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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* Samsung SDI Co., LTD.  
(Inventors: Kyu-Sung Park, Dong-Min Im, and  
Jae-Gu Yoon)

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Appeal 2011-007428  
Application 11/841,616  
Technology Center 1700

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Before FRED E. McKELVEY, RICHARD E. SCHAFER, and  
CHRISTOPHER L. CRUMBLY, *Administrative Patent Judges*.

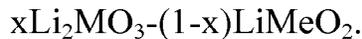
SCHAFER, *Administrative Patent Judge*.

DECISION ON APPEAL

Samsung SDI Co. (Applicant) appeals from an Examiner's decision rejecting claims 1-20. 35 U.S.C. §§ 6(b) and 134(a). We affirm.

*The Claimed Subject Matter*

The invention relates to a lithium-containing cathode active material, a cathode containing that material and a battery including the cathode. The cathode active material includes a transition metal oxide and a complex lithium oxide. The lithium oxide is represented by the following formula (Formula 1):



The formula symbolizes the combination of two oxides:  $\text{Li}_2\text{MO}_3$  and  $\text{LiMeO}_2$ . Applicant explains that in Formula 1, "x is a factor determining the molar ratio of  $\text{Li}_2\text{MO}_3$  and  $\text{LiMeO}_2$ ". Specification ¶ 33. The value of x must be in the range  $0 < x \leq 0.8$ . In other words, the molar ratio of the two oxides,  $\text{Li}_2\text{MO}_3 : \text{LiMeO}_2$ , must be in the range from greater than 0 to 0.8. "M" in Formula 1 represents the metals Mn, Ti, Zr or their combinations. "Me" represents those same three metals and additionally the elements V, Cr, Fe, Co, Ni, Cu, Al, Mg, B and their combinations.

Representative Claim 1 reads as follows:

1. A cathode active material comprising:
    - a transition metal oxide; and
    - a complex compound represented by Formula 1:  
Formula 1  
 $x\text{Li}_2\text{MO}_3-(1-x)\text{LiMeO}_2$
- wherein:
- $0 < x \leq 0.8$
  - M is selected from the group consisting of Mn, Ti, Zr and combinations thereof, and
  - Me is at least one metal selected from the group consisting of Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Al, Mg, Zr, B and combinations thereof.

App. Brief 9 (Claims Appendix).

*Rejections*

In the Answer, the Examiner maintained the following rejections:

1. Claims 1-3, 6-13 and 16 under 35 U.S.C. 102(b) as anticipated by Gao;<sup>1</sup>
2. Claims 4 under 35 U.S.C. 103(a) over the combined teachings of Gao, as applied to claims 1-3, 6-13 and 16, and Takaoka;<sup>2</sup> and
3. Claims 14, 15 and 17-20 under 35 U.S.C. 103(a) over the combined teachings of Gao, as applied to claims 1-3, 6-13 and 16, and Shiozaki.<sup>3</sup>

*Discussion*

In contesting the rejections, Applicant directs substantive comments only to Claim 1 and the Gao reference. Accordingly, our disposition will focus only on Claim 1 and Gao. 37 CFR § 41.37(c)(1)(vii).

We sustain the Examiner's rejections for the reasons stated on pages 3-4 and 6-8 of the Answer. We add the following comments for emphasis.

The dispositive issue in this appeal is whether the claims exclude complex oxides having multiple phases. We discern no error in the Examiner's conclusion that they do not.

While Applicant is correct that Gao teaches complex lithium oxides that include multiple oxide phases, Applicant's claims do not expressly limit the oxides to any particular morphology. The claims only require that the oxides of Formula 1 be "cathode active." Gao's oxides are cathode active. Gao ¶ 5.

Applicant's disclosure does not provide a basis for interpreting the claims as excluding multiple phases from the scope of the claimed subject matter.

Applicant's specification is silent on the morphology of the claimed complex

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<sup>1</sup> U.S. Pub. No. 2003/0035999 A1.

<sup>2</sup> U.S. Pub. No. 2004/0129916 A1.

<sup>3</sup> U.S. Pub. No. 2004/0234857 A1.

oxides. It seems to us that if the crystal morphology of the oxides was important to the invention, Applicant would have pointed it out in its specification.

Applicant's arguments relying on the difference in the methods of making the oxides taught by Gao and Applicant (App. Brief 5-6), do not persuade us that the claims exclude multiple phase lithium oxides. Assuming that Applicant is correct in its assertion that the combustion synthesis process (Specification ¶ 28) would not result in a multiple oxide phases, Applicant teaches that other processes may be used to form the oxide. Thus, Applicant describes the use of low temperature hydrothermal processes to make the Formula 1 oxides. Specification ¶ 29. In fact, Applicant teaches that the process of manufacturing the oxide is not critical: "[a]ny suitable preparation process may be used to prepare the complex compound of Formula 1." Specification ¶ 30. Applicant has not argued or presented evidence that these other processes would not result in complex oxides having multiple phases. Thus, no conclusion as to the morphology of the oxides of Formula 1 can be drawn from the processes Applicant used to make the oxides.

Applicant also points to the phrase "complex compound" as indicating that that multiple phases are excluded: "[T]he term 'complex compound' itself defines the phase morphology of the material, and those of ordinary skill in the art would recognize that the separate lithium oxide phases disclosed in Gao do not read on the 'complex compound' recited in independent claim 1." Rep. Brief, 1-2.

Applicant has not directed us to evidence that establishes that "complex compound" has an accepted meaning in the art or to evidence that otherwise supports its argument. Counsel's argument cannot take the place of evidence lacking in the record. *Estee Lauder Inc. v. L'Oreal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997); *In re Langer*, 503 F.2d 1380, 1395 (CCPA 1974). Actually, Applicant's specification appears to indicate the contrary. The specification says

that the compounds symbolized by Formula 1 are a combination of two different oxides— $\text{Li}_2\text{MO}_3$  and  $\text{LiMeO}_2$ —rather than a single oxide. Specification ¶ 33.

Lastly, we note that Gao’s complex oxides are not required to be multiphase. That morphology is only a preference. In discussing the method of making the oxide Gao teaches that the source materials must be intimately mixed:

“Intimately mixed” as used herein refers to mixing the source compounds together sufficiently such that upon firing the source compounds can be formed into a substantially single-phase metal oxide. As discussed below in more detail, it is often preferable in accordance with the invention that the source compounds be intimately mixed such that they could form a substantially single phase metal oxide but not be fired in such a way as to form a substantially single phase metal oxide. In any event, the source compounds are preferably dry mixed, e.g., by mixing the source compounds in a ball mill to produce the intimate mixture.

Gao ¶ 31 (emphasis added). See also Gao ¶ 33 (“Preferably, the firing step includes heating the mixture . . . to produce separate lithium metal oxide phases . . . .”) (Emphasis added.) In assessing patentability, all disclosure of the prior art, including unpreferred embodiments, must be considered. *In re Inland Steel Co.*, 265 F.3d 1354, 1361 (Fed. Cir. 2001); *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976).

Applicant’s arguments do not convince us of error in the Examiner’s decisions rejecting Claims 1-20.

#### DECISION

The decision of the Examiner is affirmed.

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

AFFIRMED

Appeal 2011-007428  
Application 11/841,616

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