

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UMICORE S.A. and UMICORE USA INC.,
Petitioner,

v.

UCHICAGO ARGONNE, LLC,
Patent Owner.

Case IPR2016-00253
Patent 6,680,143 B2

Before GRACE KARAFFA OBERMANN, JO-ANNE M. KOKOSKI,
and MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

OBERMANN, *Administrative Patent Judge*.

DECISION
Denying *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Petitioner requests *inter partes* review of claims 1–4, 8, 9, and 17 of U.S. Patent No. 6,680,143 B2 (Ex. 1001, “the ’143 patent”). Paper 7 (“Pet.”). Patent Owner filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). Applying the standard in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail at trial with respect to at least one challenged patent claim, we deny the Petition.

A. *Related Matters*

The Petition identifies as related matters a proceeding in the U.S. International Trade Commission (“the ITC”) and an action filed in federal district court in Delaware. Pet. 2 (citing *In re Lithium Metal Oxide Cathode Materials, et. al*, ITC-337-TA-951 (filed Feb. 19, 2015); *BASF Corp. v. Umicore N.V.*, 1:15-cv-00172-LPS-CJB (D. Del.) (filed Feb. 20, 2015)).

The Petition also identifies IPR2016-00242 (“IPR 242”), which involves U.S. Patent No. 6,677,082 (Ex. 2042, “the ’082 patent”), “the parent to the ’143 patent.” Pet. 2. Concurrently herewith, we issue a decision denying review in IPR 242.

B. *The ’143 Patent*

The ’143 patent is titled “Lithium Metal Oxide Electrodes for Lithium Cells and Batteries.” Ex. 1001, Title. At the time of the invention, lithium-metal oxide compounds of general formula LiMO_2 were “very well known” and “of interest as positive electrodes for rechargeable lithium batteries.” *Id.* at 1:56–61. The ’143 patent “addresses the stability of LiMO_2 electrode structures.” *Id.* at 2:42–43. Specifically, the claimed invention “relates to stabilized LiMO_2 electrodes” in which a “rocksalt phase Li_2MO_3 is

introduced as a component to the overall electrode structure.” *Id.* at 3:27–29. That “overall electrode structure” is “defined” by the “general formula $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$.” *Id.* at 3:29–30.

The challenged claims require an electrode “having a general formula $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$ ” in which “both the LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$ components [are] layered.” *Id.* at 10:18–33; 41–46; 11:13–12:5; Certificate of Correction (for removal of semicolon). The specification describes in detail the layered structures of the two individual electrode components (LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$). *Id.* at 3:41–4:30. The specification also refers to the “overall electrode structure” represented by “general formula $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$.” *Id.* at 3:29–30. The crux of the dispute is whether, under the broadest reasonable interpretation of the claims, the term “ $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$,” and in particular the “•” notation, defines a structural relationship between the two electrode components (LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$). *Id.* at 10:20, 11:16.

C. Illustrative Claim

Claim 1 illustrates the subject matter of the ’143 patent and reads as follows, with the dispositive limitation emphasized:

1. A lithium metal oxide positive electrode for a non-aqueous lithium cell prepared in its initial discharged state **having a general formula $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$** in which $0 < x < 1$, and where M is one or more ions with an average oxidation state of three with at least one ion being Mn, and where M' is one or more ions with an average oxidation state of four, with both the LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$ components being layered and the ratio of Li to M and M' being greater than one and less than two.

Ex. 1001, 10:18–26; Certificate of Correction (for removal of semicolon).

Claims 2–4, 8, and 9 depend from claim 1 and, thus, inherit the “general formula” limitation of claim 1. Claim 17 is directed to an electrochemical cell that includes an electrode having the same “general formula” specified in claim 1. *Id.* at 10:27–33, 41–46; 11:13–12:5.

