

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

URT UMWELT UND RECYCLINGTECHNIK GMBH
Petitioner,

v.

DUESENFELD GMBH
Patent Owner.

IPR2024-00887
Patent 11,050,097 B2

Before MEREDITH C. PETRAVICK, CHRISTOPHER M. KAISER,
and KEVIN W. CHERRY, *Administrative Patent Judges*.

KAISER, *Administrative Patent Judge*.

PRELIMINARY GUIDANCE
PATENT OWNER'S MOTION TO AMEND
37 C.F.R. § 42.121(e)

I. INTRODUCTION

On November 20, 2024, we instituted trial as to claims 1–3, 7–10, 12, 13, and 15–19 (“the challenged claims”) of U.S. Patent No. 11,050,097 B2 (Ex. 1001, “the ’097 patent”). Paper 10. After institution, on February 12, 2025, Patent Owner filed a Motion to Amend that is contingent on the patentability of claims 1, 2, 3, 8, 12, 13, 16, and 19. Paper 19 (“Motion” or “Mot.”). Specifically, Patent Owner submitted a contingent motion to amend that proposed substitute claims 22–29 to respectively replace original claims 1–3, 8, 12, 13, 16, and 19 of the ’097 patent, where Patent Owner asked that each substitute claim be considered only if the Board finds its corresponding original claim unpatentable. Mot. 7. On May 7, 2025, Petitioner filed an Opposition to the Motion. Paper 25 (“Opposition” or “Opp.”).

In the Motion, Patent Owner requested that we provide preliminary guidance concerning the Motion in accordance with 37 C.F.R. § 42.121(a)(1)(ii). Mot. 7; *see* 37 C.F.R. § 42.121(e)(1); *see also Rules Governing Motion to Amend Practice and Procedures in Trial Proceedings under the America Invents Act before the Patent Trial and Appeal Board*, 89 Fed. Reg. 76,421 (Sept. 18, 2024) (“Final Rule”). 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 establishes a reasonable likelihood that the substitute claims are unpatentable. 37 C.F.R. § 42.121(e)(1), (2); *see also* 35 U.S.C. § 316(d) (statutory requirements for a motion to amend); 37 C.F.R. § 42.121(a)(2), (a)(3), (b) (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). The reasonable likelihood standard this Preliminary Guidance applies is different than the preponderance of the evidence standard applied when ultimately deciding the Motion. *Compare* 37 C.F.R. § 42.121(e)(1) *with* § 42.121(d). Finally, this preliminary guidance is not a “decision” for purposes of rehearing under 37 C.F.R. § 42.71(d). 37 C.F.R. § 42.121(e)(2).

For purposes of this Preliminary Guidance, we focus on the proposed substitute claims, and specifically on the amendments proposed in the Motion. *See* 37 C.F.R. § 42.121(e)(1); Final Rule, 89 Fed. Reg. at 76,425. We do not address the patentability of the originally challenged claims. *See 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 or any other subsequent decision in this proceeding. 37 C.F.R. § 42.121(e)(2); *see Medytox, Inc. v. Galderma S.A.*, 71 F.4th 990, 1000 (Fed. Cir. 2023).

II. PRELIMINARY GUIDANCE

A. Statutory and Regulatory Requirements

Patent Owner bears the ultimate burden to show that its motion to amend complies with the requirements of 35 U.S.C. § 316(d)(1), (3) and 37 C.F.R. § 42.121(a)(2), (a)(3), (b)(1), and (b)(2). 37 C.F.R. § 42.121(d)(1). 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. *See* 37 C.F.R. § 42.121(e)(1).

1. Reasonable Number of Substitute Claims

A motion to amend must propose a reasonable number of substitute claims. 35 U.S.C. § 316(d)(1)(B); 37 C.F.R. § 42.121(a)(3). Patent Owner has shown it proposes a reasonable number of substitute claims. Mot. 11. Patent Owner proposes eight substitute claims to replace eight challenged claims. *Id.* 8–10.

