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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YOSHITO ISHII, SOUICHIROU SUDA, and TATSUYA
NISHIDA

Appeal 2019-002232
Application 12/914,215
Technology Center 1700

Before JEFFREY T. SMITH, JAMES C. HOUSEL, and
BRIAN D. RANGE, *Administrative Patent Judges*.

RANGE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1, 3–18, 20, 22, 23, 25, and 27–29. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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 Hitachi Chemical Company, Ltd. Br. 1.

CLAIMED SUBJECT MATTER²

Appellant describes the invention as relating to a negative electrode for a lithium secondary battery that can be used in portable devices, electric automobiles, and electricity storage. Spec. 10–16. Claim 1, reproduced below with emphasis added to a key recitation, is illustrative:

1. A negative electrode for a lithium secondary battery comprising:

a layer of a mixture containing graphite powder that has an average particle diameter in a range of 1 to 100 μm , **a crystallite size Lc (002) in a C-axis direction of a crystal of at least 1000 Å**, a specific surface area of at most 8 m^2/g , and an aspect ratio of at most 5, and an organic binder on a current collector,

wherein an interlayer distance, $d(002)$, of a crystal of the graphite powder is 3.36 Å or less,

wherein a density of the layer of the mixture containing graphite powder and the organic binder is in a range of 1.5 to 1.95 g/cm^3 , and

wherein a diffraction intensity ratio (002)/(110) measured by X-ray diffractometry of the layer of the mixture is at most 500.

REFERENCES

The Examiner relies upon the prior art below in rejecting the claims on appeal:

Ishii et al. ("Ishii '822")	US 2001/0033822 A1	Oct. 25, 2001
Ishii et al. ("Ishii")	US 6,344,296 B1	Feb. 5, 2002

² In this Decision, we refer to the Final Office Action dated January 2, 2018 ("Final Act."), the Appeal Brief filed September 7, 2018 ("Br."), and the Examiner's Answer dated October 24, 2018 ("Ans.").

Kitagawa et al. ("Kitagawa")	US 6,455,199 B1	Sept. 24, 2002
Maeda et al. ("Maeda")	JP 09259884A	Oct. 3, 1997
Shoji et al. ("Shoji")	JP 11283622A	Oct. 15, 1999
Shoji et al. ("Shoji '844")	JP 2001283844A	Oct. 12, 2001

REJECTION(S)

The Examiner maintains (Ans. 3) the following rejections on appeal:

- A. Claims 1, 3–18, 20, 22, 23, 25, and 29 under 35 U.S.C. § 103 as obvious over Shoji '622 in view of Ishii '296 and either Maeda or Kitagawa. Ans. 3.
- B. Claims 27 and 28 under 35 U.S.C. § 103 as obvious over Shoji '622 in view of Ishii '296 and either Maeda or Kitagawa and further in view of Shoji '844 or Ishii '822. *Id.* at 8.

OPINION

The Examiner has the initial burden of establishing a *prima facie* case of obviousness under 35 U.S.C. § 103. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992) (“[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability.”). To establish a *prima facie* case of obviousness, the Examiner must show that each and every limitation of the claim is described or suggested by the prior art or would have been obvious based on the knowledge of those of ordinary skill in the art or the inferences and creative steps a person of ordinary skill in the art would have employed. *In re Fine*,

837 F.2d 1071, 1074 (Fed. Cir. 1988); *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007).

To resolve the issues before us on appeal, we focus on the Examiner's findings and determinations that relate to the error Appellant identifies. The Examiner relies on Shoji as a primary reference and finds that Shoji suggests a negative electrode mixture with particle diameter, density, diffraction intensity ratio, and interlayer distances within the ranges of independent claims 1 and 11. Ans. 3. The Examiner finds that Shoji does not teach claim 1 and claim 12's claimed Lc (i.e., as recited by claim 1, "crystallite size Lc (002) in a C-axis direction of a crystal of at least 1000 Å"). *Id.* at 6. The Examiner finds, however, that Maeda and Kitagawa each disclose an electrode carbon material wherein the graphite material has an Lc of 1000 Angstroms or more. *Id.* at 7. The Examiner determines that "it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the graphite material of Shoji '622 to have an Lc of 1000 Angstroms or more and an interlayer distance of 3.35-3.36 Angstroms as taught by Maeda or Kitagawa since it would have charge/discharge cycle characteristics, energy density, high rate discharge performance and reliability of the battery." *Id.*

Appellant argues that a person of skill in the art would not have combined the teachings of Shoji and Maeda or Kitagawa to reach an Lc of at least 1000 Angstroms. Br. 11-13. In particular, Appellant argues that Shoji's examples discourage an Lc of at least 1000 Angstroms. *Id.* at 11-12.

Appellant's argument persuades us of reversible error. Shoji's inventive embodiments 1-4 all have an Lc of less than 1000 Angstroms. Shoji ¶¶ 23 (embodiment 1 has Lc of 500 Å), 29 (embodiment 2 has Lc of

450 Å), 30 (embodiment 3 has Lc of 300 Å), 31 (embodiment 4 has Lc of 780 Å), 34 (embodiments 5–8 have same Lc as embodiment 1), 36 (embodiments 9–12 have same Lc as embodiment 1), 38 (embodiments 13–15 have same Lc as embodiment 1). Comparative examples 1 and 2, however, each have an Lc of 1000 Å. *Id.* at ¶¶ 32 (comparative example 1 has Lc of 1000 Å), 33 (comparative example 2 has Lc of 1000 Å). Shoji's tables indicate that comparative examples 1 and 2 have a lower discharge capacity ratio than the inventive examples. *Id.* at ¶ 46, Tables 1–4. Shoji, therefore, does not provide guidance that an Lc of 1000 Å would be acceptable in combination with Shoji's other traits. The Examiner does not address Shoji's examples.

We weigh the evidence from Shoji along with evidence from the secondary references that the Examiner cites, Maeda and Kitagawa. Maeda indicates that its negative electrode has an Lc of more than 1000 Å, but Maeda does not indicate whether or not Lc is an important variable. Maeda ¶¶ 14–15. Maeda, therefore, adds little to the analysis.

Kitagawa indicates that an Lc of 1000 Å or more, at least when combined with Kitagawa's other characteristics, provides "a high level reversible capacity." Kitagawa Abstract, Table 1, 9:47–55. The Examiner, however, has not explained why a person of skill in the art would expect this advantage to also benefit a negative electrode having Shoji's characteristics. *See* Br. 13 (explaining how Kitagawa has different packing density than Shoji).

On balance, Appellant's argument persuades us that the Examiner has not adequately explained why a person of skill in the art would have had reason to modify the Lc of Shoji to reach 1000 Å or more. We, therefore, do

not sustain the Examiner's rejection of independent claims 1 or 12. Because the Examiner's treatment of dependent claims does not cure this error, we also do not sustain the Examiner's rejection of those claims.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3-18, 20, 22, 23, 25, 29	103	Shoji, Ishii, Maeda, Kitagawa		1, 3-18, 20, 22, 23, 25, 29
27, 28	103	Shoji, Ishii, Maeda, Kitagawa, Shoji '844, Ishii '822		27, 28
Overall Outcome				1, 3-18, 20, 22, 23, 25, 27-29

REVERSED