D. Evidence Asserted in the Petition

The Petition is supported by the Declaration of Dr. Wilmont F. Howard (Ex. 1003)¹ and asserts the following prior art references:

1. Koichi Numata et al., *Synthesis & Characterization of Layer Structured Solid Solutions in the System of $\text{LiCoO}_2\text{-Li}_2\text{MnO}_3$* , 117 Solid State Ionics 257 (1999) (Ex. 1005, “Numata”);
2. Tsutomu Ohzuku et al., *Synthesis & Characterization of $\text{LiAl}_{1/4}\text{Ni}_{3/4}\text{O}_2$ (R3m) for Lithium-Ion (Shuttlecock) Batteries*, 142 J. Electrochem. Soc. 4033 (Dec. 1995) (Ex. 1008, “Ohzuku”);
3. E. Rossen et al., *Structure and Electrochemistry of $\text{Li}_x\text{Mn}_y\text{Ni}_{1-y}\text{O}_2$* , 311–318 Solid State Ionics 57 (1992) (Ex. 1010, “Rossen”);
4. David Linden, *Handbook of Batteries* (2d Ed. 1995) (Ex. 1007, “Linden”);

¹ Patent Owner contends that Dr. Howard is not qualified to opine from the perspective of a person of ordinary skill in the art, because he lacks practical “expertise in x-ray crystallography.” Prelim. Resp. 21. Dr. Howard need not be a person of ordinary skill in the art, but rather, must be “qualified in the pertinent art.” *Sundance Inc. v. Demonte Fabricating Ltd.*, 550 F.3d 1356, 1363–64 (Fed. Cir. 2008). Dr. Howard has a Ph.D. in physical organometallic chemistry, has “over 24 years of experience in the lithium-ion battery technology field,” and has “reviewed and considered” the references raised in the Petition. Ex. 1003 ¶¶ 5, 6, 8. We are persuaded that he is qualified to opine regarding the perspective of a person of ordinary skill in the art.

5. Rossouw et al., *Synthesis & Structural Characterization of a Novel Layered Lithium Manganese Oxide, $Li_{0.36}Mn_{0.91}O_2$, & its Lithiated Derivative, $Li_{1.09}Mn_{0.91}O_2$* , J. Solid State Chem., vol. 104, 464-466 (1993) (Ex. 1013, “Rossouw”); and

6. Japanese Patent Publication No. H09-293538 (1997) (certified English translation) (Ex. 1009, “Miyasaka”).

E. The Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1–4, 8, 9, and 17 of the ’143 patent on the following grounds:

Claims	Basis	References
1–4, 17	§ 103	Numata
8, 9	§ 103	Numata, Ohzuku
1–3, 8, 9	§ 103	Rossouw
17	§ 103	Rossouw, Linden
1–4, 17	§ 103	Rossen
8, 9	§ 103	Rossen, Ohzuku
1–4, 17	§ 103	Miyasaka, Numata
8, 9	§ 103	Miyasaka, Numata, Ohzuku

II. ANALYSIS

We next address whether the Petition meets the threshold showing for institution of *inter partes* review under 35 U.S.C. § 314(a). We consider each ground of unpatentability in view of the understanding of a person of ordinary skill in the art. For the purposes of this decision, the prior art itself

is sufficient to demonstrate the level of ordinary skill in the art at the time of the invention. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (prior art itself can reflect appropriate level of ordinary skill in art).

A. Claim Interpretation

The Board interprets claims in an unexpired patent using the “broadest reasonable construction in light of the specification of the patent.” 37 C.F.R. § 42.100(b); *see In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1275–79 (Fed. Cir. 2015), *cert. granted sub nom. Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 890 (mem.) (2016). Under the broadest reasonable interpretation standard, claim terms are given their ordinary and customary meaning in view of the specification, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

