

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMPEREX TECHNOLOGY LTD.
Petitioner,

v.

SEMICONDUCTOR ENERGY LABORATORY CO., LTD.,
Patent Owner

Case IPR2023-01016
Patent No. 10,741,828

PATENT OWNER'S PRE-INSTITUTION SUR-REPLY

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PATENT OWNER'S EXHIBIT LIST

EXHIBIT-2001	Declaration of Dr. Brett Lucht
EXHIBIT-2002	<i>Curriculum Vitae</i> of Dr. Brett Lucht
EXHIBIT-2003	Li et al., <i>Fracture Behavior in Battery Materials</i> , J. Phys. Energy 2 (2020)
EXHIBIT-2004	Li et al., <i>Cathode Materials Modified by Surface Coating for Lithium Ion Batteries</i> , Electrochimica Acta 51, 3872–83 (2006)
EXHIBIT-2005	Takada, <i>Progress and Prospective of Solid-State Lithium Batteries</i> , Acta Materiala 61, 759–70 (2013)
EXHIBIT-2006	Xu, et al., <i>Lithium Transport Through Lithium-Ion Battery Cathode Coatings</i> , J. Mater. Chem. A. 3, 17248–72 (2015)
EXHIBIT-2007	Jayasree, et al., <i>Nanoscale-Engineered LiCoO₂ as a High Energy Cathode for Wide Temperature Lithium-Ion Battery Applications—Role of Coating Chemistry and Thickness</i> , Nanotechnology 33, 1–19 (2022)
EXHIBIT-2008	Ahaliabadeh, et al., <i>Extensive Comparison of Doping and Coating Strategies for Ni-Rich Positive Electrode Materials</i> , J. Power Sources 540, 1–23 (2022)
EXHIBIT-2009	Han, et al., <i>Influence of Coating Protocols on Alumina-Coated Cathode Material: Atomic Layer Deposition versus Wet-Chemical Coating</i> , J. Electrochem. Soc. 166, A3679–84 (2019)
EXHIBIT-2010	Yamamoto, et al., <i>Stabilization of the Electronic Structure at the Cathode/Electrolyte Interface via MgO Ultra-thin Layer during Lithium-ions Insertion/Extraction</i> , Electrochemistry 82, 891–96 (2014)
EXHIBIT-2011	U.S. Patent Application 2012/0258358 A1 (“Yura”)

I. PETITIONER’S NEW THEORIES AND EVIDENCE THAT SHIM, LEE, AND YU ARE PRINTED PUBLICATIONS CANNOT BE INTRODUCED FOR THE FIRST TIME IN REPLY TO THE POPR

Petitioner’s belated presentation of theories and evidence related to the alleged public accessibility of Shim, Lee, and Yu for the first time in the Reply runs afoul of 35 U.S.C. § 312(a) and the Board’s precedent in *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 (PTAB Dec. 20, 2019).

Section 312(a) sets forth requirements for **the petition** to “identif[y], **in writing and with particularity**, . . . the grounds on which the challenge to each claim is based and **the evidence** that supports the grounds for the challenge to each claim.” 35 U.S.C. § 312(a) (emphasis added). *Hulu* expands on § 312(a) in the context of printed publications, emphasizing that the petition itself must present “the prior art relied upon and evidence that it qualifies as such.” *Hulu*, 13. Specifically, “at the institution stage, the petition must identify, with particularity, evidence sufficient to establish a reasonable likelihood that the reference was publicly accessible before the critical date” *Id.*

As detailed in the POPR, Petitioner failed to comply with § 312(a) and *Hulu* by electing not to address **any** evidence in the Petition whatsoever—let alone “in writing and with particularity”—that Shim, Lee, or Yu were publicly accessible before the critical date of the challenged claims of the ’828 Patent. POPR, 54–58; Pet., 10–11. The statutory requirements cannot be waived and the omission is fatal.

