

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.

IPR2023-01016
Patent 10,741,828 B2

Before DONNA M. PRAISS, JON B. TORNQUIST,
and CHRISTOPHER M. KAISER, *Administrative Patent Judges*.

KAISER, *Administrative Patent Judge*.

DECISION

Denying Petitioner's Request on Rehearing of
Decision Denying Institution of *Inter Partes* Review
37 C.F.R. § 42.71(d)

I. INTRODUCTION

Amperex Technology Ltd. (“Petitioner”) filed a petition for an *inter partes* review (Paper 2 (“Pet.”)) challenging claims 1–8 of U.S. Patent No. 10,741,828 B2 (Ex. 1001 (“the ’828 patent”)). Semiconductor Energy Laboratory Co., Ltd. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply (Paper 7), and Patent Owner filed a Preliminary Sur-Reply (Paper 8). We determined that the information presented in the Petition did not establish a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims, and, accordingly, we did not institute an *inter partes* review. Paper 11 (“Dec.”). Following our denial of institution, Petitioner filed a Request for Rehearing. Paper 12 (“Req. Reh’g”). We have considered Petitioner’s Request for Rehearing and, for the reasons set forth below, we deny the requested relief.

II. STANDARD OF REVIEW

A party requesting rehearing bears the burden of showing that a decision should be modified. 37 C.F.R. § 42.71(d). The party must identify all matters it believes the Board misapprehended or overlooked, and the place where each matter was addressed previously in a motion, an opposition, or a reply. *Id.* When rehearing a decision on petition, we review the decision for an abuse of discretion. 37 C.F.R. § 42.71(c). An abuse of discretion occurs when a “decision was based on an erroneous conclusion of law or clearly erroneous factual findings, or . . . a clear error of judgment.” *PPG Indus. Inc. v. Celanese Polymer Specialties Co.*, 840 F.2d 1565, 1567 (Fed. Cir. 1988) (citations omitted).

III. DISCUSSION

Petitioner requests rehearing of our denial of institution, arguing that we abused our discretion in three respects. Req. Reh’g 1–15. We consider Petitioner’s arguments below.

A. *The Decision on Institution*

Petitioner challenged claims 1–8 of the ’828 patent on eight grounds. Dec. 5. Five of those grounds relied on various combinations of references including Shim and Fey. *Id.* at 11–17. Upon considering these grounds, we determined that Petitioner had not shown sufficiently that Shim or Fey taught or suggested the limitations of the challenged claims requiring that fluorine be present in crack portions of positive electrode active material (PEAM) particles or in portions of PEAM particles that include crystal defects. *Id.* In particular, we determined that Petitioner did not show sufficiently (1) that either Shim or Fey taught or suggested that particles of a fluorine-containing coating material would become lodged in the cracks of PEAM particles or (2) that a person of ordinary skill in the art would have understood that the exposed surface within a crack in Shim’s PEAM particle would react with Shim’s electrolyte to produce a fluorine-containing coating within the crack. *Id.*

B. *Petitioner’s Arguments on Rehearing*

In its Request for Rehearing, Petitioner argues that we abused our discretion by overlooking an argument made in the Petition and by misapprehending or overlooking the teachings of both Shim and Fey. Req. Reh’g 3–15. Specifically, Petitioner argues first that we overlooked its argument that a person of ordinary skill in the art would have understood that fluorine would have become present in the cracks in Shim’s PEAM particles via a reaction between the newly exposed material on the crack

walls and the fluorine-containing electrolyte. *Id.* at 3–11. Petitioner also argues that we misapprehended the standard for obviousness, causing us to overlook Fey’s suggestion that particles of fluorine-containing coatings would become lodged within cracks in PEAM particles. *Id.* at 11–13. Finally, Petitioner argues that we misapprehended Shim’s teaching that particles of fluorine-containing coatings would become lodged within cracks in PEAM particles. *Id.* at 13–15.

C. Analysis

We are not persuaded that we abused our discretion for any of the reasons that Petitioner advances. We consider each of Petitioner’s arguments below.