The independent challenged claims specify an electrode having “a general formula $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$ ” in which “both the LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$ components [are] layered.” Ex. 1001, 10:20, 24–25 (claim 1); 11:16, 12:3–4 (claim 17). The specification describes crystallographic properties of each component of the two-component electrode; specifically, both the LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$ components have a “layered” structure. *Id.* at 3:66, 4:6. On that point, the specification describes how the compounds that make up the $\text{Li}_2\text{M}'\text{O}_3$ rocksalt component are organized (or “layered”). *Id.* at 3:66–4:2. The specification also describes how the compounds that make up the LiMO_2 component are organized (or “layered”). *Id.* at 4:8–10. The dispositive issue before us, however, is whether the claim term

“ $x\text{LiMO}_2 \bullet (1-x)\text{Li}_2\text{M}'\text{O}_3$ ” further requires a structurally integrated relationship between the two component materials (LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$).

The specification indicates that “general formula $x\text{LiMO}_2 \bullet (1-x)\text{Li}_2\text{M}'\text{O}_3$ ” defines a structural relationship between the two component materials (LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$). *Id.* at 3:27–31 (two-component electrode structure is “defined by the general formula $x\text{LiMO}_2 \bullet (1-x)\text{Li}_2\text{M}'\text{O}_3$ ”). The specification further describes a structural relationship in which the “domains of the two components exist side by side” and share a “common oxygen array.” *Id.* at 4:14–19. The specification explains that the $\text{Li}_2\text{M}'\text{O}_3$ component “is introduced as a component to the overall electrode structure”—which, in our view, strongly suggests structural integration. *Id.* at 3:27–30. The disclosures in the specification persuade us that the inventors used the “•” notation in the “ $x\text{LiMO}_2 \bullet (1-x)\text{Li}_2\text{M}'\text{O}_3$ ” claim term as shorthand to convey a structural limitation on the overall electrode structure. *Id.* at 4:26–27 (disclosing “a $x\text{LiMO}_2 \bullet (1-x)\text{Li}_2\text{M}'\text{O}_3$ structure that contains monoclinic LiMnO_2 as the $\text{LiM}'\text{O}_2$ component,” in which “it is believed that the tetravalent M' ions can partially occupy the M positions in the monoclinic layered LiMnO_2 structure, thereby providing increased stability to the overall structure”).

That meaning is confirmed by the prosecution history. Our reviewing court has explained that the prosecution history of a patent “is to be consulted even in determining a claim’s broadest reasonable interpretation.” *Straight Path IP Grp., Inc. v. Sipnet EU S.R.O.*, 806 F.3d 1356, 1362 (Fed. Cir. 2015). We consider all evidence cited to us with sufficient specificity, including prosecution history. *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015) (the broadest reasonable interpretation of claim

language is resolved in light of the specification and cited portions of the prosecution history). On that point, Patent Owner directs us with sufficient specificity to prosecution history that is especially persuasive.²

Patent Owner identifies in the reexamination history a record of an interview with the examiner in which Dr. Michael Thackeray, a named inventor of the '143 patent, clarified the definition of general formula $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$. Prelim. Resp. 13. Dr. Thackeray presented PowerPoint slides during the interview that memorialize his clarification of the meaning of the term " $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$ " as intended by the inventors. Ex. 2001, 537–62. In one slide, Dr. Thackeray explained that empirical chemical formulae do “not convey sufficient structural information to define the claimed electrode,” therefore, the inventors claimed “the two component formula $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$, because this sets forth the structure of the material (i.e., two distinct components).” *Id.* at 554. In another slide, Dr. Thackeray confirmed that the formula “unambiguously defines” the claimed invention to include “a specific structure (i.e., an integrated two-component structure).” *Id.* at 549. Dr. Thackeray clearly and unmistakably stated that “the claimed electrode