2. Respond to Ground of Unpatentability

A motion to amend must respond to a ground of unpatentability involved in the proceeding. 37 C.F.R. § 42.121(a)(2)(i). Patent Owner has shown that the motion to amend responds to a ground of unpatentability involved in this proceeding. Mot. 17. In particular, Patent Owner notes that “each of claims 22-29 now contains a limitation requiring a dryer, or drying, operating in a batch mode.” *Id.*; *see also, Id.* at 20–26 (Claim Listing). Patent Owner contends that “LithoRec’s drying device, however, is not a batch drying device, and LithoRec in fact teaches away from the use of batch drying devices.” Mot. 17. Patent Owner quotes LithoRec’s teaching that “[f]or this reason, batch drying is not used.” *Id.* (quoting page 226 of LithoRec (Ex. 1016)). Patent Owner further contends that “each of the claims excludes LithoRec, and the combination of LithoRec with another reference to reach the new claims would not have the necessary motivation, especially given LithoRec’s express teaching away.” *Id.*

3. Scope of Amended Claims

A motion to amend may not enlarge the scope of the claims of the patent. 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii). Patent Owner’s Motion has not enlarged the scope of the claims of the patent. As Patent Owner explains in the

Motion, “each Proposed Substitute Claim begins with the language of either independent claim 1 or independent claim 12, and provides only narrowing amendments thereto.” Mot. 12.

4. New Matter

A motion to amend may not introduce new subject matter. 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii). Patent Owner’s Motion has not introduced new subject matter. Patent Owner identifies support in the application that matured into the challenged patent (the ’484 application) for each limitation of each proposed substitute claim. Mot. 14–17. Petitioner does not raise any argument on this issue. For the purposes of this Preliminary Guidance, and on this record, it appears that Patent Owner has met this requirement.

B. Unpatentability Arguments by Petitioner

Petitioner bears the ultimate burden to show that any proposed substitute claims are unpatentable. 37 C.F.R. § 42.121(d)(2). For the reasons discussed below, at this stage of the proceeding, and based on the current record,¹ it appears that Petitioner has shown a reasonable likelihood that proposed substitute claims 22–29 are unpatentable. *See* 37 C.F.R. § 42.121(e)(1).

Petitioner presents three grounds of unpatentability for proposed substitute claims 22–29, as shown in the table below. Opp. 1.

Ground No.	Claims	Basis
1	22–24, 26–28	LithoRec, Perry
2	22–29	LithoRec, Uchida

¹ We express no view on the patentability of original claims 1–3, 7–10, 12, 13, and 15–19 in this Preliminary Guidance. Instead, we focus on the new limitations of proposed substitute claims 22–29 in the Patent Owner’s Motion to Amend.

3	22–29	LithoRec, Perry, Mitsubishi
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1. Whether LithoRec teaches away from “batch mode” drying

Petitioner relies on LithoRec for its patentability challenge under all three grounds presented in the opposition. *See* Opp. 1–23. Accordingly, if LithoRec teaches away from batch mode drying operations, then all three of Petitioner’s grounds in opposition to the Motion would fail.

As discussed above, Patent Owner contends that LithoRec teaches away from operating a drying device in batch mode. *See* Section II.A.2, *supra*. Patent Owner’s position appears to be based primarily on LithoRec’s teaching on page 226 that “batch drying is not used.” Ex. 1016, 226. Petitioner disagrees and argues that “LithoRec does not limit the pilot plant to a vibratory fluidized bed dryer or teach away from the other types of drying devices.” Opp. 6. Petitioner contends that a person or ordinary skill in the art “would also be familiar with the benefits and tradeoffs of batch and continuous drying.” *Id.* at 8.

On this preliminary record, we do not agree with Patent Owner that LithoRec teaches away from the use of batch mode drying. “A reference does not teach away, however, if it merely expresses a general preference for an alternative invention but does not ‘criticize, discredit, or otherwise discourage’ investigation into the invention claimed.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009).

On pages 226–227, LithoRec discloses the following regarding the process of drying shredded battery material:

The electrolytes need to be evaporated for the subsequent dry treatment processes, which are primarily aimed at extracting the active mass. On the one hand, this step eliminates the potential hazard of

flammable solvents and, on the other hand, converts the active mass into the dry powder form required for dry processing.

Convection dryers are used for drying, as they provide the best drying result for the very inhomogeneous composition of the material. There is also the question of whether drying should also take place in a batch or continuously. As some of the liquids to be vaporized are highly flammable solvents, the drying temperature should probably be severely restricted. This in turn speaks in favor of drying under vacuum, as the drying temperature can be kept low.

