skill in the art must have had a reasonable expectation of success of doing so. *PAR Pharm., Inc. v. TWi Pharms., Inc.*, 773 F.3d 1186, 1193 (Fed. Cir. 2014).

a) Claim 1

(1) Cheng and Le

Petitioner asserts that Cheng in combination with Le teaches or suggests each limitation of claim 1. Pet. 23–27. On this record, we find Petitioner has shown sufficiently that Cheng in combination with Le teaches or suggests each limitation of claim 1. For example, Petitioner asserts that Cheng describes “how to convert alkenes having carbon chain length of 2 to 12 carbon atoms to corresponding 1,2-alkanediols” and that “[t]he corresponding 1,2-alkanediols have a carbon chain length of 2 to 12 carbon atoms because the starting 1-alkenes have a carbon chain length of 2 to 12 carbon atoms.” *Id.* at 23 (citing Ex. 1010, 6:29–67, 7:1–40, 11:35–41, 13:40–50; Ex. 1002 ¶ 62). Petitioner notes that “[a] carbon chain length of 2 to 12 carbon atoms overlaps with the claimed carbon chain length of about 5 to about 20 carbon atoms.” *Id.*

Petitioner acknowledges that Cheng does not characterize its 1-alkenes as “bio”-1-alkenes or as having a “regioselectivity of at least about 80%,” as recited in claim 1, but asserts that it is remedied by Le. *Id.* at 23. Petitioner notes that Le describes alkenes, i.e., olefins, that are obtained from a fatty substance consisting of a plant oil extracted from renewable sources. *Id.* at 23–24 (citing Ex. 1007 ¶¶ 23, 27, 28, 36, 37, 53–57, 62, 63, 86–89, 94–117). Thus, according to Petitioner, a “POSITA understands the alcohol (e.g., 1-heptanol) and the alkene (e.g., 1-heptene) in Le’s method are a bio-1-alcohol and a bio-1-alkene because they are derived from renewable plant oils, rather than petroleum or other fossil fuel sources.” *Id.* at 24 (citing Ex. 1002 ¶¶ 63–64; Ex. 1001, 13:53–55). Petitioner further asserts that Le teaches the resulting bio-alkene has a carbon chain of about 5 to about 20 carbon atoms by teaching production of bio-1-hexene, bio-1-heptene, and

bio-1-nonene (i.e., carbon chain lengths of 6, 7, and 9 carbons, respectively). *Id.* at 24–25 (citing Ex. 1007 ¶¶ 94–105, 110–114, 117; Ex. 1002 ¶ 65).

Petitioner also relies on Le’s teachings for the claimed “regioselectivity of at least about 80%.” Pet. 25. According to Petitioner, “Le discloses a process that ‘makes it possible to produce predominantly one olefin with a very limited number of isomers.’” *Id.* (citing Ex. 1007 ¶¶ 12, 21; Ex. 1002, ¶ 67). Petitioner asserts that Le also teaches that dehydrating a bio-1-alcohol results in “a single isomer (an alpha-olefin),” i.e., 1-alkene, but “when the saturated alcohol is not in the alpha-position, a mixture of two isomers is formed.” *Id.* (citing Ex. 1007 ¶ 68; Ex. 1002, ¶¶ 67–69).

Petitioner asserts that a POSITA would have understood that “Le’s method of obtaining a single isomer of the bio-1-alkene results in a bio-1-alkene regioselectivity of greater than 95%, which is ‘at least about 80%,’” as recited in claim 1. Pet. 5 (citing Ex. 1002 ¶ 69). Petitioner’s declarant, Dr. Taber, testifies that a POSITA would understand that Le’s “single isomer” is at least 95% 1-alkene “because if there were any significant isomerization Le would have readily found and reported the byproduct.” Ex. 1002 ¶ 69. Although Dr. Taber does not cite any objective evidence in support of this opinion, we are persuaded at this stage of the proceeding—and without the benefit of Patent Owner’s substantive response—that Petitioner has shown sufficiently that a POSITA reading Le would have understood that it would have been obvious to design a dehydration reaction of a bio-1-alcohol to result in a predominantly bio-1-alkene of at least 80%. *See id.* ¶¶ 41–52.