² The parties agree that the reexamination history of the '082 patent is relevant to the meaning of the term " $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$ " that appears in the '143 patent claims. Pet. 6; Prelim. Resp. 11 n.4; see Ex. 2006, 19–20 (the ITC decision, applying the '082 patent reexamination history to the construction of the '143 patent claims); *Omega Eng'g, Inc., v. Raytek Corp.*, 334 F.3d 1314, 133e (Fed. Cir. 2003) (“prosecution disclaimer may arise from disavowals made during the prosecution of ancestor patent applications”); *Augustine Med., Inc v. Gaymar Indus., Inc.*, 181 F.3d 1291, 1300 (Fed. Cir. 1999) (prosecution of parent may limit “scope of a later application using the same claim term”).

materials include two layered crystalline components with domains of the two components (i.e., LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$) integrated together (i.e., side by side).” *Id.* at 571. A person of ordinary skill in the art would be hard-pressed to conclude, in light of such statements, that the ’143 patent claims include no structural relationship between the two component materials. See Pet. 12 (advancing that untenable position by arguing that, where the two individual electrode components “are both ‘layer structured’ materials,” the “claimed general formula” is disclosed) (quoting Ex. 1005, Abstract).

On that point, we find instructive the analysis applied by the ITC. Although a somewhat different claim construction standard applies in *inter partes* reviews, and although we are not bound by the claim construction adopted by the ITC, we find their analysis especially persuasive under the facts and circumstances of this case.

Before the ITC, Petitioner argued that Dr. Thackeray’s statements make “abundantly clear” that the integrated structure “is so fundamental to the purported invention that such structure is inherent in the claimed formula.” Ex. 2008, 28; *see id.* at 23–29. Petitioner argued forcefully for an application of prosecution history disclaimer, on a theory that Dr. Thackeray “expressly clarified” that “the claims require two different types of crystalline domains integrated together in the same material.” Ex. 2007, 25; *see id.* at 21–28 (extensive argument regarding disclaimer effect of Dr. Thackeray’s presentation during reexamination).

Petitioner implored the ITC to hold that “Dr. Thackeray’s unequivocal statements characterizing the claimed inventions and the clear disavowal of subject matter in order to allow issuance of his claims” limits the scope of the claims to include a structural integration between the two components

“for both the ’082 patent and the ’143 patent[.]” *Id.* at 28. The ITC agreed, holding that “the patentee made express disclaimers and statements” during reexamination “that distinguished the prior art and/or further defined the invention” claimed in the ’143 patent. Ex. 2006, 20.

On this record, the broadest reasonable interpretation of the claim term “ $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$ ” in light of the specification and prosecution history is the same construction adopted by the ITC; that claim term requires “a structurally integrated two-component material.” *Id.* at 21. We apply the same construction across the claims of both the ’082 and ’143 patents. *See* IPR 242 (decision, filed concurrently herewith, denying review of ’082 patent claims based on the same interpretation of the formula).

B. The Asserted Grounds of Unpatentability

We next address Petitioner’s asserted grounds of unpatentability. It is worth noting at the outset that Dr. Howard’s testimony before the ITC refutes any contention that the solid solutions disclosed in Numata and Rossen meet the properly-construed patent claims. Specifically, Dr. Howard testified that “a solid solution would not be within the scope of the claims” because, in a solid solution, the components are not structurally integrated. Ex. 2015, 13 (Dr. Howard’s deposition testimony, 135:14–18); *see id.* at 6–7, 9–10 (Dr. Howard’s deposition testimony, 48:21–49:3, 92:25–93:12). In light of the testimony of Petitioner’s own witness, we do not address further any arguments that a solid solution falls within the scope of the challenged claims. Against that backdrop, we turn to the grounds of unpatentability advanced in the Petition.

1. Grounds Based on Numata

Petitioner argues that Numata discloses an electrode having the required general formula $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$.³ In that regard, Petitioner directs us to Numata's disclosure of a "mixture of two phases of LiCoO_2 and Li_2MnO_3 ," which was the failed product of an attempt to make a solid solution. Pet. 14 (citing Ex. 1005, 259). Petitioner does not direct us to any evidence establishing why an ordinary artisan would have focused on Numata's discarded two-phase material. *Id.* at 11–14. The Petition also fails to show sufficiently that the discarded product would have included a structurally integrated two-component material as required by the challenged claims. In that regard, the Petition presents a claim chart, relying on Numata's disclosure of "a mixture," but fails to explain why or how that mixture would have suggested a structurally integrated two-component electrode as required by the formula set forth in the challenged claims. *Id.* at 14 (citing Ex. 1005, 259).