As there is currently no reliable data on the substances contained in the battery cells that would allow drying to be reliably designed, only a rough estimate of drying can be made at this point. The manufacturers of drying systems could not be persuaded to submit an offer under the given circumstances. It is assumed that the necessary process steps (inerting, filling, drying, emptying) of a discontinuously operating dryer require a longer work cycle in total than the pre-shredder. For this reason, batch drying is not used.

The liquid to be evaporated is mainly bound to the active mass to be separated, which in turn adheres more or less strongly to the arrester foils (copper or aluminum foils). It would therefore be advantageous if the drying process is accompanied by mechanical stress on the dried material. Fluidized-bed dryers are very suitable for intensive drying. However, since the material to be dried is a very inhomogeneous material with a very wide range of unit sizes (from coarse metal parts to fine powder), only dryers that can ensure material transport by exciting the flow bottom are suitable. The choice of dryer should therefore be a vibratory fluidized bed dryer. In addition to effective drying, the vibration will also contribute to further rubbing of the active mass from the films.

Drying must take place in a protective gas atmosphere (nitrogen), just like the crushing process beforehand. The dryer gases are circulated in a closed circuit and cleaned using a filter and condenser.

Ex. 1016, 226–227. On this record, we find that the above disclosure of LithoRec, including the statement that “batch drying is not used,” does not necessarily “criticize, discredit, or otherwise discourage,” the use of batch drying. LithoRec explains, in the paragraphs reproduced *supra*, that the authors considered “the

question of whether drying should also take place in a batch or continuously” and decided to use continuous drying instead of batch drying. More specifically, LithoRec explains that batch drying was considered, but not selected, because “manufacturers of drying systems could not be persuaded to submit an offer under the given circumstances” and “[i]t is assumed that the necessary process steps (inerting, filling, drying, emptying) of a discontinuously operating dryer require a longer work cycle in total than the pre-shredder.” Ex. 1016, 226. Thus, the LithoRec authors decided that “[t]he choice of dryer should therefore be a vibratory fluidized bed dryer.” But that choice does not “criticize, discredit, or otherwise discourage” the use of batch mode dryers.

We note that Petitioner has submitted additional evidence in support of the Opposition, including an updated Declaration of Mr. Volker Spies (Ex. 1030) and a transcript of a deposition of Patent Owner’s declarant, Mr. Vani Dantam, conducted May 2, 2025 (Ex. 1039). In the May 2, 2025 deposition, Mr. Dantam was asked “[a]re there known tradeoffs between batch dryers and continuous dryers?” *Id.* at 21:14–15. Mr. Dantam responded “I would say so, yes.” *Id.* at 21:16. Based on Mr. Dantam’s testimony, Petitioner argues that a person of ordinary skill in the art would “be familiar with the benefits and tradeoffs of batch and continuous drying,” including that “batch drying offers better control of drying, while continuous drying is used when drying consistency is not necessary.” Opp. 8 (citing Ex. 1039, 21:14–23).

At this stage, Patent Owner has not had an opportunity to address Petitioner’s new evidence or present rebuttal evidence. Patent Owner will have an opportunity to do so. Yet, even in the absence of Petitioner’s testimonial evidence regarding the “tradeoffs of batch and continuous drying,” our preliminary review of the disclosure of LithoRec indicates to us that batch drying was considered by

the LithoRec authors as a suitable option, and that continuous drying was selected as a better option for various reasons including difficulty persuading manufacturers of drying systems to submit an offer and because of the longer work cycle involved in batch drying. Thus, even without relying on Petitioner's deposition evidence (Ex. 1039), we tend to agree with Petitioner that LithoRec does not teach away from the use of batch mode dryers.

2. Petitioner's Reliance on LithoRec Common to All Grounds

For purposes of this preliminary guidance, we focus on the newly added limitations of the proposed substitute claims. Petitioner relies on LithoRec as disclosing the following newly added limitations:

- i. Limitations [22-B], [23-B], [24-B], and [25-B] (inactivating the comminuted material such that an inactivated comminuted material is obtained, wherein the inactivating step is performed after the comminuting step)
- ii. Limitations [26-C], [27-C], [28-D], and [29-D] (wherein the inactivation device is configured to perform the inactivating step after the comminuting step of the comminution unit)

Petitioner contends that LithoRec discloses that drying is performed after comminuting. Opp. 2–3 (citing Pet. §§ III.A.1 and III.C.1). Based on our preliminary review, we tend to agree with Petitioner that LithoRec discloses these limitations.