1. Formation of Fluorine-Containing Coating via Reaction with Electrolyte

In determining that Petitioner did not argue in the relevant portion of the Petition that a person of ordinary skill in the art would have understood that fluorine would be present in a crack portion of Shim due to the reaction of Shim’s electrolyte producing a fluorine-containing coating in a crack portion (Pet. 55), we noted the testimony of Dr. Troy Hayes, Petitioner’s declarant. Dec. 15 (citing Ex. 1003 ¶ 165). Although Dr. Hayes testified that a person of ordinary skill in the art would have had such an understanding, we determined that Petitioner did not present this argument in the Petition. *Id.* at 15–17. Petitioner argues now that we overlooked such an argument in the Petition. Req. Reh’g 3–11 (citing Pet. 39, 43–45, 52–55).

Petitioner argues first that we overlooked an argument on page 39 of the Petition that makes the same argument that Dr. Hayes makes. *Id.* at 3–4. We disagree. Petitioner’s entire argument for the presence of fluorine in a crack portion was as follows:

As described above in Sections XI.A.2.f and XI.A.2.g.ii, Shim (either alone or in combination with Lee) discloses fluorine in Shim's coating, and a POSITA would have understood that such coating material would be present in crack portions. *See* Ex. 1005, Fig. 2(b); Ex. 1016, 4. Thus, because Shim renders obvious a fluorine-containing coating, a POSITA would have understood fluorine would likewise be present in crack portions. Ex. 1003, ¶¶ 164–65. For the same reasons, if Shim's particle is combined with Lee's teaching of a fluorine-containing coating, then a POSITA would have understood that this fluorine would be found in crack portions. *See id.*

Pet. 55. This language does not reference page 39 of the Petition. Instead, it cites “Sections XI.A.2.f and XI.A.2.g.ii,” which appear on pages 43–45 and 52–55, respectively. We cannot have overlooked an argument on which Petitioner did not rely.

Petitioner next argues that section XI.A.2.f of the Petition “explicitly discusses that LiPF_6 decomposition will cause a fluorine-containing film to form on all exposed PEAM surfaces” and that we overlooked this argument. Req. Reh'g 4. This argument contradicts Petitioner's previous argument that section XI.A.2.f merely “discloses fluorine in Shim's coating,” and that a person of ordinary skill in the art “would have understood that such coating material would be present in crack portions.” Pet. 55. Moreover, although section XI.A.2.f discusses the LiPF_6 hydrolysis process that Dr. Hayes discusses, it does not, as Petitioner now argues, “explicitly discuss[] that LiPF_6 decomposition will cause a fluorine-containing film to form on all exposed PEAM surfaces.” *Id.* at 43–45 (describing “fluorine used in a PEAM,” “fluorine in the PEAM particle,” “a fluorine-containing film . . . on the PEAM's surface, which is part of the PEAM,” “LiF formed on cathode surfaces,” and “formation of a fluorine-containing layer,” but not formation of fluorine-containing film “on all exposed PEAM surfaces”). Instead, as

Petitioner argued previously, section XI.A.2.f merely “discloses fluorine in Shim’s coating,” and Petitioner’s argument for the presence of fluorine within crack portions relies on a teaching that particles of a fluorine-containing coating material would become lodged in crack portions. *Id.* at 55. As discussed below and in our decision denying institution, we were not persuaded that Petitioner sufficiently showed that the prior art made this additional teaching. Dec. 11–15. Thus, we did not overlook any argument in section XI.A.2.f for the presence of fluorine in the crack portions of a PEAM particle.

Petitioner also argues that we overlooked the argument in section XI.A.2.g.iii of the Petition that fluorine would be present in the crack portions of PEAM particles. Req. Reh’g 4. In particular, Petitioner notes that section XI.A.2.g.iii “cross-references Section XI.A.2.f. regarding the formation of fluorine on all exposed PEAM surfaces.” *Id.* (citing Pet. 55). Petitioner argues that “[t]his type of cross-referencing is not only appropriate and allowable, but regular practice when discussing antecedent claim terms found in different elements.” *Id.* (citing *Intell. Ventures II LLC v. Ericsson Inc.*, 685 F. App’x 913, 920 (Fed. Cir. 2017); *Deere & Co. v. Gramm*, IPR2015-00898, Paper 7 at 18–19 (PTAB Sept. 23, 2015)). As discussed above, however, section XI.A.2.f does not discuss the formation of a fluorine-containing coating “on all exposed PEAM surfaces.” In addition, as also discussed above, section XI.A.2.g.iii makes only the argument that fluorine would have been present in the coating material and that particles of the coating material would have become lodged in the crack portions of the PEAM particles, not that fluorine would have become present in the crack portions via a reaction between the exposed crack walls and a fluorine-containing electrolyte. Pet. 55. Thus, we did not overlook any argument in

