

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SYMRISE AG and SYMRISE INC.,
Petitioners,

v.

INOLEX INVESTMENT CORPORATION,
Patent Owner.

Case IPR2023-01035
U.S. Patent No. 10,995,048

**PATENT OWNER'S REPLY TO PETITIONERS' OPPOSITION
TO REVISED NON-CONTINGENT MOTION TO AMEND**

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Ex. 2002	J. Ross, “Heterogeneous Catalysis,” Elsevier B.V. (2012) (“Ross”)
Ex. 2003	Kim <i>et al.</i> , “Dual-bed catalytic system comprising Al ₂ O ₃ and Ba/Al ₂ O ₃ with enhanced 1-octene productivity in 1-octanol dehydration for linear α -olefin production,” <i>J. Ind. Eng. Chem.</i> 119:376-85 (2023) (“Kim”)
Ex. 2004	Experimental data for Comparative Example 10 of U.S. Patent No. 10,995,048 for the conversion of 1-octanol to octenes
Ex. 2005	Deposition Testimony of Douglass F. Taber, January 23, 2024
Ex. 2006	Second Declaration of Michael E. Wright, Ph.D.
Ex. 2007	Deposition Testimony of Douglass F. Taber, June 11, 2024
Ex. 2008	Int’l Patent Pub. No. WO 2022/122139 A1 (“Bugdahn”)
Ex. 2009	D.J. Ward <i>et al.</i> , “Sustainable routes to alkenes: applications of homogeneous catalysis to the dehydration of alcohols to alkenes,” <i>Catal. Sci. Technol.</i> 13:2638-2647 (2023) (“Ward”)
Ex. 2010	Third Declaration of Michael E. Wright, Ph.D.
Ex. 2011	Summary Chart Comparing Substitute Claims 29-44, Disclaimed Claims 1-7, 9-11, 24-26, 28, 29, 35, and 36 of U.S. Patent No. 10,882,803, and Remaining Unadjudicated Claims 8, 12-23, 27, 30-34, 37, and 38 of U.S. Patent No. 10,882,803

I. INTRODUCTION

Patent Owner Inolex Investment Corp. (“Inolex”) submits this Reply to Petitioners’ Opposition to the Revised Non-Contingent Motion to Amend (“Opp.,” Paper 20) the claims of U.S. Patent No. 10,995,048 (“the ’048 Patent”).

Petitioners allege that (1) Inolex is estopped from arguing for the patentability of substitute claims 29-44 (Opp. at 19-23); (2) the substitute claims are procedurally improper (*id.* at 23-25); (3) the substitute claims are invalid under § 112 for lack of written description and indefiniteness (*id.* at 2-5); and (4) the substitute claims are invalid as obvious (*id.* at 5-19). None of Petitioners’ assertions withstand scrutiny.

II. THE SUBSTITUTE CLAIMS ARE PATENTABLY DISTINCT FROM CLAIMS 1-7, 9-11, 24-26, 28, 29, 35, AND 36 OF U.S. PATENT NO. 10,882,803

Petitioners allege that Inolex is estopped from pursuing substitute claims 29-44 in this proceeding based on Inolex’s disclaimer of claims 1-7, 9-11, 24-26, 28, 29, 35, and 36 of U.S. Patent No. 10,882,803 (“the ’803 patent”) (the “Disclaimed Claims”). Petitioners allege Inolex’s RMTA should have identified any differences between the Disclaimed Claims and the substitute claims, but no disclaimer had been made at the time Inolex’s RMTA was filed. For the reasons discussed herein and in Dr. Wright’s Third Declaration, Substitute Claims 29-44 are patentably distinct from the Disclaimed Claims based on differences that *materially alter the question of invalidity*, and therefore estoppel does not apply. *Cf. Apple Inc. v. Softview LLC*, No.

APPEAL 2021-5530, at *17, *19 (P.T.A.B. Sept. 22, 2022) (citing *MaxLinear, Inc. v. CF Crespe LLC*, 880 F.3d 1373, 1377 (Fed. Cir. 2018)).

