

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 IPR2023-01349

U.S. Patent. No. 11,043,660

PETITIONER'S REQUEST FOR DIRECTOR REVIEW

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All emphasis added unless otherwise noted.

Pursuant to 37 C.F.R. § 42.71(d), Amperex Technology, Ltd. (“Petitioner”) submits this Request for Director Review of the Board’s Decision Denying Institution of *Inter Partes* Review of U.S. Patent No. 11,043,660, Paper 9 (“ID”).

I. INTRODUCTION

The Institution Decision (“ID”) failed to perform the proper obviousness inquiry under *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). The failure is underscored by the recent “Updated Guidance for Making a Proper Determination of Obviousness” (“Notice”) issued by Director Vidal, which “serves as a reminder for USPTO personnel of the flexible approach to obviousness that is required under *KSR* and Federal Circuit precedent.” Notice, 89 Fed. Reg. 14449 (Feb. 27, 2024).

The ID departs in numerous material ways from *KSR*, Federal Circuit precedent, and the renewed guidance in the Notice. Notably, the ID:

- Improperly required a showing that, in Blangero (the primary reference), the Petition’s proposed rock-salt forms of magnesium oxide (“MgO”), lithium fluoride (“LiF”), and lithium titanate (generally, “LTO”) would have been superior to all other possible forms—even though the ID confirmed that such rock-salt structures were known and suitable. ID at 13–15.
- Concluded that Blangero failed to render obvious rock-salt forms of MgO and LiF compounds because it permitted, rather than required, those compounds to have a rock-salt crystal structure. ID at 12.

- Failed to consider evidence that a POSITA would have expected Blangero's MgO already to be in rock-salt form due to background teachings that rock salt is the stable phase of MgO at room temperature, and even more readily crystallizes at Blangero's higher temperatures. ID at 12–13.
- Prevented a POSITA from exercising ordinary creativity to use the known beneficial rock-salt form of MgO in Blangero's particle. *Id.*

This is not surprising, as the Administrative Patent Judge who authored the ID has publicly suggested an obviousness standard going beyond that of *KSR*.¹ Petitioner respectfully requests Director Review and remand with instructions to address the legal errors underpinning the ID to ensure compliance with the guidance provided

¹ Conference Session from “The Power of PTAB: The New Authority in Patent Law” (Oct. 20, 2017) at 21:30–21:54 (“It’s really easy to look at somebody else’s invention and say, ‘well, I could have done that,’ right? And, after the fact it’s pretty easy to find, well, ‘there’s a piece of it in this prior art reference, and there’s a piece of it in that prior art reference,’ and *KSR* says, well, you know, ‘if there’s some reason to combine them, you would have combined them.’ And none of that is untrue, it’s just that *it isn’t quite legally enough.*”), available at

<http://www.facebook.com/ChicagoKentLaw/videos/a-view-from-the-bench-with-ptab-judges-chris-kaizer-and-willia/10155081347502825>.

in Director Vidal's Notice, *KSR*, and Federal Circuit precedent.

II. OVERVIEW OF PETITIONER'S OBVIOUSNESS ARGUMENT

The relevant element at issue in Claim 1 of the '660 Patent concerns a broad, simple concept: that a region of a positive electrode active material ("PEAM") particle, generally used in lithium-ion batteries, comprises a common crystal referred to as "rock salt." Ex. 1001, Cl. 1. The Petition repeatedly demonstrates that several compounds found on PEAM surfaces in the prior art (*e.g.*, MgO, LiF, LTO) were known to adopt a rock-salt formation and presented a wealth of evidence confirming that the formation of rock-salt crystal structures was a well-known phenomenon. *See* Ex. 1013 at 3; Ex. 1030 at 16 ("[T]he stable phase at room temperature and pressure conditions" of MgO is "a rocksalt cubic structure of NaCl[.]"); Ex. 1031 at 3, Fig. 2; Ex. 1040 at Fig. 4; Ex. 1003, ¶ 142. The materials relied upon by the Petition provide greater disclosure of the rock-salt form of these compounds than even the '660 Patent itself, which merely states that "magnesium oxide also has a rock-salt crystal structure." Ex. 1001, 23:8–9. Despite this disparity between record evidence and the '660 Patent—and the absence of any dispute that these compounds were known to adopt rock-salt crystal structures—the Board abused its discretion by applying an overly rigid and legally incorrect interpretation of obviousness in the ID. *See Neurocrine Biosciences, Inc. v. Spruce Biosciences, Inc.*, PGR2021-00088, Paper 16 (P.T.A.B. Aug. 4, 2023) at 6–8.