- iii. Limitation [24-G] (wherein the drying is such that the comminuted material is dried until an electrolyte content in the comminuted material is so low that an electrochemical reaction is impossible or only to a negligibly small extent)
- iv. Limitations [28-C] and [29-C] (such that the comminuted material is dried until an electrolyte content in the comminuted

material is so low that an electrochemical reaction is impossible or only to a negligibly small extent)

Petitioner contends that LithoRec discloses drying the comminuted material until an electrolyte content in the comminuted material is so low that an electrochemical reaction is impossible, which Petitioner contends also satisfies the broader “or only to a negligibly small extent” limitation. Opp. 3 (citing Pet. §§ III.A.2 and III.C.2). Based on our preliminary review, we tend to agree with Petitioner that LithoRec discloses these limitations.

- v. Limitations [23-G] and [25-H] ((d) producing, during the drying, a gaseous electrolyte component recoverable by condensation)
- vi. Limitations [27-E] and [29-G] ((d) the drying device configured to produce a gaseous electrolyte component recoverable by condensation)

Petitioner contends that LithoRec discloses these limitations. Opp. 4–5. In particular, Petitioner contends that LithoRec’s process “produces a gaseous electrolyte component by way of drying and recovers the gaseous electrolyte component by condensation.” *Id.* at 5 (citing Ex. 1016, 227; Ex. 1030 ¶¶ 23–24). Based on our preliminary review, we tend to agree with Petitioner that LithoRec discloses these limitations.

3. Ground 1: LithoRec and Perry

Petitioner contends that proposed substituted claims 22–24 and 26–28 would have been obvious over the combination of LithoRec and Perry. Opp. 1–13. Petitioner provides a detailed analysis of each limitation of each of proposed substitute claims 22–24 and 26–28. *Id.*

- i. Limitations [22-F], [23-F], and [24-F] (wherein the drying uses a drying device operated in batch mode)
- ii. Limitations [26-B], [27-B], and [28-B] ((b) an inactivation device comprising a drying device operated in batch mode, configured to inactivate the comminuted material)

Petitioner contends that “the combined teachings of LithoRec and Perry provide reasons for employing batch drying,” namely that “LithoRec discloses that due to the ‘highly flammable’ nature of the solvents being evaporated, vacuum drying is desired so that the drying temperature can be lowered.” Opp. 10 (quoting Ex. 1016, 226). Petitioner contends that “Perry discloses various types of batch dryers that operate under vacuum” and, more specifically, that “vacuum-shelf dryers ‘are particularly useful for handling small batches of materials wet with toxic or valuable solvents.’” *Id.* (quoting Ex. 1006, 12–44).

As noted above, Patent Owner contends that “each of the claims excludes LithoRec, and the combination of LithoRec with another reference to reach the new claims would not have the necessary motivation, especially given LithoRec’s express teaching away.” Mot. 17. We explain above our preliminary determination that LithoRec does not teach away from the use of batch mode drying. For similar reasons, we do not agree with Patent Owner that a person of ordinary skill in the art “would not have [had] the necessary motivation” (*id.*). Although the authors of LithoRec decided that batch mode drying was not the *best* option for their pilot plant, that does not imply that the use of batch mode dryers, such as Perry’s vacuum shelf dryers, would not have been *suitable*. “It’s not necessary to show that a combination is ‘the best option, only that it be a suitable option.’” *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 800 (Fed. Cir. 2021) (quoting *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1197–98 (Fed. Cir. 2014)).

On this record, our preliminary determination is that Petitioner has sufficiently shown that a person of ordinary skill in the art would have been motivated to substitute Perry’s vacuum-shelf dryers, which operate in batch mode, with LithoRec’s vibratory fluidized bed dryer, for essentially the reasons set forth in the Opposition. In particular, Petitioner has identified a concrete benefit of using Perry’s vacuum shelf dryers, namely that they “are particularly useful for handling toxic or valuable solvents” (Ex. 1006, 12–44), a benefit that LithoRec expressly suggested was important in LithoRec’s teaching that the material to be dried contains “highly flammable solvents,” and that “the drying temperature should probably be severely restricted,” which “speaks in favor of drying under vacuum, as the drying temperature can be kept low” (Ex. 1016, 226).