As Dr. Wright discusses, the lack of specificity in the Disclaimed Claims makes the substitute claims non-obvious and readily distinguishable from the Disclaimed Claims. **Ex. 2010**, ¶¶50-60. Specifically, all but three of the Disclaimed Claims merely require “a catalyst,” while claims 9-11 require a catalyst selected from “ZnAl₂O₄ and γ -alumina catalysts.” See **Ex. 1045**, col. 29, l. 24 – col. 32, l. 17; **Ex. 2010**, ¶52; **Ex. 2011**. Specifically, substitute claims 29-44 require non-obvious process parameters including the requirements of i) a calcium-promoted γ -alumina catalyst, ii) calcined at a temperature of about 420 °C to about 480 °C, iii) wherein the catalyst has not been silanized, iv) in a reactor at a temperature of 240 °C to 360 °C. **Ex. 2010**, ¶¶52-59. Further, substitute claims 34, 25, 37, 38, 40, 41, 43, and 44 require that “the calcium-promoted catalyst has been calcined at a temperature of about 440 °C to about 460 °C,” which is similarly non-obvious and separately patentable over the Disclaimed Claims. **Ex. 2010**, ¶¶54-55. And Petitioners’ obviousness analysis of the requirement that the bio-1-alkene be “produced in a conversion of at least 95% and a bio-1-alkene regioselectivity of 95% to about 99% from a single-pass reaction after at least 20 hours time-on-stream” is wholly inadequate (Opp., 30-21; **Ex. 1046**, ¶22), as a POSITA would have no understanding from claims 6-7 of the ’803 patent that any of the claimed conversion or

regioselectivity were obtained from a single pass of reactants through a continuous flow reactor. **Ex. 2010**, ¶58. Therefore, a POSITA would have no understanding, let alone a reasonable expectation that disclaimed claims 6 and 7 could achieve the required regioselectivity or conversion in a single pass through the continuous flow reactor. *Id.*, ¶¶58-60.

Acknowledging that the specific catalyst and reaction temperatures required by the substitute claims are not obvious, Petitioners attempt to focus on the specification of the '803 patent. Opp., 20-22 (citing *Abbvie Inc. v. Mathilda & Terence Kennedy Inst. of Rheumatology Trust*, 764 F.3d 1366 (Fed. Cir. 2014)). However, *AbbVie* is inapposite as both the Disclaimed Claims and substitute claims are directed to processes—not chemical compounds, which was the basis in *AbbVie* for examining the specification to determine utility. *See id.* at 1380-81. What is more, a POSITA would know that the processes of both the Disclaimed Claims and the substitute claims have utility in and of themselves without resort to the '803 patent specification because both processes make C₆ to C₁₀ bio-1-alkenes that are used in a wide range of chemical applications beyond the preparation of bio-1,2-alkanediols. *See Ex. 2010*, ¶51 (citing **Ex. 1007** (*Le*) and their use in polymerization reactions).

The Federal Circuit analyzed double patenting in the context of claims directed to processes in *General Foods v. Studiengesellschaft Kohle mbH*, where it explained that “[o]ur precedent makes clear that the *disclosure* of a patent cited in

support of a double patenting rejection cannot be used as though it were prior art, *even where the disclosure is found in the claims.*” 972 F.2d 1272, 1281 (Fed. Cir. 1992) (citing *In re Braat*, 937 F.2d 589, 594 n.5 (Fed. Cir. 1991)). Thus, it is not appropriate for Petitioners to cite the preferred embodiments disclosed in the specification of the ’803 patent (but which do not appear in the Disclaimed Claims) as “prior art” for determining obviousness of the substitute claims. *Id.*, **Ex. 2010**, ¶54. This error would be even more egregious here, where those preferred embodiments are the subject of other claims of the ’803 patent *that were not challenged by Petitioners and not disclaimed by Inolex.*

Further, any analysis of the non-obviousness of substitute claims 29-44 in view of the Disclaimed Claims must take into account secondary indicia, such as unexpected results. Inolex submits that the secondary indicia of non-obviousness discussed herein and in the RMTA must be considered, and when done so, weighs heavily to support the patentability of substitute claims 29-44 over the Disclaimed Claims, as the Disclaimed Claims are much broader and non-specific compared to the closest prior art. In sum, estoppel under 37 C.R.F. § 42.73(d)(3) should not apply because Inolex is not attempting to recapture in this proceeding subject matter that was lost in IPR2023-1439. *See Apple Inc. v. Contentguard Holdings, Inc.*, No. IPR2015-00458, 2015 WL 4760573, at *4-5 (P.T.A.B. July 15, 2015).