section XI.A.2.g.iii for the presence of fluorine in the crack portions of a PEAM particle due to a reaction between the exposed crack walls and the fluorine-containing electrolyte.

Petitioner argues that our oversight of its arguments in the Petition for the presence of fluorine in the crack portions of PEAM particles due to a reaction between the crack walls and the electrolyte “carries through [our] five related reasons for why this argument was not contained within the Petition.” Req. Reh’g 4–11. As the discussion above shows, however, we did not overlook any argument on which Petitioner relied to show the presence of fluorine in the crack portions of PEAM particles due to a reaction between the crack walls and the electrolyte.

2. *Whether Fey Teaches or Suggests that Particles of Fluorine-Containing Coating Would Become Lodged Within Crack Portions*

In deciding that Petitioner had not shown sufficiently that Fey taught or suggested that particles of a fluorine-containing coating would become lodged within the crack portions of PEAM particles, we stated that “Fey only suggests, rather than teaching unequivocally, that ‘particles of the coating material . . . become ingrained in the crevices and cracks on the cathode surface.’” Dec. 12 (quoting Ex. 1016, 4). Petitioner argues that this statement misapprehends the appropriate standard for obviousness, under which a “reference must be considered not only for what it expressly teaches, but also for *what it fairly suggests*.” Req. Reh’g 11 (quoting *In re Rhoads*, 646 F. App’x 967, 974 (Fed. Cir. 2016)).

Fey states that “changes in the surface texture resulting from the contraction and expansion of the lattice during the cycling process could have enabled the particles of the coating material to become ingrained in the crevices and cracks on the cathode surface.” Ex. 1016, 4. Petitioner edited

this statement to “[P]articles of the coating material [] become ingrained in the crevices and cracks on the cathode surfaces.” Pet. 54 (alterations in Petition). Petitioner’s edit amounts to a mischaracterization of Fey, making the reference seem much less equivocal than it actually is. Instead of describing a process that “could have [been] enabled,” as Fey actually states, Petitioner argues that Fey describes the process as inevitably occurring. In short, Petitioner describes Fey as making a teaching where it instead makes a mere suggestion. Petitioner is, of course, correct that the standard for obviousness requires us to consider both what a reference teaches and what it would have suggested to a person of ordinary skill in the art. Our statement that Fey only suggested the ingraining of coating particles in the crack portions of the PEAM particles rather than teaching it was intended merely to point out Petitioner’s mischaracterization of the evidence, not to state that Fey’s suggestion was irrelevant from an obviousness perspective.

That this was so was made unambiguously clear by the fact that we went on to analyze whether Fey’s suggestion that particles of its coating could become lodged in the cracks of PEAM particles sufficiently supported Petitioner’s argument that particles of a fluorine-containing coating would become so lodged. Dec. 12–13. We found Fey’s disclosure insufficient to support this argument because Petitioner did not explain sufficiently why a person of ordinary skill in the art would have applied Fey’s suggestion about its MgAl_2O_4 coating to the materially different fluorine-containing coatings of Shim or Lee. *Id.*

In particular, we noted that “[b]oth Petitioner and Dr. Hayes state that this would be the case . . . , but neither provides reasoning to explain why it would,” while “Patent Owner and its declarant, Dr. Brett Lucht, direct us to evidence that both the choice of coating material and the choice of coating

method can have dramatic effects on the physical and chemical properties of the resultant coating.” *Id.* (citing Pet. 55; Prelim. Resp. 24–25; Ex. 1003 ¶ 164; Ex. 2001 ¶¶ 68–69; Ex. 1005, 2, 8; Ex. 1006, 1; Ex. 1016, 1–2; Ex. 2004, 2–5; Ex. 2005, Table 2; Ex. 2006, Table 1; Ex. 2007, 1–2; Ex. 2008, 5–6; Ex. 2009, 1; Ex. 2010, 1). Petitioner argues now that we should not have “credit[ed] Dr. Lucht’s suggestion that the choices of coating material and method ‘can have dramatic effects on the physical and chemical properties of the resultant coating,’” because “the silence of the ’828 Patent undercuts this evidence.” Req. Reh’g 12–13 (quoting Dec. 12; citing Ex. 1001, 21:38–24:36).