Petitioner asserts that a POSITA “would be motivated to convert the bio-alkenes of Le into 1,2-bio-alkanediols according to Cheng’s process because ‘. . . vicinal alkanediols, such as 1,2-alkane diols . . .’ are useful in

commercial applications; and Cheng’s method is a ‘commercially attractive way[]’ for carrying out the conversion without objectionable odors commonly associated with the 1,2-alkanediols.” *Id.* at 21–22 (citing 1010, 1:6–10, 1:40–48; Ex.1002 ¶ 58). Petitioner, therefore, contends that it would have been obvious to a POSITA to use the bio-1-alkenes of Le to produce bio-1,2-alkanediols according to the procedures outlined by Cheng. *Id.* at 22 (citing Ex.1002 ¶ 61).

In light of Petitioner’s arguments and evidence—and absent a response from Patent Owner at this time—we are persuaded that Petitioner has shown sufficiently that a POSITA would have had a reason to combine Cheng’s method for generating 1,2-alkanediols from 1-alkenes with Le’s bio-1-alcohols to reach the invention of claim 1 with a reasonable expectation of success. *See* Pet. 21–27; Ex. 1002 ¶¶ 58–72.

(2) Cheng and Wright

To the extent Cheng is insufficient with respect to the bio-alkene and regioselectivity limitations of claim 1, Petitioner bolsters its challenge with Wright. Petitioner asserts that Wright describes subjecting bio-1-alcohols to heat in a reactor with a catalyst to produce corresponding bio-1-alkenes having a chain length of 4 to 23 carbon atoms with high regioselectivity (>92%). Pet. 38–40 (citing, e.g., Ex. 1009 ¶¶ 3, 8, 16–18, 22, 27, 30, 34, claims 2, 11, 12; Ex. 1002 ¶¶ 99, 105, 107, 108). Petitioner notes that Wright also describes examples of dehydrating bio-1-butanol to bio-1-butene, which has a chain length of 4 carbons and falls within the scope of “about 5” carbon atoms. *Id.* at 39 (citing Ex. 1009 ¶¶ 27, 34, claim 2; Ex. 1002 ¶ 107). Petitioner further notes that Wright teaches that in some embodiments, the bio-1-alcohol is 1-pentanol or 1-hexanol. *Id.* at 39 (citing Ex. 1009 ¶ 22; Ex. 1002 ¶ 108).

Petitioner argues that a POSITA would have been motivated to combine Wright with Cheng because 1,2-alkanediols taught by Cheng have known commercial applications. *Id.* at 36 (citing Ex.1010, 1:6–10; Ex.1002 ¶¶ 99–100). Petitioner further argues that a POSITA would have understood that bio-1-alkenes are known chemical precursors to commercial products and that Cheng describes a commercially attractive method of using bio-1-alkene products, such as those described by Wright to prepare vicinal alkanediols. *Id.* at 36 (citing Ex.1010, 1:6–10, 1:40–48; Ex.1002 ¶ 99). According to Petitioner, a POSITA would have understood that Wright could be combined with Cheng to provide the conversion of a bio-1-alkene, such as 1-hexene to 1,2-epoxyhexane, which is then converted to 1,2-hexanediol. *Id.* at 36 (citing Ex.1010, 13:55–14:58, 16:1–40; Ex.1002 ¶¶ 100, 103).

In light of Petitioner’s arguments and evidence—and absent a response from Patent Owner at this time—we are persuaded that Petitioner has shown sufficiently that a POSITA would have combined Cheng’s method for generating 1,2-alkanediols from 1-alkenes with Wright’s bio-1-alcohols to reach the invention of claim 1 with a reasonable expectation of success. *See* Pet. 38–40; Ex. 1002 ¶¶ 99–113.

b) Dependent Claims 2–7, 9–11, 24–26, 28, and 29

Regarding dependent claims 2–7, 9–11, 24–26, 28, and 29, we have considered the arguments and evidence presented by Petitioner and find Petitioner has shown sufficiently that the combination of Cheng and Le and the combination of Cheng and Wright teach or suggest the additional limitations of those claims, and that a POSITA would have had a reason to combine the references with a reasonable expectation of success for the reasons stated in the Petition. *See* Pet. 28–35 (citing, e.g., Ex. 1010, 11:35–

