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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JINHYUNG LIM,
SUNG-KYUN CHANG, WON SEOK CHANG,
SIN YOUNG PARK, HO SUK SHIN, HYUN JIN OH,
JUNG MIN HAN, IN SUNG UHM, WANG MO JUNG,
and DONG HUN LEE

Appeal 2019-004950
Application 14/441,580
Technology Center 1700

Before MICHAEL P. COLAIANNI, GEORGE C. BEST, and
DEBRA L. DENNETT, *Administrative Patent Judges*.

BEST, *Administrative Patent Judge*.

DECISION ON APPEAL

The Examiner finally rejected claims 1, 7, and 8 of Application 14/441,580 under 35 U.S.C. § 103(a) as obvious and provisionally and non-provisionally rejected those claims on the ground of nonstatutory obviousness-type double patenting (OTDP). Final Act. (June 29, 2018).

Appellant¹ seeks reversal of the rejections pursuant to 35 U.S.C. § 134(a). We have jurisdiction under 35 U.S.C. § 6(b).

For the reasons set forth below, we *affirm* the obviousness and the non-provisional OTDP rejections. We decline to review the provisional OTDP rejection.

I. BACKGROUND

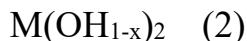
The '580 Application describes a transition metal precursor for preparation of a lithium transition metal oxide, which can be used as a positive electrode active material in secondary batteries. Spec. 1:7–10. The '580 Application describes mixing the transition metal precursor and a lithium precursor and then sintering the mixture to prepare the lithium transition metal oxide. *Id.* at 6:9–10.

Claim 1 is representative of the '580 Application's claims and is reproduced below from the claims listing in the Claims Appendix to the Appeal Brief:

1. A transition metal precursor for preparation of a lithium transition metal oxide,

wherein precursor particles constituting the transition metal precursor are transition metal hydroxide particles,

wherein the transition metal hydroxide particles are a compound represented by Formula 2 below:



wherein M is at least two selected from the group consisting of nickel (Ni), cobalt (Co), manganese (Mn),

¹ We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as LG Chem, LTD. Appeal Br. 2.

aluminum (Al), copper (Cu), iron (Fe), magnesium (Mg), boron (B), chromium (Cr), titanium (Ti), zirconium (Zr) and hafnium (Hf); and $0 \leq x \leq 0.5$; and

wherein a tap density of the transition metal precursor is from 1.3 g/cc to 1.6 g/cc, and a ratio of tap density to average particle diameter D50 of the precursor satisfies a condition represented by Equation 1 below:

$$2000 < \frac{\text{Tap density}}{\text{Average particle diameter D50 of (7-13 or 3-30 microns)}} < 3500 \text{ (g/cc} \cdot \text{cm)} \quad (1)$$

Appeal Br. (Claims App.) 16 (emphasis added).

II. REJECTIONS

On appeal, the Examiner maintains the following rejections:

1. Claims 1, 7, and 8 are rejected under 35 U.S.C. § 103(a) as unpatentable over Niittykoski.² Final Act. 9; Answer 10.
2. Claims 1, 7, and 8 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Shin³ and Niittykoski. Final Act. 11; Answer 12.
3. Claims 1, 7, and 8 are provisionally rejected for OTDP over claims 1–8 of Application 14/559,155. Final Act. 3; Answer 4.
4. Claims 1, 7, and 8 are rejected for OTDP over the combination of claims 1–8 of Shin and Niittykoski. Final Act. 4; Answer 5.

² WO 2012/037975 A1, published Mar. 29, 2012. The Examiner cited US 2013/0168600 A1, published July 4, 2013, as the U.S. national stage filing of this international application. Because Appellant did not object to this practice, we also shall do so.

³ US 8,394,299 B2, issued Mar. 12, 2013.

5. Claims 1, 7, and 8 are rejected for OTDP over the combination of claims 1–6 of Park '143⁴ and Niittykoski. Final Act. 5; Answer 6.
6. Claims 1, 7, and 8 are rejected for OTDP over the combination of claims 1–5 of Park '770⁵ and Niittykoski. Final Act. 7; Answer 8.

III. DISCUSSION

Appellant argues for reversal of all of the rejections at issue based upon the limitations in independent claim 1. Appeal Br. 5–15. We, therefore, select claim 1 as representative of the claims subject to this ground of rejection and limit our discussion to this claim. 37 C.F.R. § 41.37(c)(1)(iv).