III. LEGAL STANDARD

“Because Congress has vested the Director with the ‘power and duties’ of the PTO, the Director has the authority to provide for a means of reviewing PTAB decisions . . . and, upon review, may issue decisions [her]self on behalf of the Board.” *United States v. Arthrex, Inc.*, 141 S. Ct. 1970, 1987 (2021). “Requests for Director Review of the Board’s decision whether to institute an AIA trial . . . shall be limited to decisions presenting (a) an abuse of discretion or (b) important issues of law or policy.” Revised Interim Director Review Process at 2(B).

The ID’s finding of non-obviousness is both an abuse of discretion and raises an important issue of law or policy—namely, that the obviousness standard the Board applied in the ID is contrary to Supreme Court and Federal Circuit precedent and the Director’s Notice. The Supreme Court rejected use of a “rigid approach” to obviousness and instead set forth “an expansive and flexible approach.” *KSR*, 550 U.S. at 415. As the Director has noted, this flexible approach requires that the Board consider “all that the art *reasonably suggests*” and credit “the common sense and common knowledge of a PHOSITA,” including where an “allegedly missing teaching would have been *understood by a PHOSITA*.” Notice (citing *KSR*, 550 U.S. at 1741). Moreover, a reference may be modified even when an option suggested by the prior art was not the “*best* option.” *Id.* (citing *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1197–98 (Fed. Cir. 2014)).

IV. ARGUMENT

In holding that Blangero did not render obvious a “second region compris[ing] a rock-salt crystal structure” (Ex. 1001, Cl. 1), the ID articulated these requirements, despite admitting that Blangero’s second region may have a rock-salt structure:

[T]he record as it currently stands tends to show that **MgO and LiF may, but need not, have a rock-salt crystal structure.**

Given this, to show that Blangero’s disclosure of MgO or LiF in its coating teaches or suggests a rock-salt crystal structure, Petitioner needs to explain why a person of ordinary skill in the art either would have understood the compounds to have a rock-salt crystal structure [1] **when manufactured according to the disclosure of Blangero** or [2] would have chosen to use [the compounds] in a rock-salt crystal structure **rather than in another available form.**

ID at 12. Both tests are legally inappropriate and set a standard for obviousness far exceeding Federal Circuit and Supreme Court requirements. For [1], the ID adopts an overly rigid approach by improperly focusing on the “disclosure of Blangero,” overlooking the wealth of evidence of what a POSITA would have understood, and reducing a POSITA to a mere automaton. *KSR*, 550 U.S. at 421; *see infra* § IV.B. The ID’s conclusion in [2], requiring that the Petition show that a proposed option is the “best” option, is contrary to Federal Circuit precedent. *See infra*, § IV.A.

A. The ID Incorrectly Required That the Petition’s Proposed Option Be the “Best” Option Rather Than A “Suitable” Option

Despite acknowledging that MgO, LiF, and LTO were each known to have

rock-salt crystal structures, and making no findings about teaching away (ID at 11, 14), the ID found that the Petition did not show that a POSITA would have chosen to use these compounds—LTO in particular—“in a rock-salt crystal structure rather than in *another available form*” in Blangero’s particle. *Id.* at 13–16. This was error. As the Director emphasized, obviousness “does not require that the motivation be the *best* option, only that it be a *suitable* option from which the prior art did not teach away.” *PAR Pharm.* 773 F.3d at 1197–98 (emphasis in original).

Consistent with the Director’s guidance, the Petition shows that a POSITA would have seen the rock-salt form of LTO (namely, LiTiO_2) as a *suitable option* in Blangero’s particle, including by citing Dr. Hayes’ testimony that LiTiO_2 is a suitable coating material for PEAMs used in lithium-ion batteries (or LIBs). Paper 2 at 29 (citing Ex. 1003, ¶¶ 145–46). The Petition further cites Dr. Hayes explanation as to why a POSITA would have chosen such a coating, including the “*inspiring high-voltage cycling capability*,” “*thermal stability*,” and “strengthened interfacial stability.” *Id.* In fact, the Petition and Dr. Hayes both cite Wang, a 2012 study cited to corroborate the motivations of a POSITA, which reached the express conclusion that “*rock-salt type LiTiO_2 can be used as the suitable candidate of coating materials . . . for LIBs.*” *Id.* at 30 (citing Ex. 1029). And Wang’s study demonstrated “impressive cycling performances” using similar high-temperature sintering as Blangero. Ex. 1003, ¶¶ 145–46 (citing Ex. 1029).