We need not determine whether it was appropriate to credit Dr. Lucht’s testimony over the evidence supporting Petitioner’s argument that the fluorine-containing coatings allegedly taught or suggested by Lee or Shim would have behaved in the same way as Fey’s non-fluorine-containing coating, because we did not so credit Dr. Lucht’s testimony. Instead, we determined that Petitioner did not direct us to evidence sufficient to support its argument. Petitioner argued that “Shim (either alone or in combination with Lee) discloses fluorine in Shim’s coating, and a POSITA would have understood that such coating material would be present in crack portions” and that “because Shim renders obvious a fluorine-containing coating, a POSITA would have understood fluorine would likewise be present in crack portions.” Pet. 55 (citing Pet. 43–45, 52–55; Ex. 1003 ¶¶ 164–165; Ex. 1005, Fig. 2(b); Ex. 1016, 4). The cited portions of the Petition discuss the presence of fluorine in the coating, but not in crack portions, as taught or suggested by Shim and Lee (pages 43–45), and the presence of magnesium, but not fluorine, in crack portions (pages 52–55), so they do not support Petitioner’s conclusory argument at page 55 that fluorine, in the form of

particles of fluorine-containing coating material, would be present in crack portions. For the reasons discussed below, we are not persuaded that we erred in determining that Petitioner failed to show sufficiently that Figure 2(b) of Shim teaches or suggests the presence of fluorine in crack portions. This leaves Petitioner's citations to Fey, which teaches that particles of a non-fluorine-containing coating could become lodged in crack portions, and to Dr. Hayes's declaration, which suggests that Fey's mechanism would apply equally to fluorine-containing coatings. Pet. 55 (citing Ex. 1003 ¶¶ 164–165; Ex. 1016, 4). Neither Fey nor Dr. Hayes explains or directs us to additional evidence to support the contention that Fey's mechanism would apply to the fluorine-containing coating of Shim or Lee. Ex. 1003 ¶¶ 164–165; Ex. 1016, 4. Thus, Petitioner did not sufficiently support its argument that the fluorine-containing coatings allegedly taught or suggested by Lee or Shim would have behaved in the same way as Fey's non-fluorine-containing coating. Our citation to Dr. Lucht's testimony merely reinforced this determination, because Dr. Lucht persuasively pointed out Petitioner's failure to support its argument sufficiently.

3. *Whether Petitioner Showed Sufficiently that Shim Teaches that Particles of Coating Would Accumulate in Crack Portions*

In arguing in the Petition for the presence of a representative element in a crack portion of a PEAM particle, Petitioner argued that a person of ordinary skill in the art “would have understood: (1) magnesium in the bulk of Shim's particle diffuses into Shim's coating; and (2) elements within Shim's coating will be found in Shim's crack portions.” Pet. 53 (citing Ex. 1003 ¶ 162). As evidence that “elements within Shim's coating will be found in Shim's crack portions,” Petitioner directed us to Figure 2 of Shim,

arguing that “Shim itself demonstrates th[e] ingrain[ing] effect [of Fey].” *Id.* at 53–55 (citing Ex. 1005, Fig. 2; Ex. 1016, 4). Dr. Hayes testified with respect to Figure 2 that “a crack in the cross section of the PEAM particle shows . . . lower concentrations of Co and Li but higher concentrations of Mg and Ti (which are expected to be found in the coating).” Ex. 1003 ¶ 162.