A. Rejections of claims 1, 7, and 8 as unpatentable under § 103(a) over Niittykoski, either with or without Shin.

According to Appellant, the Examiner reversibly erred in rejecting independent claim 1 for four reasons: (1) contrary to the “claimed low tap density,” the prior art “suggested using a precursor with higher tap density to prepare a lithium transition metal oxide” (Appeal Br. 5); (2) through use of the claimed transition metal precursor, Appellant solved the previously unknown problem of undesirable side reactions caused by crushed active material (*id.* at 8–9); (3) Appellant has demonstrated the criticality of the claimed precursor’s tap density 1.3–1.6 g/cc, which provides unexpected results (*id.* at 9–12); and (4) the Examiner failed to articulate why additional tests are needed to show criticality. *Id.* at 12–13.

⁴ US 9,431,143 B2, issued Aug. 30, 2016.

⁵ US 9,601,770 B2, issued Mar. 21, 2017.

First, we are not persuaded by Appellant’s attempt to distinguish the claimed tap density as lower than allegedly higher tap densities known in the art. *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (“Many of Appellant’s arguments fail from the outset because . . . they are not based on limitations appearing in the claims.”). The Examiner found that Niittykoski teaches that a transition metal precursor’s tap density was controllable within the range of 0.8–2.8 g/cc. Final Act 9 (citing Niittykoski ¶¶ 12, 39). Thus, the Examiner has made findings that the applied prior art discloses a tap density range that overlaps and encompasses the claimed transition metal precursor’s tap density. Final Act. 10. This is sufficient to create a prima facie case of obviousness. *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) (a prima facie case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art).

Second, even assuming that the problem of undesirable side reactions caused by broken or crushed active material was previously unknown, Appellant’s purported discovery of the solution is not dispositive. *See Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005) (“One of ordinary skill in the art need not see the identical problem addressed in a prior art reference to be motivated to apply its teachings.”); *see also In re Oetiker*, 977 F.2d 1443, 1448 (Fed. Cir. 1992) (Nies, C.J., concurring).

Third, Appellant’s arguments have not identified reversible error in the Examiner’s prima facie case of obviousness. Once established, a prima facie case can be overcome if Appellant shows either (i) that the prior art teaches away from the claimed invention or (ii) that there are new and unexpected results relative to the closest prior art. *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1322 (Fed. Cir. 2004) (citing *In re Geisler*,

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116 F.3d 1465, 1471 (Fed. Cir. 1997); *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990)).

Here, Appellant does not argue that any of the references relied upon by the Examiner teaches away from the claimed subject matter. Rather, Appellant asserts that “[t]he record includes data showing the criticality of the claimed range of 1.3 to 1.6 g/cc for the tap density of the precursor.” Appeal Br. 9; *see generally id.* at 10–12 (contending that both the Specification and the Declaration of Byunchun Park under 37 C.F.R. § 1.132 (“Park Declaration”) establish that the claimed tap density range provides unexpectedly smaller changes in D50 particle sizes after pulverization or calcination treatments).

The Examiner, however, concluded that Appellant’s relied upon data was not commensurate in scope with claim 1 because the tested precursor material only contained nickel, cobalt, and manganese. Answer 22; *see Spec.* 16. The Examiner found that “[i]t is unclear if Formula 2 having M being, for example, copper (Cu) and iron (Fe) would have the same data [or not] as that of the Examples 1–3, Comparative Examples 1–2 and Additional Comparative Examples A and B.” Answer 22.

Appellant argues that the Examiner has failed to establish a prima facie case of obviousness as Niittykoski “is specifically directed to the precursor material containing nickel, cobalt and manganese, the same metals as data shown in Tables 1–3 of the Appellant’s specification and Tables 2–3 of the [Park] Declaration.” Reply Br. 6. Appellant argues that claim 7 recites a smaller Markush group of metals in which “M comprises at least two transition metals selected from Ni, Co or Mn.” Appeal Br. (Claims App.) 16; *see also* Reply Br. 6.

We are not persuaded by these arguments because M in Formula 2 “is written in Markush form, such that the entire element is disclosed by the prior art if one alternative in the Markush group is in the prior art.”

Fresenius USA, Inc. v. Baxter Intern., Inc., 582 F.3d 1288, 1298 (Fed. Cir. 2009). Appellant admits that Niittykoski discloses one alternative in the claimed Markush group. Reply Br. 6.

Appellant, furthermore, has not provided any evidence or persuasive reasoning showing that the ratios of D50 pre-/post-treatment resulting from testing the remaining metals recited in claim 1 would have been similar to the D50 ratios obtained from the tested precursor material containing nickel, cobalt, and manganese. In other words, Appellant has not proffered any evidence establishing unexpected results with a precursor material containing at least two metals selected from the group of aluminum, copper, iron, magnesium, boron, chromium, titanium, zirconium, and hafnium. *See In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972); *In re Harris*, 409 F.3d 1339, 1344 (Fed. Cir. 2005) (Unexpected results must be “commensurate in scope with the degree of protection sought by the claims on appeal.”).⁶

⁶ Appellant raises new arguments that Niittykoski “fails to recognize the claimed ratio as a result-effective variable” for the first time in the Reply Brief. Reply Br. 2–6, 8. These arguments are untimely. We, therefore, will not consider them. *Ex parte Nakashima*, 93 USPQ2d 1834 (BPAI 2010) (informative) (explaining that arguments and evidence not timely presented in the principal Brief will not be considered when filed in a Reply Brief, absent a showing of good cause explaining why the argument could not have been presented in the Principal Brief); *Ex parte Borden*, 93 USPQ2d 1473, 1477 (BPAI 2010) (informative) (“Properly interpreted, the Rules do not require the Board to take up a belated argument that has not been addressed by the Examiner, absent a showing of good cause.”).