The ID overlooked this corroborating evidence and required an unprecedentedly high bar, disregarding what Wang suggested because Wang purportedly did not expressly suggest using LiTiO_2 or state that it outperformed other LTO compounds. ID at 15–16. In doing so, the ID improperly required far more than is required under *KSR*, including: (1) LiTiO_2 would have been the **best** option out of all LTO compounds and (2) LiTiO_2 would have been “an improvement in a categorical sense” over one form of LTO suggested by Blangero. *See Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1381 (Fed. Cir. 2023) (finding Bauman’s cache obvious to use in Kabemoto as a “suitable option,” even without evidence that Bauman’s cache was a “categorical” improvement over Kabemoto’s cache).

Similarly, the ID improperly dismissed the Petition’s argument regarding rock-salt MgO and LiF : “neither Petitioner nor Dr. Hayes sufficiently explains the choice of rock-salt-type materials **over other options**.” ID at 13. Not only is this not required to demonstrate obviousness, but it is also undermined by the Board’s acknowledgement that “ MgO and LiF **may** . . . have a rock-salt crystal structure.” *Id.* at 11–13. That rock-salt forms of MgO and LiF are suitable options is a sufficient demonstration of obviousness. *See PAR Pharm., Inc.*, 773 F.3d at 1197–98.

In sum, the ID erred in finding rock-salt LiTiO_2 , MgO , and LiF non-obvious due to the lack of evidence of their superiority to all other forms of these compounds. This is not required to demonstrate obviousness, and the ID should be reversed.

B. The ID's Obviousness Analysis Falls Short of the "Expansive And Flexible" Standard

As a separate, independent ground for reversal, the ID applied an overly rigid approach to obviousness that rendered the POSITA a mere automaton, unable to make basic observations or apply straightforward common sense. *See KSR*, 550 U.S. at 415 (requiring an "expansive and flexible approach" to obviousness). The Board correctly acknowledged that its "obviousness analysis . . . need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." ID at 5–7 (quoting *KSR*, 550 U.S. at 418). But as explained below, the ID did not consider these "inferences and creative steps" and failed to apply the "expansive and flexible" standard under *KSR*.

1. The ID's Admission that Rock-Salt Forms of MgO and LiF Were Known Options Undermines Its Findings of Non-Obviousness

Even before considering the Petition's evidence that rock-salt MgO would have been obvious, the Board's own admission that MgO and LiF were known to have rock-salt forms undermines its findings of non-obviousness. In *Bard*, the Board initially found a claim reciting two co-located syringes not obvious over a reference that was silent regarding arrangement of two syringes. *C.R. Bard, Inc. v. Medline Indus., Inc.*, No. 2020-1900, 2021 WL 3574043, at *4 (Fed. Cir. Aug. 13, 2021). The Federal Circuit reversed, finding that the Board incorrectly focused on what the

reference disclosed while ignoring evidence that a POSITA known “of the obvious option of placing both syringes in the same compartment,” because “[w]hen two equally viable options are available” (*i.e.*, storing two syringes together or separately), “either one would seem to have been obvious.” *Id.* at *4; *see also Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1339–40 (Fed. Cir. 2020) (similar).

Blangero teaches using MgO and LiF in its particle (which the Board acknowledges). ID at 11–12. Similar to the two possible syringe locations in *Bard* (store together or not), the Board identified two possible structures for MgO and LiF: rock-salt or not. *Id.* And similar to the Board's erroneous findings in *Bard*, here the ID found rock-salt forms of MgO and LiF non-obvious merely in the absence of any express disclosure of rock-salt forms of these compounds. *Id.* In doing so, and despite acknowledging that “**MgO and LiF may, but need not, have a rock-salt crystal structure**” (*id.*), the ID failed to consider that “[w]hen two equally viable options are available”—*e.g.*, rock-salt and non-rock-salt—“without more, **either one would seem to have been obvious.**” *Bard*, 2021 WL 3574043, at *4. Indeed, the viability of rock-salt MgO in a particle like Blangero's was uncontested: the Petition and Dr. Hayes cited to evidence of rock-salt MgO in similar particles, which was not challenged by PO or the Board. Paper 2 at 28; Ex. 1003, ¶¶ 90–94, 142 (both citing Ex. 1030). And undisputed evidence indicated the common rock-salt form of MgO was known to have a positive impact on its stability. Paper 2 at 28; Ex. 1003, ¶¶ 90–

94, 142. Thus, “without more,” rock-salt forms of MgO and LiF were obvious as viable and suitable options. *Bard*, 2021 WL 3574043, at *4.