- iii. Limitations [22-E], [23-E], and [24-E] (wherein the drying occurs at a maximum pressure of 300 hPa)
- iv. Limitations [26-F], [27-G], and [28-G] (such that the drying device operates with a pressure of 300 hPa or less)

Petitioner contends that “Perry also discloses that vacuum-shelf (batch) dryers operate in the range of 1 to 25 mmHg (1.3 to 33.3 hPa).” *Id.* at 11 (citing Ex. 1006, 12–45). According to Petitioner, a person of ordinary skill in the art “would have been motivated to combine the teaching of Perry with the teaching of LithoRec since both references teach batch drying and drying under vacuum conditions in order to lower the drying temperature and avoid the ignition or combustion of the highly flammable solvents during drying.” Opp. 11–12 (citing Ex. 1016, 226; Ex. 1030 ¶¶ 18–22). Petitioner further contends that “[a] process engineer would perform this kind of routine optimization at the time of the invention as a standard part of plant setup.” *Id.* at 12 (citing Ex. 1030 ¶ 22; Ex. 1039, 15:15–16:13).

The Federal Circuit has held that “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *E.I. DuPont de Nemours & Co. v. Synvina CV*, 904 F.3d 996, 1006 (Fed. Cir. 2018) (quoting *In re Aller*, 220 F.2d 454, 456 (CCPA 1955)). “[W]here there is a range disclosed in the prior art, and the claimed invention falls within that range, the burden of production falls on the patentee to come forward with evidence of teaching away, unexpected results, or other pertinent evidence of nonobviousness.” *Id.* (quoting *Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013)); *cf. In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003) (“[T]he existence of overlapping or encompassing ranges shifts the burden to the applicant to show that his invention would not have been obvious.”). Likewise, there is a rebuttable presumption grounded on a claimed range overlapping a range disclosed in the prior art. *E.I. DuPont de Nemours & Co.*, 904 F.3d at 1007 (quoting *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1311 (Fed. Cir. 2006)) (“The presumption [of obviousness] can be rebutted if it can be shown that the prior art teaches away from the claimed range, or the claimed range produces new and unexpected results.”); *cf. Peterson*, 315 F.3d at 1330–31 (discussing role of evidence of unexpected results or criticality and teaching away in rebutting a prima facie case of obviousness in examination of an application). In sum,

“where there is a range disclosed in the prior art, and the claimed invention falls within that range, the burden of production falls upon the patentee to come forward with evidence” of teaching away, unexpected results or criticality, or other pertinent objective indicia indicating that the overlapping range would not have been obvious in light of that prior art.

E.I. DuPont de Nemours & Co., 904 F.3d at 1008 (quoting *Galderma*, 737 F.3d at 738). To be clear, the burden of persuasion always lies with Petitioner, as “[t]he

factfinder then assesses [the patentee’s] evidence, along with all other evidence of record, to determine whether a patent challenger has carried its burden of persuasion to prove that the claimed range was obvious.” *Id.* at 1007. “[I]n the absence of evidence indicating that there is something special or critical about the claimed range, an overlap suffices to show that the claimed range was disclosed in—and therefore obvious in light of—the prior art.” *Id.* at 1008. The overlap itself provides sufficient motivation to optimize the ranges. *See Peterson*, 315 F.3d at 1330 (“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of . . . ranges is the optimum combination . . .”).

Based on our preliminary review, Petitioner has sufficiently shown that Perry discloses drying under a pressure within a range of 1.3 to 33.3 hPa, a range that overlaps the claimed “pressure of 300 hPa or less.” Accordingly, our preliminary view is that the burden of production has shifted to Patent Owner to demonstrate that the invention would not in fact have been obvious, for example by showing unexpected results or criticality of the claimed range.

We note that Patent Owner has not yet had an opportunity to respond to Petitioner’s new evidence regarding “routine optimization” submitted in Exhibits 1030 (Declaration of Volker Spies) and 1039 (Deposition of Dantam), or to submit rebuttal evidence.² Patent Owner will have the opportunity to do so in its reply to Petitioner’s Opposition (or in a revised motion) in this proceeding.

² In support of the Patent Owner Response, we note that Patent Owner submitted the declaration of Vani Dantam, which contains testimony that the “advantages and benefits of vacuum drying at pressures below 300 hPa without using foreign substances were notably superior” to “prior battery recycling methods [that] involved the use of foreign substances or high temperatures.” Ex. 2025 ¶ 174. Although this testimony explains that the ’097 patent’s approach gave superior

v. Conclusion as to Ground 1

Our preliminary, non-binding determination on the current record is that Petitioner has established a reasonable likelihood that substitute claims 22–24 and 26–28 are unpatentable as obvious over LithoRec and Perry.