Patent Owner, by contrast, advances persuasive evidence that Numata's discarded "mixture" would not have suggested to an ordinary artisan a structurally integrated two-component material. Prelim. Resp. 24 (citing dictionary definition of "mixture") (Ex. 2040). Patent Owner's position, moreover, is bolstered by prior testimony provided by Petitioner's own witness, Dr. Howard, who stated under oath in the ITC proceeding that, even if domains of LiCoO_2 and Li_2MnO_3 exist in a single particle, the

³ The Office previously concluded that "Numata fails to teach a lithium metal oxide positive electrode having the formula claimed." Ex. 2001, 465, 515 (Office Action dated February 28, 2013).

domains are not necessarily structurally integrated. Ex. 2015, 9–10 (Dr. Howard’s deposition testimony, 92:25–93:12 (“No, they may not be touching. They may be separated by some physical distance. Maybe it is just a few angstroms, but that is sufficient.”)).

Petitioner’s present position that Numata’s “mixture” satisfies the “ $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$ ” limitation of the challenged claims (Pet. 14) also is at odds with the arguments Petitioner advanced before the ITC. There, Petitioner argued that, “[i]n order for an $\text{Li}_2\text{M}'\text{O}_3$ ” component “to provide stability to an LiMO_2 component, they have to share a common oxygen array. They have to be structurally compatible.” Ex. 2011, 50 (Petitioner’s counsel, 188:18–20). Petitioner specifically argued that it is not enough for the LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$ components to exist as “two separate particles of the same material. They have to have some ability to be structurally combined and provide the extra stability to the electrode, which is what this invention is all about.” Ex. 2011, 50 (Petitioner’s counsel, 188:20–24); see Ex. 2015, 9–10 (Dr. Howard’s deposition testimony, 92:25–93:12, indicating that, even if domains of LiCoO_2 and Li_2MnO_3 exist in a single particle, the domains are not necessarily structurally integrated).

That is inconsistent with Petitioner’s argument before us that Numata’s mixture of LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$ includes “domains” that necessarily must exist “side by side since no other configuration would be geometrically feasible.” Ex. 1003 ¶ 38 (cited at Pet. 12).⁴ That

⁴ That position is based on opinion testimony of Dr. Howard that is unsupported by objective evidence and, therefore, is entitled to little weight. Ex. 1003 ¶ 38; 37 C.F.R. § 42.65(a) (opinion testimony that does not disclose underlying facts or data “is entitled to little or no weight”); *Ashland*

inconsistency concerns a matter of inflexible technical fact that cannot be accounted for by the different claim construction standards applied here and in the ITC. On this record, Petitioner fails to meet the threshold showing for review on the grounds based on Numata.

2. Grounds Based on Rossouw

Petitioner argues that a formula in Rossouw “can be rewritten in the two-component structural notation” of the general formula claimed in the ’143 patent. Pet. 22–23. Petitioner advances x-ray diffraction (“XRD”) data as “evidence[] that Rossouw’s material has the same two-component structure of the claimed general formula.” *Id.* at 24. Taking account of the information in the Petition and Preliminary Response, Petitioner fails to show sufficiently that Rossouw discloses or suggests an electrode in which the LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$ components are structurally integrated as required by the challenged claims. *Compare id.* at 21–24, with Prelim. Resp. 31–26.