To the extent the Director is concerned that the Board noted other possible forms for MgO (ID at 12), this is immaterial in view of *Bard*. The *Bard* reference disclosed a medical kit with a first syringe in a specific compartment and a second syringe with no express location. *Id.* The second syringe could have been located in multiple different places in such a kit, but the court found only two options: “either together with the [first] syringe or apart.” *Id.* at *4. Similarly here, even if there are multiple forms of non-rock-salt MgO, a POSITA ultimately would have had only two options: either rock-salt or not. As for LiF, the Board only identified “amorphous” LiF as an alternative to rock-salt LiF, indicating that a POSITA *literally* only had two options based on record evidence: rock-salt or amorphous. At bottom, the Board’s failure to find rock-salt MgO and LiF obvious—despite being presented with evidence their rock-salt forms were suitable options and noting that they “may” have rock-salt structure—is grounds for reversal.

2. The ID’s Rigid Analysis Improperly Ignored Evidence that Blangero Inherently Disclosed Rock-Salt MgO

Even beyond the fact that rock-salt MgO is a viable option for Blangero’s particle (which *Bard* confirms is enough for obviousness), Dr. Hayes and corroborating evidence explain that Blangero fairly suggests to a POSITA that its

MgO **would be** in rock-salt form. *See* Paper 2 at 28; *In re Rhoads*, 646 F. App'x 967, 974 (Fed. Cir. 2016) (reference must be considered “for **what it fairly suggests**”).

The Board's failure to credit this evidence is an independent ground for remand.

Specifically, Dr. Hayes explained that a POSITA would have known rock salt is the stable phase of MgO at room temperature and would have known how to form rock-salt MgO at substantially higher temperatures, including as disclosed by Blangero and Bai's 2007 study of MgO on LiCoO₂ PEAMs. Ex. 1003, ¶ 142 (citing Exs. 1013, 1030). In fact, Dr. Hayes explained that a POSITA would have **more** reason to believe Blangero's MgO was in rock-salt form, as Blangero's MgO is formed during high-temperature “segregation” and MgO was known to crystallize “more readily” at higher temperatures (such as Blangero's 925 °C firing step). *Id.*

The ID states that this argument was “not discussed, nor even cited, in the Petition,” and so overlooked it. ID at 12–13. This is incorrect. The Petition makes clear that Blangero's surface layer comprising MgO is made by “segregation” (Paper 2 at 27), which Dr. Hayes explains is a high temperature synthesis step. Ex. 1003, ¶¶ 141–42. The Petition then states that a “POSITA would have known that at least the MgO portion of Blangero's coating would have a rock-salt crystal (*i.e.*, NaCl) structure,” and cites to Dr. Hayes' explanation as to why rock-salt MgO is even more likely at high temperatures. Paper 2 at 28 (citing Ex. 1003, ¶ 142). Thus, the Petition **does** argue that a POSITA would have found rock-salt MgO obvious in view of

Blangero's disclosures and cites supporting evidence.

Setting aside the Board's oversight of this argument, the Board also erred when it ignored that rock-salt MgO is "the stable phase at room temperature," instead focusing on Blangero's high-temperature step. ID at 12–13. The Board overlooked Blangero's disclosures that its particle (and thus the MgO therein) will cool to room temperature during manufacturing. *See* Ex. 1005, ¶¶ [0110]–[0120] (describing "cooling" steps after firing). Moreover, it is common sense that Blangero's PEAM particle (and the MgO therein) must cool to room temperature because consumer electronics do not operate at 925 °C. *See* Pet. at 24 (describing Blangero's commercial applications); Ex. 1005, ¶¶ [0002] (similar). The ID's analysis assumes that Blangero's MgO will remain at extremely high temperature and is therefore untenable. *See, e.g., Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009) (obviousness may include recourse to "common sense" that "do[es] not necessarily require explication in any reference or expert opinion").

The Board is further incorrect that including Dr. Hayes' opinion amounted to improper incorporation by reference. ID at 13. Such incorporation by reference is disfavored where "the Board would be forced to 'play archeologist with the record'" to search for arguments external to the briefing. *Penumbra Inc., v. Rapidpulse, Inc.*, IPR2021-01466, Paper 7 at 15 (citation omitted). Here, the Petition properly cited the *precise paragraph* in Dr. Hayes' Declaration explaining that, under Blangero's

high-temperature conditions, MgO more readily assumes a rock-salt form to support the argument that a POSITA would have known that Blangero's MgO would be in rock-salt form. Paper 2 at 28 (citing Ex. 1003, ¶ 142). This is sufficient. *See Tetra Tech Inc. v. Georgetown Rail Equipment Company*, IPR2019-006129, Paper 12 at 19 (“We do not construe reference to a few declaration paragraphs to support a discrete point to rise to the level of improper incorporation by reference.”).