4. Ground 2: LithoRec and Uchida

Petitioner contends that proposed substituted claims 22–29 would have been obvious over the combination of LithoRec and Uchida. Opp. 13–19. Petitioner provides a detailed analysis of each limitation of each of proposed substitute claims 22–29. *Id.* at 1–5, 13–19.

i. Overview of Uchida (Ex. 1026)

Uchida is a U.S. patent titled “Lithium Battery Treatment Method” that issued on February 28, 2008. Ex. 1026, codes (54), (43). Uchida discloses “[a] method of recovering valuable materials from lithium batteries wherein a lithium/transition metal composite oxide is used as a positive electrode active material.” *Id.* code (57) (Abstract). Uchida describes a vacuum heating process wherein a lithium ion battery “is heated under reduced pressure and the volatile elements such as the electrolyte and the organic matter is recovered.” *Id.* ¶ 71.

Although Petitioner does not offer any explanation that Uchida qualifies as prior art to the ’097 patent, Uchida issued on February 28, 2008 which is approximately eight years before the ’097 patent’s earliest claimed priority date of April 28, 2015. *See* Ex. 1001, codes (22), (86), (87), (30). Accordingly, for the

results, it does not explain why those results would have been unexpected. *Id.* Moreover, Patent Owner does not argue that any of the proposed amended claims require the absence of “foreign substances” that Mr. Vantam testifies were the reason for the unexpected results of the ’097 patent. *Id.*; Paper 17, 55; Mot. 1–26.

purposes of this preliminary guidance, we presume that Uchida qualifies as prior art to the '097 patent and proposed substitute claims 22–29.

- ii. [22-F], [23-F], [24-F], and [25-F] (wherein the drying uses a drying device operated in batch mode)
- iii. [26-B], [27-B], [28-B], and [29-B] ((b) an inactivation device comprising a drying device operated in batch mode, configured to inactivate the comminuted material)

Petitioner contends that the vacuum heating process described in Uchida “employs batch drying to evaporate electrolytes from battery material.” *Id.* at 14 (citing Ex. 1026 ¶¶ 71, 75). Petitioner’s position is that Uchida’s vacuum heating process can be considered as a batch mode drying operation because it takes place in a treatment chamber 64. *Id.* Petitioner contends that a person of ordinary skill in the art “would have been motivated to utilize batch drying as a method to evaporate electrolytes from comminuted battery material since both references teach batch drying as a viable option for evaporating electrolytes from battery material.” *Id.* at 14–15 (citing Ex. 1016 at 98, 226; Ex. 1026 ¶¶ 71, 75).

Based on our preliminary review, we tend to agree with Petitioner that Uchida’s vacuum heating process describes a batch mode drying operation. We also tend to agree with Petitioner that a person of ordinary skill in the art would have considered Uchida’s vacuum heating process to be a viable substitute for LithoRec’s vibratory fluidized bed dryer.

- iv. [22-E], [23-E], [24-E], and [25-E] (wherein the drying occurs at a maximum pressure of 300 hPa).
- v. [26-F], [27-G], [28-G], and [29-I] (such that the drying device operates with a pressure of 300 hPa or less)

Petitioner contends that

Uchida discloses actuating a vacuum pump to reduce the pressure in the treatment chamber to a range of 1 to 500 hPa, and the electrolytes are heated to a temperature near their boiling point. Uchida notes that the vapor pressure of DMC at 24 °C is 24 hPa and that the vapor pressure of EMC at 25 °C is 33 hPa.

Opp. 15 (citing Ex. 1026 ¶¶ 74, 75, 78, Fig. 5). According to Petitioner, “one of ordinary skill would have applied the pressure range taught by Uchida to the drying process taught by LithoRec in order to keep the drying temperature low and avoid a hazardous chemical reaction during the drying process, as taught by LithoRec.” *Id.* at 15 (citing Ex. 1016, 226; Ex. 1030 ¶¶ 29–33).