Before the ITC, Petitioner argued that structural integration can only be confirmed by “atomic level” transmission electron microscopy (“TEM”). Ex. 2012, 2, 20 (arguing that “atomic level” TEM is necessary to confirm structural integration). Before the ITC, moreover, Dr. Howard confirmed that XRD analysis alone is inconclusive to determine whether a $\text{Li}_2\text{M}'\text{O}_3$ component is structurally integrated with another component in the electrode material: “By itself, however, the x-ray [diffraction analysis] is not

Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 294 (Fed. Cir. 1985) (a lack of objective support for expert opinion “may render the testimony of little probative value in a validity determination”).

definitive.” Ex. 2015, 4–5 (Dr. Howard’s deposition testimony, 43:20–44:18).

Here again, Petitioner takes a position on an inflexible technical fact (the sufficiency of XRD data to establish structural integration) that is inconsistent with positions taken before the ITC. The position advanced by Petitioner before the ITC, however, is consistent with the ’143 patent disclosure, which explains that the invention and prior art “will be unequivocally distinguished from one another by high-resolution transmission electron microscopy, i.e., differences will be evident in the microstructural features of the $x\text{LiMnO}_2 \cdot (1-x)\text{Li}_2\text{MnO}_3$ electrodes of the present invention and those of the prior art.” Ex. 1001, 5:41–52.

Petitioner’s information (based on XRD data) does not show sufficiently that Rossouw’s electrode material satisfies the “ $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$ ” limitation of the challenged claims. Accordingly, we decline to institute trial on the grounds based on Rossouw.

3. Grounds Based on Rossen

Rossen was considered during the original prosecution and the reexamination of the ’082 patent. Ex. 2001, 465 (reexamination); Ex. 2042, 2 (original prosecution). Rossen was also considered during examination of the ’143 patent. Ex. 1001, 2. There is some validity to Patent Owner’s argument that the Office has “considered many times and rejected” the same issues raised in the Petition with respect to Rossen. Prelim. Resp. 39. In any case, for reasons discussed above in connection with the grounds based on Numata, Petitioner does not show sufficiently that Rossen’s two-phase mixture of LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$ —which Rossen describes as an

“unsuccessful” attempt to make a solid solution—meets the structural integration requirement of the challenged claims. Ex. 1010, 312.

Petitioner does not direct us to any rational reason why a person of ordinary skill in the art would have been prompted to focus on Rossen’s unsuccessful mixture or been led by the disclosure of that material to the claimed invention. See Pet. 34–35. On that point, the Petition states, without citation to any objective evidence, that a structurally integrated material “would have been obvious” over Rossen’s unsuccessful mixture “because a two phase mixture would have areas where the phases are side by side because geometry dictates that it must be true.” *Id.* at 35. That bare attorney argument is insufficient to support institution of trial.

Petitioner’s argument that XRD data establishes that Rossen, in fact, discloses a structurally integrated electrode (Pet. 35–36) is unpersuasive for the same reasons discussed above in the context of the grounds based on Numata. That argument is refuted by Petitioner’s own arguments, and the testimony of its own witnesses, before the ITC. Inconsistencies between Petitioner’s arguments here and in the ITC are catalogued by Patent Owner—we do not repeat them here. See, e.g., Prelim. Resp. 41–44 (including footnote 13). The inconsistencies cannot be explained by the different claim construction standards that apply in the two forums; they relate to inflexible technical facts. See *id.*

Petitioner does not direct us to any XRD data for Rossen’s unsuccessful mixture. Instead, Petitioner relies on XRD profiles for Rossen’s $\text{Li}_{1.1}\text{Mn}_y\text{Ni}_{1-y}\text{O}_2$ and $\text{Li}_x\text{Mn}_{0.3}\text{Ni}_{0.7}\text{O}_2$ series, which Rossen describes as “predominantly single-phase samples,” i.e., solid solutions. Ex. 1010, 314; see Pet. 36 (citing Ex. 1010, Fig. 5). Moreover, even

assuming Petitioner did point to XRD data corresponding to Rossen's unsuccessful mixture, as explained in connection with Petitioner's grounds based on Rossouw, Petitioner takes a position here on an inflexible technical fact (the sufficiency of XRD data to establish structural integration) that is inconsistent with positions taken before the ITC. *See supra* Section II.B.b.