Petitioners also allege that issue preclusion prevents Inolex from arguing for the patentability of substitute claims 29-44. Opp., 22-23 (citing *Aspex Eyewear, Inc. v. Zenni Optical Inc.*, 713 F.3d 1377, 1380 (Fed. Cir. 2013)). Petitioners are wrong.

In *Aspex*, the patentee previously alleged infringement by clip-on eyewear, which resolved on summary judgment of non-infringement (affirmed on appeal) and invalidity of a single claim for obviousness. *Id.*, 1379-80. Collateral estoppel precluded the later claims of infringement by substantially identical products because the issue of that infringement had been fully litigated. *Id.*, 1378-79, 1382.

The Federal Circuit has explained that “[i]f the differences between the unadjudicated patent claims and adjudicated patent claims do not materially alter the question of invalidity, collateral estoppel applies.” *Ohio Willow Wood Co. v. Alps South, LLC*, 735 F.3d 1333, 1342 (Fed. Cir. 2013)). As discussed above, substitute claims 29-44 include numerous limitations that are the subject of other claims of the ’803 patent *that were not challenged by Petitioners and not disclaimed by Inolex*. See also **Ex. 1047**; **Ex. 1049**; **Ex. 2010**, ¶¶52, 55-58. Not only was the subject matter of at least claims 15, 16, 18, 20, and 21 of the ’803 patent not litigated in IPR2023-01439, that subject matter materially alters the question of whether the substitute claims are non-obvious over the Disclaimed Claims that were litigated. See *id.*, ¶¶49-60. Against that backdrop, issue preclusion does not apply because the PTAB must decide whether the limitations of substitute claims 29-44 present materially different

issues that alter the question of patentability, making them patentably distinct from the Disclaimed Claims. *See MaxLinear*, 880 F.3d at 1378-79 (remanding to the PTAB for further consideration of the patentability of unadjudicated dependent claims).

III. THE SUBSTITUTE CLAIMS ARE NOT PROCEDURALLY IMPROPER

Petitioners allege that Inolex's RMTA should be denied under 37 C.F.R. § 41.121 or under PTAB's inherent discretion to identify sanctionable misconduct. Inolex disagrees, and respectfully requests the RMTA be entered. Inolex's Motion and RMTA each proposed claim amendments responsive to Petitioners' Grounds, narrowed the claims (in the first instance relying on claim limitations that Petitioners had not challenged), and did not introduce new matter. *See* Papers 12, 18; **Ex. 2001**; **Ex. 2006**. Further, both the '048 patent specification and Dr. Wright's testimony have consistently identified Dr. Wright's prior work with silanized γ -alumina catalysts as the closest prior art. *See* **Ex. 1001**, col. 7, ll. 19-45, Example 10; **Ex. 2006**, ¶¶77; **Ex. 2010**, ¶¶96-97, 122, 133. And this is plainly not an instance in which a Party has submitted false information or intentionally withheld data. *Cf. Spectrum Solutions LLC v. Longhorn Vaccines & Diagnostics, LLC*, No. IPR2021-00847, Paper 133 at *6 (P.T.A.B. Oct. 27, 2023).

IV. SUBSTITUTE CLAIMS 29-44 SATISFY 35 U.S.C. § 112

A. Substitute Claims 29-44 Satisfy the Written Description Requirement of 35 U.S.C. § 112(a)

Petitioners allege that substitute claims 29-44 fail the written description requirement because a “flow rate” is not specified by these claims, and that the ’048 patent’s Examples 3, 10, and 11 do not disclose flow rates. Opp. at 3.