Petitioner further contends that Patent Owner “asserts that the claimed pressure range produces unexpected results, but fails to provide any supporting evidence.” Opp. 16.³ According to Petitioner, Patent Owner “never challenges that ‘maximum pressure of 300 hPa’ is other than the mere result of routine optimization.” *Id.*

Based on our preliminary review, we agree with Petitioner that Uchida discloses a treatment chamber operated within a pressure range that overlaps the claimed ranges of “maximum pressure of 300 hPa” and “300 hPa or less.” For purposes of this preliminary guidance, our guidance is essentially the same as set

³ Based on our review of the record, it appears that Petitioner may be referring to Patent Owner’s arguments regarding unexpected results on page 55 of Patent Owner’s Response (Paper 19 (citing Ex. 2025 ¶ 174)). In this preliminary guidance, we focus on the proposed substitute claims and arguments presented in the Motion and Opposition; we do not address arguments made in other papers regarding the original claims. In addition, as noted above, although the testimony on which Patent Owner’s argument rests explains that the ’097 patent’s approach gave superior results, it does not explain why those results would have been unexpected. Ex. 2025 ¶ 174. Moreover, Patent Owner does not argue that any of the proposed amended claims require the absence of “foreign substances” that Mr. Vantam testifies were the reason for the unexpected results of the ’097 patent. *Id.*; Paper 17, 55; Mot. 1–26.

forth above with respect to Perry’s disclosure of an overlapping pressure range. Namely, that Petitioner has sufficiently shown that Uchida discloses an overlapping range and that the burden of production has therefore shifted to Patent Owner to come forward with evidence of non-obviousness of the claimed range (e.g., unexpected results).

- vi. [25-F] (wherein the drying occurs at temperature of 80 °C or less)
- vii. [29-E] (wherein the drying occurs at temperature of 80 °C or less)

Petitioner contends that Uchida teaches that “the vapor pressure of DMC [(dimethyl carbonate)] at 24 °C is 24 hPa and that the vapor pressure of EMC [(ethyl methyl carbonate)] at 25 °C is 33 hPa.” Opp. 18 (citing 1026 ¶¶ 74, 75, 78). According to Petitioner, a person of ordinary skill in the art

would have understood from Uchida that DMC (one of the electrolytes recognized by LithoRec as being in the battery material) can be safely evaporated at 24 °C and would have reduced the drying pressure to 24 hPa to achieve the 24 °C to safely evaporate the DMC electrolyte from the comminuted battery material.

Id. at 18 (citing Ex. 1016, 100; Ex. 1030 ¶¶ 37–38).

Petitioner further argues that “[Patent Owner’s] expert explained that it was standard practice to optimize temperature, and that temperature and pressure optimization simply tend to follow Boyle’s law.” *Id.*⁴

⁴ Petitioner referenced “Petitioner’s expert,” but did not provide a citation to the record in support of this statement. It appears that Petitioner’s reference to “Petitioner’s expert” is a typographical error. In the deposition of Patent Owner’s declarant, Mr. Dantam testified that Boyle’s law describes the relationship between temperature, pressure, and volume. Ex. 1039, 48:9–17.

Based on our preliminary review, we agree with Petitioner that Uchida reasonably suggests, to a person of ordinary skill in the art, operating the treatment chamber to perform drying at a temperature below 80 °C. Thus, Petitioner has sufficiently shown that Uchida discloses an overlapping range and the burden of production has therefore shifted to Patent Owner to come forward with evidence of non-obviousness of the claimed range (e.g., unexpected results).

viii. Conclusion as to Ground 2

We note that Patent Owner has not had an opportunity to address the Uchida reference. Patent Owner will have the opportunity to do so in its reply to Petitioner's Opposition (or in a revised motion) in this proceeding.

For the forgoing reasons, our preliminary, non-binding determination on the current record is that Petitioner has established a reasonable likelihood that substitute claims 22–29 are unpatentable as obvious over LithoRec, and Uchida.

5. Ground 3: LithoRec, Perry, Mitsubishi

Petitioner contends that proposed substituted claims 22–29 would have been obvious over the combination of LithoRec and Uchida. Opp. 19–23. Petitioner's Ground 3 is essentially the same as Ground 2, except that Ground 3 also includes proposed substitute claims 25 and 29. *Id.*

i. Overview of Mitsubishi (Exs. 1031, 1032)

Mitsubishi is a Japanese Unexamined Patent Application Publication titled “Lithium Ion Secondary Battery Recycling Method” that published on January 7, 2013. Ex. 1032, codes (54), (43). Exhibit 1032 is an English translation of the original Japanese language version of Mitsubishi submitted as Exhibit 1031. *See* Ex. 1033 (Translation Certificate).