In the Reply, Petitioner argues that *Hulu* allows for submission of “supplemental evidence of public availability . . . in a reply to a [POPR].” Reply, 1. But none of the limited scenarios in which *Hulu* contemplates that petitioners may submit additional evidence in reply to a POPR relieves petitioners of their burden in the first instance to identify **in the Petition** the grounds and evidence relied upon. To the contrary, *Hulu* cautions that “[t]he opportunity to submit additional evidence does not allow a petitioner to completely reopen the record, for example, changing theories after filing a petition.” *Hulu*, 15. Where, as here, Petitioner advanced no theories of public accessibility in the Petition of any kind, all the theories and evidence addressed in the Reply are necessarily new and improper. *Microsoft Corp. v. ThroughPuter, Inc.*, IPR2023-00852, Pap. 15 at 6 (Oct. 11, 2023) (“Petitioner’s intended reply brief and evidence would, in essence, set forth from scratch Petitioner’s contentions for qualifying [the reference] as prior art—particularly with regard to public accessibility We find this situation to be more aligned with a wholly new approach by Petitioner than with merely ‘respond[ing]’ to Patent Owner’s arguments by elaborating on existing arguments and evidence.”).

Petitioner’s attempt to disregard the statutory requirements for a petition and circumvent the word count limit by belatedly addressing entirely new public accessibility theories and evidence (including three new librarian declarations) for

the first time in the Reply should not be condoned. *Id.*, 6 at FN5 (explaining that “the incorporation of arguments [into the petition] arising from” librarian declarations such as Petitioner’s Babbit, Mullins, Fu, and Habernickel declarations is prohibited by 37 C.F.R. § 42.6(a)(3) to “eliminate abuses”).

II. THE REPLY FAILS TO REFUTE THE POPR’S SHOWING THAT SHIM, LEE, AND FUJIKI ARE CUMULATIVE TO LIU AND THAT DISCRETIONARY DENIAL IS THEREFORE WARRANTED UNDER 35 U.S.C. § 325(d)

A. Shim, Lee, and Fujiki are Cumulative to Liu

Petitioner’s allegation that Shim was “overlook[ed]” by the Examiner (*see* Reply, 3) fails to address the fact that Shim, Lee, and Fujiki (“SLF”) are cumulative to Liu—i.e., “[t]he closest prior art of record” that the Examiner explicitly addressed in his reasons for allowance. POPR, 4; Ex. 1002, 1346–47. The Reply does not dispute, nor could it, that the Examiner specially recognized Liu in the reasons for allowance or that SLF are cumulative to Liu with respect to nearly all claim limitations.

The Reply instead contends that SLF are not cumulative to Liu since Liu allegedly does not teach “crack portion[s]” (claim 1).¹ Reply, 4. But Liu’s alleged deficiency with respect to the claimed “crack portion” applies equally to SLF.

¹ Petitioner’s defense, similarly applied to “a portion which includes crystal defects” in claim 5, fails for the same reasons as those applied to “crack portion.”

Indeed, as addressed in the POPR, SLF contain no disclosure of the claimed “crack portion” limitations at all. *See* POPR, 13–15, 17, 18–19, 38, 50.

For example, Petitioner contends that Shim renders obvious a “crack portion” because a POSITA allegedly would have understood Shim’s disclosure of “degradation mechanisms” and “cathode degradation” to be referring to a crack portion. Pet. at 46. While Dr. Lucht explained that Petitioner’s assertions in this regard are wrong (POPR, 13–14; Ex. 2001, ¶ 48), even if Petitioner’s assertions were correct (which they are not), the same logic would apply equally to Liu, which similarly discloses “degradation” (Ex. 1019 at 6), “unstable internal [cathode] structure” (*id.* at 7), and, further, contemplates “stability of a contact interface between LiCoO₂ and the electrolyte” (*id.*). Petitioner’s reliance on Shim’s teachings for purposes of alleging obviousness while brushing aside substantially similar teachings in Liu to sidestep § 325(d) denial is indefensible.