However, Example 5 of the ’048 patent specifically discloses a flow rate of 0.2 mL/min. **Ex. 1001**, col. 27, ll. 20-28 (Example 5); **Ex. 2010**, ¶63. A POSITA reviewing the ’048 patent would understand that the inventors were in possession of a process to use the claimed calcium-promoted catalyst at a flow rate of 0.2 mL/min, and would recognize that similar flow rates could be utilized to practice the claimed processes. **Ex. 2010**, ¶62-64. What is more, Dr. Wright’s unrebutted testimony is that “POSITA would know that temperature and flow rate (or, more precisely, WHSV) are two fundamental process parameters that can be controlled.” **Ex. 1046**, ¶32 (citing **Ex. 2005**, ¶115); **Ex. 2010**, ¶62-64. Therefore, for a specific catalyst at any specific reaction temperature, a POSITA would understand that increasing reactor temperature and decreasing flow rate typically lead to increased 1-alkene conversion but decreased regioselectivity (and *vice versa*). **Ex. 2010**, ¶62. Here, the critical temperature for calcination of the claimed catalyst is disclosed and a POSITA could easily calculate WHSV for Example 5, thereby demonstrating that the inventors were in possession of the claimed processes. *Id.*, ¶¶63-64.

Further, Petitioners' expert, Dr. Taber, testified that a POSITA would not need to know the flow rate (or several other experimental parameters) in order to understand that a process had been performed—rather the important information to a POSITA is the disclosed result. *See Ex. 2010*, ¶¶64-65 (citing *Ex. 2005*, p. 36, ll. 8-22). For at least these reasons, a POSITA would understand that the inventors were in possession of the process required by the substitute claims.

B. The Phrase “*Heating the Bio-1-Alcohol in a Continuous Flow Reactor at a Temperature of 240 °C to 360 °C*” Is Not Indefinite

Petitioners allege that the phrase “dehydrating a bio-1-alcohol by heating the bio-1-alcohol in a continuous flow reactor at a temperature of 240 °C to 360 °C” is indefinite because this claim could cover a process that operates at a single temperature within the claimed range or a process that starts at 240 °C and ends at 360 °C. *Opp.* at 4-5. Petitioners are legally and factually wrong.

Contrary to Petitioner's argument, a POSITA reviewing the specification of the '048 patent would readily understand that the phrase at issue merely requires that the continuous flow reactor be heated at a temperature within the specified range. *See Ex. 2010*, ¶¶61-69. This is evident from the words of the phrase itself (which are not ambiguous), as well as the specification of the '048 patent and the background in the technology. *See id.*, ¶¶67-75. Indeed, a POSITA would understand that a reactor (or separate zones of a reactor) are controlled at a specific

temperature over the course of the process. *See id.*, ¶¶68-73. And both Petitioners' own patent application and Dr. Taber's testimony reflect the lack of ambiguity in the phrase at issue. *See id.*, ¶¶68-65; Ex. 2008, ¶¶[0015], [0126]; **Ex. 2007**, p. 161, ll. 4-14; p. 162, l. 22 – p. 163, l. 9.

In sum, the '048 patent (as well as the background in the technology) inform a POSITA with reasonable certainty about the scope of the claimed process recited in substitute claim 29. Indeed, as stated in *Nautilus* (the only case cited by Petitioners) the standard for definiteness "recogniz[es] that absolute precision is unattainable." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014).

V. THE SUBSTITUTE CLAIMS ARE NOT OBVIOUS OVER THE PRIOR ART

Inolex submits that that substitute claims 29-44 are non-obvious over Grounds 3 and 4. With respect to Ground 4, Petitioner's expert has not met his burden to show a motivation to combine the references (or how that would be done), or that a POSITA would have any reasonable expectation that the prior art combination would result in the claimed process. **Ex. 2010**, ¶¶100-109, 133-134. A similar impermissible reliance on hindsight and failure to view the prior art through the lens of a POSITA infects Ground 4. *Id.*, ¶116. What is more, the substitute claims are non-obvious over both Grounds based on secondary indicia of non-obviousness, which include unexpected results, long-felt need, and the failure of others.

A. Petitioners' Expert Impermissibly Relies on Hindsight and Fails to View Obviousness Through the Lens of a POSITA

In instituting this proceeding, the PTAB adopted Petitioners' proposed POSITA, who 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." Paper 7, 6-7. However, Dr. Taber's failure to analyze the prior art through this lens of a POSITA being one who had little practical experience has infected his analysis of obviousness, including secondary indicia. See **Ex. 2010**, ¶¶30-41, 47-48, 70, 72-73, 77, 79, 81, 85, 94, 100, 102-106, 111-121, 125, 133-134.