Although Petitioner does not offer any explanation that Mitsubishi qualifies as prior art to the '097 patent, Mitsubishi published on January 7, 2013 which is approximately two years before the '097 patent's earliest claimed priority date of April 28, 2015. *See* Ex. 1001, codes (22), (86), (87), (30). Accordingly, for the purposes of this preliminary guidance, we presume that Mitsubishi qualifies as prior art to the '097 patent and proposed substitute claims 22–29.

- ii. [22-E], [23-E], [24-E], and [25-E] (wherein the drying occurs at a maximum pressure of 300 hPa)
- iii. [26-F], [27-G], [28-G], and [29-I] (such that the drying device operates with a pressure of 300 hPa or less)

Petitioner contends that Mitsubishi discloses a system and process for recycling lithium ion batteries wherein battery material is dried under vacuum at a pressure of “100 hPa or less, which is within the claimed pressure range.” Opp. 20 (citing Ex. 1032, ¶ 25).

Based on our preliminary review, we agree with Petitioner that Mitsubishi discloses a drying battery material within a pressure range that overlaps the claimed range of “maximum pressure of 300 hPa” and “300 hPa or less.” For purposes of this preliminary guidance, our guidance is essentially the same as set forth above with respect to Perry and Uchida's disclosure of overlapping pressure ranges. Namely, that Petitioner has sufficiently shown that Mitsubishi discloses an overlapping range and the burden of production has therefore shifted to Patent Owner to come forward with evidence of non-obviousness of the claimed range (e.g., unexpected results).

- iv. [25-F] (wherein the drying occurs at temperature of 80 °C or less)
- v. [29-E] (wherein the drying occurs at temperature of 80 °C or less)

Petitioner contends that “Mitsubishi discloses a temperature range (80 °C to 120 °C) associated with the disclosed pressure range (100 hPa or less).” Opp. 21 (citing Ex. 1032 ¶ 25). According to Petitioner, “the 80 °C to 120 °C temperature range of Mitsubishi overlaps the claimed ‘80 °C or less’ temperature range.” *Id.* at 22. Petitioner further contends that Patent Owner “asserts that the claimed temperature range produces unexpected results, but fails to provide any supporting evidence” and that Patent Owner “never challenges that ‘80 °C or less’ is other than the mere result of routine optimization.” *Id.*

We note that the claimed range of “80 °C or less” ends where Mitsubishi’s range begins, and thus the overlap is nominal. Yet, “even a slight overlap in range establishes a prima facie case of obviousness.” *Peterson*, 315 F.3d at 1329. Thus, our guidance for this limitation is essentially the same as our guidance for the pressure limitation discussed above. Namely, that Petitioner has sufficiently shown that Mitsubishi discloses an overlapping range and the burden of production has therefore shifted to Patent Owner to come forward with evidence of non-obviousness of the claimed range (e.g., unexpected results).

vi. Conclusion as to Ground 3

Our preliminary, non-binding determination on the current record is that Petitioner has established a reasonable likelihood that substitute claims 22–29 are unpatentable as obvious over LithoRec, Perry, and Mitsubishi.

6. Conclusion as to Obviousness

We acknowledge that Patent Owner has not yet had the opportunity to respond to Petitioner's contention that substitute claims 22–29 are unpatentable as obvious under 35 U.S.C. § 103. Patent Owner will have the opportunity to do so in its reply to Petitioner's Opposition (or in a revised motion) in this proceeding.

III. CONCLUSION

This concludes our Preliminary Guidance. Patent Owner has the option to reply to this Preliminary Guidance *or* to file a revised MTA by DUE DATE 3. 37 C.F.R. § 42.121(e)(3), (f); Paper 11. Patent Owner's reply or revised MTA may only respond to this Preliminary Guidance or Petitioner's Opposition and may be accompanied by new evidence (including declarations). 37 C.F.R. § 42.121(e)(3). Petitioner has the option to file a sur-reply responsive to this Preliminary Guidance, Patent Owner's reply, or Patent Owner's revised MTA but may not present new evidence in any case. 37 C.F.R. § 42.121(e)(3). Petitioner may also file a reply to the preliminary guidance in the case Patent Owner does not file a reply or revised MTA. 37 C.F.R. § 42.121(e)(4).

In addition, 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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