The XRD data raised in connection with Rossen's "predominately single-phase samples" is unpersuasive. Pet. 36 (citing Ex. 1010, Fig. 5); Ex. 1010, 314. Here again, we refer to Dr. Howard's testimony in the ITC proceeding, which is instructive: "a solid solution would not be within the scope of the claims" because, in a solid solution, the components are not structurally integrated. Ex. 2015, 13 (Dr. Howard's deposition testimony, 135:14–18); *see id.* at 6–7, 9–10 (Dr. Howard's deposition testimony, 48:21–49:3, 92:25–93:12).

On this record, Petitioner fails to meet the threshold showing for review on the grounds based on Rossen.

4. Grounds based on Miyasaka

The Petitioner advances two grounds of unpatentability based on Miyasaka. Pet. 4. Petitioner asserts that Miyasaka's electrode is composed of two components (LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$) and that each is a layered material. *Id.* at 50. For the claim term " $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$," which requires structural integration of the two components, Petitioner directs us to more information about the individual components. *Id.* at 51 (claim chart).

Petitioner articulates no persuasive reason why or how Miyasaka discloses a structurally integrated two-component electrode as specified in the challenged claims. *Id.* at 49–52. Petitioner contends that Miyasaka's

lithium manganese oxide, e.g., Li_2MnO_3 , corresponds to the $\text{Li}_2\text{M}'\text{O}_3$ component of the formula recited in the claims. *Id.* at 49. We agree with Patent Owner, however, that Petitioner fails to explain how Miyasaka, which discloses that the $\text{Li}_2\text{M}'\text{O}_3$ component “may have any spinel structure” suggests the layered component structure required by the challenged claims. Pet. 47 (quoting Ex. 1009, 5 (¶ 13)); *see id.* at 10–11 (¶¶ 54, 59) (describing the $\text{Li}_2\text{M}'\text{O}_3$ component upon which Petitioner relies, as “having a spinel crystal structure.”). In contrast to Petitioner’s argument, the specification of the ’143 patent distinguishes spinel structures from layered structures. Ex. 1001, 2:21–27.

Petitioner also directs us to Miyasaka’s mixture of LiMO_2 and $\text{Li}_2\text{M}'\text{O}_3$ particles. Pet. 51 (claim chart). Petitioner admits here that Miyasaka discloses an electrode “comprising a physical mixture” of the component materials, yet before the ITC, Petitioner argued that a physical mixture of the components will not meet the claims of the patent. Ex. 2011, 6:12–20, 188:18–20. On that point, Dr. Howard testified before the ITC that a physical mixture of materials is not structurally integrated (Ex. 2015, 145:14–146:3), but before us he implies that Miyasaka’s physical mixture satisfies the “ $x\text{LiMO}_2 \cdot (1-x)\text{Li}_2\text{M}'\text{O}_3$ ” limitation of the claims. Ex. 1003, 92.

On this record, Petitioner does not show a reasonable likelihood of prevailing on the grounds based on Miyasaka.

III. CONCLUSION

Taking account of the information presented in the Petition and Preliminary Response, we determine that Petitioner fails to demonstrate a

IPR2016-00253
Patent 6,680,143 B2

reasonable likelihood of prevailing at trial as to any challenged claim.
Accordingly, the Petition is *denied* and no trial is instituted.

IV. ORDER

It is

ORDERED that the Petition is *denied* and no trial is instituted.

IPR2016-00253
Patent 6,680,143 B2

PETITIONER:

Timothy W. Riffe
Joseph V. Colaianni
IPR41377-0003IP1@fr.com
ptabinbound@fr.com

PATENT OWNER:

GREGG F. LOCASCIO
EUGENE GORYUNOV
gregg.locascio@kirkland.com
eugene.goryunov@kirkland.com