41, 13:40–43, 14:52–53, 14:59–17:63, Examples 2–5; Ex. 1007 ¶¶ 2, 7, 19, 20, 23, 36–37, 53–57, 59, 62–66, 67, 68, 86–89, 94–109, 117, 119, 168–174; Ex. 1002 ¶¶ 73–98); *see also* Pet. 40–45 (citing, e.g., Ex. 1010, 11:35–41, 13:40–43, 14:52–53, 14:59–17:63, Examples 2–5; Ex. 1009 ¶¶ 3, 8, 16, 17–20, 22, 24, 27, 30, 32, 34, claims 1, 7, 11, 12, 19–22; Ex. 1002 ¶¶ 114–131).

5. Conclusion

On this record at this stage of the proceeding, we find Petitioner has shown a reasonable likelihood that it would prevail on its assertions that claims 1–7, 9–11, 24–26, 28, and 29 would have been unpatentable as obvious over the combination of Cheng and Le and the combination of Cheng and Wright.

D. Alleged Obviousness over Furuya and Le or Wright

Petitioner argues that claims 1–7, 9–11, 24–26, 28, 29, 35, and 36 are unpatentable as obvious over the combination of Furuya and Le. Pet. 45–54. Petitioner also argues that those claims are unpatentable as obvious over the combination of Furuya and Wright. *Id.* at 54–61.

On this record—and without a substantive response from Patent Owner—we determine that Petitioner has established a reasonable likelihood that it would prevail in showing that the challenged claims are unpatentable over the cited references. We incorporate here our earlier findings and discussion regarding Le and Wright.

1. Furuya (Ex. 1013)

Furuya is a U.S. patent entitled, “Alkanediol Composition, Process for Producing the Same, and Cosmetic” which was filed on Aug. 19, 2011, and issued on May 8, 2012. Ex. 1013, codes (54), (22), (45). Furuya states that alkanediols are typically produced by oxidizing an olefin with hydrogen peroxide and hydrolyzing the epoxy compound byproduct. *Id.* at 1:49–52.

Furuya explains that, although the hydrolyzed epoxy compound is usually distilled to remove an undesired odor, “alkanediol compositions have a smell even after distillation.” *Id.* at 1:66. Thus, Furuya describes a method for efficiently producing “a less malodorous alkanediol composition.” *Id.* at 2:4–5.

Furuya discloses that the alkanediol compound produced by the best mode of the invention “has at least four carbon atoms” and that “any two hydrogen atoms of a saturated aliphatic hydrocarbon . . . are replaced by hydroxyl groups,” such as 1,2-hexanediol. *Id.* at 2:65–3:1, 3:5.

2. Analysis

Petitioner asserts that Furuya in combination with either Le or Wright teaches or suggests each limitation of claim 1. Pet. 45–61. On this record, we find Petitioner has shown sufficiently that Furuya in combination with either Le or Wright teaches or suggests each limitation of claim 1. For example, Petitioner asserts that Furuya describes converting “1-octene (8 carbon atoms), 1-decene (10 carbon atoms), and 1-dodecene (12 carbon atoms) to 1,2-octanediol, 1,2-decanediol, and 1,2-dodecanediol, respectively.” *Id.* at 46 (citing Ex. 1013, 1:49–60, 2:41–3:11, 3:40–57, 8:6–11:9; Ex. 1002 ¶ 136). Petitioner notes that “Furuya’s carbon chain length of 4 or more carbon atoms for the α -olefins (1-alkenes) fully encompasses the claimed carbon chain length of ‘about 5 to about 20 carbon atoms.’” *Id.* at 46 (citing Ex. 1002 ¶ 136).

Petitioner acknowledges that Furuya does not characterize its olefins as “bio”-1-alkenes having a “regioselectivity of at least about 80%,” as recited in claim 1. *Id.* at 46. Petitioner relies on the teachings of Le and Wright to teach those limitations, as set forth above. *Id.* at 46–47; *see supra* Section II.C.4.(a).