We determined that “Petitioner [did not] show[] sufficiently how the high-concentration areas of magnesium and titanium in the area that Dr. Hayes identifies as a crack portion could have resulted from portions of the coating of Shim’s particle becoming ingrained in a crack,” as Petitioner argued they did. Dec. 14. This was because Figure 2(b) of Shim showed that “[t]he material making up the coating of Shim’s particle has relatively low concentrations of magnesium and titanium” that could not have accumulated to the high concentrations shown in the region that Dr. Hayes identified as a crack portion. *Id.* (citing Ex. 1005, Fig. 2(b)).

Petitioner now argues that we misapprehended the teachings of Shim. Req. Reh’g 13–15. Because the ’828 patent “requires only that fluorine and magnesium be **present** in a crack portion of a PEAM particle—not any specific mechanism by which these elements become present in the cracks,” and because Shim shows the presence of magnesium and titanium from Shim’s coating in a crack, Petitioner argues that Shim shows sufficiently that coating material will accumulate in cracks in a PEAM particle. *Id.* at 14–15 (emphasis in original).

We are not persuaded that we erred in the way Petitioner argues. As we explained in our decision on institution, the coating material around the outside of the particle cross-section in Shim’s Figure 2(b) has low concentrations of magnesium and titanium, depicted “in light blue, green, or

yellow,” but the region Dr. Hayes identifies as a crack portion has higher concentrations of magnesium and titanium, “depicted in yellow, orange, and red.” Dec. 14 (citing Ex. 1005, Fig. 2(b)). “This indicates a much higher concentration [of magnesium and titanium] in the crack portion than is present in the coating material itself.” *Id.* at 14–15 (citing Ex. 1005, Fig. 2(b); Ex. 2001 ¶ 76). Because “Petitioner [did] not explain how portions of a low-concentration material [could] accumulate in such a way as to increase in concentration,” we were unpersuaded that Petitioner had shown sufficiently that Shim taught the accumulation of coating material in the crack portions of a PEAM particle. *Id.* at 15 (citing Pet. 53–55). Given that Petitioner previously argued that the magnesium and titanium in the crack portion of Shim would have arrived there via particles of Shim’s coating accumulating in the crack, Petitioner’s argument now that the mere presence of magnesium and titanium in the crack is sufficient, regardless of the method by which those elements arrived in the crack, is a new argument, presented for the first time in the rehearing request. *See* Pet. 53–55 (arguing that Shim teaches the presence of magnesium and titanium in the crack portions only because “(1) magnesium in the bulk of Shim’s particle diffuses into Shim’s coating; and (2) elements within Shim’s coating will be found in Shim’s crack portions”). Accordingly, we do not consider it.

Petitioner also argues for the first time on rehearing that the titanium in the crack portion in Shim’s Figure 2(b) must come from Shim’s coating material accumulating in the crack because “Shim’s coating is the *only* titanium source, since there is no titanium in the bulk material.” Req. Reh’g 14 (citing Pet. 42; Ex. 1003 ¶¶ 136–138). According to Petitioner, “[t]his is evident” because “titanium [is] present in the crack portion of the coated sample (Fig. 2(b)), but not present anywhere in the uncoated sample

(Fig. 2(a)).” *Id.* (citing Pet. 41–43; Ex. 1003 ¶¶ 136–138). Because this is a new argument, we do not consider it. We note, however, that Shim’s Figure 2(a) shows only the elemental distributions of lithium and magnesium, not the distribution of titanium within the PEAM particle, and absence of evidence is not evidence of absence, so we are not persuaded that this figure shows a lack of titanium within the bulk material of the particle, as Petitioner argues. Ex. 1005, Fig. 2(a).

Finally, Petitioner argues that, because Shim shows the accumulation of coating material in a crack portion of a PEAM particle, and because fluorine would have been present in the coating of the prior-art PEAM particles, the prior art teaches or suggests the presence of fluorine within the crack portions of PEAM particles. Req. Reh’g 15. As discussed above, however, we are not persuaded that we misapprehended the teachings of Shim when we determined that Petitioner had not shown sufficiently that Shim disclosed the accumulation of coating material within the crack portions of PEAM particles.

IV. CONCLUSION

For the foregoing reasons, Petitioner has not demonstrated that the Board abused its discretion in any respect in declining to institute an *inter partes* review of claims 1–8 of the ’828 patent.

V. ORDER

It is hereby

ORDERED that the Request for Rehearing is *denied*.

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