3. The Board's Rigid Analysis Also Improperly Ignored Evidence that Blangero Would Suggest Using MgO in Rock-Salt Form

Even assuming a reasonable factual dispute regarding whether Blangero's MgO would have been rock salt, there can be no dispute that a POSITA would have been motivated to modify Blangero's teachings to use rock-salt MgO for all the reasons as explained above. *See* Paper 2 at 28; Ex. 1003, ¶ 142. Indeed, the *Bard* court credited expert testimony supporting the petitioner's argument that a POSITA “had ample reason to . . . plac[e] both syringes in the same compartment.” *Bard*, 2021 WL 3574043, at *4. Similarly here, both the Petition and Dr. Hayes laid out a POSITA's ample reasons to modify Blangero's particle to use rock-salt MgO. The Petition explained that Blangero's MgO-containing coating layer “provides additional safety when the powders are in contact with the electrolyte of the battery.” Paper 2 at 25–26 (citing Ex. 1003, ¶¶ 136–37). And, as explained above, a POSITA would have understood that MgO's stable form at room temperature is rock salt, and

more readily forms rock salt at higher temperatures. *See id.* at 27–28 (citing Ex. 1003, ¶ 142). Thus, to develop an effective “inert coating layer” that protects the PEAM from the electrolyte, a POSITA would have exercised ordinary creativity to use rock-salt MgO in Blangero’s particle, lest non-rock-salt MgO become unstable at room temperature and negate the effectiveness of the coating. *See id.*

The ID’s requirement that the Petition prove that a POSITA “would have understood MgO **to have** a rock-salt crystal structure **when manufactured according to the disclosure of Blangero**” is incorrect, as it demands an express disclosure from Blangero that MgO would “have” a rock-salt structure. But as explained by the *Bard* court, “obviousness requires no such express disclosure”—the above reasons motivating a POSITA to use rock-salt MgO are enough. *Bard*, 2021 WL 3574043, at *5. This requirement further prevented a POSITA from exercising ordinary creativity, as a POSITA is “not an automaton” and should not be reduced merely to using “a puzzle element A with a perfectly fitting puzzle element B.” *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1219 (Fed. Cir. 2016). Indeed, even where puzzle pieces do not perfectly fit, the proper “flexible approach” asks whether they would have yielded a “***predictable result***.” *Id.* Here, that result—Blangero’s LiCoO₂ PEAM particle with rock-salt MgO—was plainly predictable, as the Petition and Dr. Hayes cited examples of similar LiCoO₂ PEAMs with rock-salt MgO coatings. Paper 2 at 28 (citing Ex. 1030); Ex. 1003, ¶ 142 (same).

C. The Same Panel Made Similar Legal Errors in the '828 Petition

The ID's error in applying obviousness is compounded when considering the same panel's denial of institution in IPR2023-01016 between the same Petitioner and PO. There, the same panel similarly faulted prior-art references for "only suggest[ing], *rather than teaching unequivocally*," certain claim elements, setting forward a legally unsound obviousness standard that continued into the present ID. *Amperex Tech. Ltd. v. Semiconductor Energy Lab. Co.*, IPR2023-01016, Paper 11 (P.T.A.B. Dec. 5, 2023) at 12; *Abbott v. DexCom*, IPR2022-00605, Paper 10 at 24 (P.T.A.B. Jul. 27, 2022) (rejecting argument that reference failed to "clearly and unequivocally disclose" claim elements in obviousness challenge).

Indeed, in denying rehearing on that very issue, the Board acknowledged that the Fey reference "*suggest[ed]*" that coating material becomes ingrained in cracks on a PEAM surface as supported by expert testimony and other references, but still concluded it was not obvious for lack of "additional evidence" that Fey's ingrainings mechanism would apply to another reference—essentially requiring an improper demonstration of bodily incorporation. *See* IPR2023-01016, Paper 13 at 12.

V. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests that the Director reverse the Board's decision to deny institution of IPR2023-01349.

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Petitioner's Request for Director Review

Dated: April 11, 2024

Respectfully submitted,

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Petitioner's Request for Director Review

CERTIFICATION OF SERVICE

Pursuant to 37 CFR § 42.6(e), the undersigned hereby certifies that the foregoing Petitioner's Request for Director Review was served on Patent Owner's lead and back-up counsel in its entirety by electronic service at the email addresses provided below:

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