Fourth, we are not persuaded that the Examiner failed to articulate why additional tests are needed to show criticality. *See* Appeal Br. 12–13. As set forth above, Appellant relies on data generated from testing one precursor material, which contains only three of the twelve metals recited in the claimed Markush group. We, therefore, agree with the Examiner that Appellant has not made a persuasive showing of unexpected results. *See* Answer 22–23.

In view of the foregoing, we determine that the Examiner did not reversibly err in rejecting claim 1 as unpatentable over Niittykoski, either with or without Shin. Accordingly, we also affirm the rejections of claims 7 and 8, which depend from claim 1.

B. Provisional rejection of claims 1, 7, and 8 as unpatentable for OTDP over claims 1–8 of the '155 Application.

For the reasons stated below, we exercise our discretion not to review the Examiner's provisional rejection of claims 1, 7, and 8 for OTDP. *See Ex parte Jerg*, 2012 WL 1375142 at *3 (BPAI 2012) (informative) (“Panels have the flexibility to reach or not reach provisional obviousness-type double-patenting rejections.” (citing *Ex parte Moncla*, 95 USPQ2d 1884 (BPAI 2010) (precedential))).

On December 29, 2016, the Examiner first provisionally rejected claims 1–8 for OTDP over claims 1–8 of the '155 Application. Office Action 4 (Dec. 29, 2016).

Since the initial provisional OTDP rejection, claims 1 and 7 of the '580 Application have been substantively amended. '580 Prosecution History Amendment & Response 3, 6 (April 27, 2018). Furthermore, on May 8, 2018, the '155 Application issued as U.S. Patent No. 9,966,600 B2.

In view of the substantial changes in the claims and the Examiner's grounds since the initial entry of the provisional OTDP rejection, we would have to conduct a patentability analysis *ab initio*. Preferring to have the benefit of the Examiner's expertise in the first instance, we decline this opportunity. While we do not affirm the Examiner's provisional OTDP rejection, the Examiner remains free to assert a non-provisional OTDP rejection based on the issued claims of the '600 patent, whether alone or in combination with other references.

C. Rejections of claims 1, 7, and 8 as unpatentable for OTDP over the combination of Niittykoski with either claims 1–8 of Shin; claims 1–6 of Park '143; or claims 1–5 of Park '770.

In support of reversal of the non-provisional OTDP rejections, Appellant relies on the same arguments and evidence for reversal of the rejections of independent claim 1 under § 103(a). *Compare* Appeal Br. 5–6 *with* 14–15.

For the reasons set forth above, the preponderance of the evidence supports the Examiner's conclusion of obviousness for claims 1, 7, and 8. On this record, Appellant has not: (i) identified reversible error in the Examiner's prima facie case of obviousness with respect to Niittykoski's teachings, or (ii) sufficiently demonstrated that unexpected results of the precursor's tap density range 1.3–1.6 g/cc are commensurate in scope with the claimed Markush group of metals. *See* Appeal Br. 13–15.

We, therefore, affirm the rejections of claims 1, 7, and 8 as unpatentable for OTDP over the combination of Niittykoski with either claims 1–8 of Shin; claims 1–6 of Park '143; or claims 1–5 of Park '770.

IV. CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 7, 8	103(a)	Niittykoski	1, 7, 8	
1, 7, 8	103(a)	Shin, Niittykoski	1, 7, 8	
1, 7, 8		claims 1–8 of Application 14/559,155 / Provisional Obviousness Type Double Patenting ⁷		
1, 7, 8		claims 1–8 of Shin, Niittykoski / Obviousness Type Double Patenting	1, 7, 8	
1, 7, 8		claims 1–6 of Park '143, Niittykoski / Obviousness Type Double Patenting	1, 7, 8	
1, 7, 8		claims 1–5 of Park '770, Niittykoski / Obviousness Type Double Patenting	1, 7, 8	
Overall Outcome			1, 7, 8	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

⁷ As explained above, we do not reach this rejection per *Ex parte Moncla*, 95 USPQ2d 1884 (BPAI 2010) (holding that it is premature to address a provisional rejection) (designated precedential).