With respect to Ground 4, there would have been no motivation for a POSITA to modify De Bruyn because a POSITA would have simply used one of the commercially available catalysts described there, a problem that is compounded by Dr. Taber's failure to explain why or how a POSITA would combine the preferred base-treated catalysts of De Bruyn with the acid-treated catalysts of Takamura. **Ex. 2010**, ¶¶77, 81, 85, 102-109. Dr. Taber also impermissibly relies on hindsight in picking and choosing selected teachings of Takamura without any reasonable scientific basis or expectation of success. **Ex. 2010**, ¶¶102-109.

With respect to Ground 3, a POSITA would not have found the claimed calcination temperature ranges for a calcium-promoted γ -alumina catalyst of "about

420 °C to about 480 °C” and “about 440 °C to about 460 °C” are disclosed or suggested by the prior art. **Ex. 2010**, ¶¶111-116.

B. Petitioners Fail to Rebut Inolex’s Secondary Indicia of Non-Obviousness, and When Considered They Compel Finding the Substitute Claims Non-Obvious

In its RMTA, Inolex submitted evidence of unexpected results based over the prior art, including Wright ’451, related to the prior art use of silanized catalysts, prior art calcination temperatures, and the prior art teaching that conversion increases with reactor temperature. Paper 18, 22-23. Based on Dr. Taber’s analysis and failure to rebut those secondary indicia (**Ex. 1046**, ¶¶40-61), Inolex submits that they must be considered, and when that is done they weigh heavily in favor of the patentability of substitute claims 29-44 over the prior art (**Ex. 2010**, ¶¶110-126).

First, a POSITA would not view Wright ’451 as teaching or suggesting the claimed calcium-promoted γ -alumina catalyst calcined at a temperature of about 420 °C to about 480 °C, or more preferably about 440 °C to about 460 °C. *See id.*, ¶¶111-115. Nor would a POSITA have any reason to rely on prior art calcination temperatures of different catalysts useful in different processes as providing any motivation to modify Wright ’451’s teachings, let alone with a reasonable expectation of success. *See id.* ¶116. Dr. Wright also credibly rebuts Dr. Taber’s other criticisms of the data in the ’048 patent, leaving the conclusion that a POSITA would have viewed the ’048 patent’s teaching that a calcium-promoted γ -alumina

catalyst calcined at the lower temperature of 440 °C exhibits markedly better regioselectivity for 1-octene and also higher conversion compared to the same catalyst calcined at 500 °C, as being completely unexpected. *Id.*, ¶¶114-121, 133-134. Second, a POSITA would have found it unexpected that the '048 patent's calcium-promoted γ -alumina catalyst that is not silanized provided both increased bio-1-alcohol conversion and bio-1-alkene regioselectivity compared to a prior art γ -alumina catalyst that was first treated with a base, dried, silanized, and then calcined at 400 °C. *Id.*, ¶122. Third, a POSITA would not have expected that increasing the reactor temperature would reduce conversion of 1-hexanol to 1-hexene, while maintaining a high-regioselectivity using the '048 patent's calcium-promoted γ -alumina catalyst. **Ex. 2010**, ¶¶123-127. Particularly in view of *Wright '451*'s teaching that the lowest 1-butanol conversion is always at 340 °C and conversion increases with temperature. *Id.*, ¶¶123-127. Finally, Inolex submits additional evidence of long-felt need and failure of others. **Ex. 2010**, ¶¶128-132. All of the secondary indicia weigh strongly in favor of the non-obviousness weigh of substitute claims 29-44. **Ex. 2010**, ¶135.

VI. CONCLUSION

Based on the evidence submitted herewith and in Inolex's Revised Motion to Amend (Paper 18, "RMTA"), Inolex respectfully requests that the Board grant the RMTA and issue the revised substitute claims. Paper 18, Appendix A.

Respectfully submitted,

Dated: August 15, 2024

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CERTIFICATE OF SERVICE

I hereby certify that on August 15, 2024, a true and correct copy of the foregoing PATENT OWNER'S REPLY TO PETITIONERS' OPPOSITION TO REVISED NON-CONTINGENT MOTION TO AMEND was served on counsel of record for Petitioner by filing this document through the P-TACTS System as well as delivering a copy via electronic mail to the following addresses:

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