Petitioner asserts that it would have been obvious for a POSITA to combine Furuya with Le or Wright “because Furuya removes objectionable odors associated with forming 1,2-alkanediols from 1-alkenes.” *Id.* at 45 (citing Ex. 1013, 1:49–67, 3:40–57, 8:6–11:9); *see also id.* at 55 (citing same). According to Petitioner, “a POSITA would be motivated to use bio-1-alkenes of Le [and Wright] (derived from natural feedstocks) instead of petrochemically derived 1-alkenes given the desire to improve marketing and environmental impact while reducing reliance on oil” and to “reduce environmental impacts associated with fossil fuels.” *Id.* at 45 (citing Ex. 1007 ¶¶ 9–13; Ex. 1002 ¶ 133); *see also id.* at 54–55 (citing Ex. 1002 ¶¶ 177–178; Ex. 1009 ¶¶ 3, 17, 18). Petitioner asserts that it therefore would have been obvious to a POSITA to use Le and Wright’s bio-1-alkenes to produce bio-1,2-alkanediols using Furuya’s process. *Id.* at 46 (citing Ex. 1002 ¶¶ 133, 135); *see also id.* at 55 (citing Ex. 1002 ¶ 179).

In light of Petitioner’s arguments and evidence—and absent a response from Patent Owner at this time—we are persuaded that Petitioner has shown sufficiently that a POSITA would have combined Furuya’s method for generating 1,2-alkanediols from 1-alkenes with Le’s or Wright’s bio-1-alkenes to reach the invention of claim 1 with a reasonable expectation of success. *See* Pet. 45–49; 54–58; Ex. 1002 ¶¶ 132–147, 176–191.

Regarding dependent claims 2–7, 9–11, 24–26, 28, 29, 35 and 36, we have considered the arguments and evidence presented by Petitioner and find Petitioner has shown sufficiently that the combination of Furuya and Le and Furuya and Wright teach or suggest the additional limitations of those claims, and that a POSITA would have had a reason to combine the references with a reasonable expectation of success for the reasons stated in the Petition. *See* Pet. 49–54 (citing, e.g., Ex. 1013, 1:49–60, 2:41–3:11,

3:40–57, 8:6–11:9; Ex. 1007 ¶¶ 2, 7, 19, 20, 23, 36–37, 53–57, 59, 62–66, 67, 86–89, 94–114, 117, 119, 168–174; Ex. 1002 ¶¶ 148–161, 169–175); *see also* Pet. 57–61 (citing, e.g., Ex. 1013, 1:32–60, 2:41–3:11, 3:40–57, 8:6–11:9; Ex. 1009 ¶¶ 3, 8, 16, 17–20, 22, 24, 27, 30, 32, 34, claims 1, 7, 11, 12, 19–22; Ex. 1002 ¶¶ 192–211).

3. Conclusion

On this record at this stage of the proceeding, we find Petitioner has shown a reasonable likelihood that it would prevail on its assertions that claims 1–7, 9–11, 24–26, 28, 29, 35, and 36 would have been unpatentable as obvious over the combination of Furuya and Le and the combination of Furuya and Wright.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that at least one of the challenged claims of the '803 Patent is unpatentable. Accordingly, we institute an *inter partes* review of claims 1–7, 9–11, 24–26, 28, 29, 35, and 36 of the '803 Patent on each of the grounds raised in the Petition.

Our determination in this Decision is not a final determination on the construction of any claim term or the patentability of any challenged claim and, thus, leaves undecided any factual issues necessary to determine whether sufficient evidence supports Petitioner's contentions by a preponderance of the evidence in the final written decision. *See TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (noting that “there is a significant difference between a petitioner's burden to establish a ‘reasonable likelihood of success’ at institution, and actually proving invalidity by a preponderance of the evidence at trial”) (quoting

35 U.S.C. § 314(a) and comparing § 316(e)). Any argument not raised in a timely Patent Owner Response to the Petition, or as permitted in another manner during trial, shall be deemed waived.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–7, 9–11, 24–26, 28, 29, 35, and 36 of U.S. Patent No. 10,882,803 B2 is instituted with respect to all challenged claims and all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which will commence on the entry date of this decision.

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