B. The Reply Wrongly Asserts That the Examiner Had Not Previously Considered Liu with the Benefit of a POSITA’s Knowledge as Allegedly Demonstrated in the Petition

Petitioner argues in the Reply that “the Examiner never considered Liu in view of the knowledge of a POSITA, as demonstrated by Dr. Hayes and which is **corroborated by the teachings of references such as Fey and Wang.**” Reply, 4 (emphasis added); *see* Pet., 12–13. But this is wrong. The face of the ’828 Patent identifies multiple references that would have been known to a POSITA and that

were considered by the Examiner during original examination of the '828 patent. These references show that the Examiner would have reviewed Liu, and its teachings that are cumulative to SLF, with the alleged knowledge of a POSITA that Petitioner incorrectly contends was “never considered” by the Examiner. For example, Petitioner relies on Wang (Ex. 1010) and Fey (Ex. 1016) as allegedly providing new teachings that “crack portions (visible using TEM) are commonly formed from cycling of the PEAM” (Reply , 4), but in fact the Examiner had rejected claims during prosecution based on U.S. Patent Application Publication No. 2012/0258358 (“Yura,” Ex. 2011), which similarly teaches in ¶ 72 that “a micro crack[] . . . generally occurs . . . through a volumetric expansion or contraction due to repeated charge-discharge” Ex. 2012, ¶ 72; Ex. 1002, 1137-41 (Office Action rejection relying upon Yura). The Examiner was thus aware of similar teachings to those which Petitioner alleges were not known to the Examiner when Liu was considered. Moreover, no record evidence suggests that Fey’s speculation as to the possibility that a coating material “could” be in an alleged crack (Ex. 1016, 4) would have had any impact on the Examiner’s finding that the claims were allowable over Liu’s teachings, which are cumulative to SLF. *See* POPR, 24.

III. THE BOARD NEED NOT RESOLVE CONSTRUCTIONS OF “IN A PORTION WHICH INCLUDES CRYSTAL DEFECTS” OR “PRESENT IN A CRACK PORTION” TO DENY INSTITUTION

The arguments in the POPR do not require implicit constructions of either (1) “in a portion which includes crystal defects” or (2) “present in a crack portion.”

For example, with respect to “crystal defects,” the POPR merely noted, in its ’828 Patent overview, that the Patent **discloses** crystal defects enclosed within a crystal structure. POPR, 8. But the Reply points to no substantive argument where Patent Owner ever relies on this understanding of “crystal defect” to distinguish the prior art. The Board, therefore, need not construe the “crystal defects” limitation to deny institution here. *See Wellman Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed to the extent necessary to resolve the controversy”) (declining to conduct claim construction prior to deciding validity) (internal quotations omitted).

With respect to magnesium or fluorine being “present in a crack portion,” the Reply mischaracterizes Patent Owner’s arguments in contending that the POPR proposed that “an unclaimed heating step is required for the representative element to be ‘present in a crack portion’ or ‘in a portion which includes crystal defects.’” Reply, 4–5. The POPR never asserted that a “heating step” was required. The POPR instead explained, for example, that “Petitioner’s theory that the mere doping of magnesium in the bulk of the PEAM particle would make it present in a crack portion is wrong and inconsistent with the disclosure of the ’828 Patent.”

POPR, 39–40. In other words, the POPR highlighted Petitioner’s failure to show how its own obviousness theories are consistent with the intrinsic evidence.

In any event, even if Petitioner’s preferred constructions were applied, institution should still be denied given that Shim and Fujiki do not mention crack portions in their PEAM particles observed from a TEM image whatsoever. Further, as explained in the POPR, the Petition fails to show that Shim’s doping of the bulk of a PEAM particle or Fujiki’s diffusion of magnesium in a PEAM particle would meet the implicated claim limitations even under the broad interpretations underlying Petitioner’s obviousness theories. POPR, 38, 50. Accordingly, the Board need not resolve constructions of the terms indicated in the Reply to find that the Petition is not deserving of institution.² *Wellman*, 642 F.3d at 1361.

IV. CONCLUSION

The Board should deny institution of the Petition for *Inter Partes* Review (“IPR”) of the ’828 Patent for at least the foregoing reasons in addition to those presented in the POPR.

² While it is presently unnecessary to resolve formal constructions of any claim terms for purposes of the Board’s deliberations on institution, Patent Owner does not waive any rights to later raise additional arguments that may implicate claim constructions in the event that IPR is instituted.

Respectfully submitted,

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CERTIFICATION OF SERVICE

Pursuant to 37 CFR § 42.6(e), the undersigned certifies that on October 13, 2023, a complete and entire copy of the foregoing Patent Owner's Pre-Institution Sur-Reply and accompanying Exhibit 2011 were provided via email to the Petitioner by serving the correspondence address of record as follows:

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