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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/806,543	07/22/2015	Hye Jin CHOI	K85900 1150US.1	7976
128016	7590	10/01/2019	EXAMINER	
WOMBLE BOND DICKINSON (US) LLP			TADAYYON ESLAMI, TABASSOM	
Attn: IP DOCKETING			ART UNIT	
P.O. BOX 7037			PAPER NUMBER	
ATLANTA, GA 30357-0037			1712	
			NOTIFICATION DATE	DELIVERY MODE
			10/01/2019	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HYE JIN CHOI, JOHN DAVID BASS, ERIC LACHMAN,
DANIEL MARK GIAQUINTA, HOWARD W. TURNER, and
ELLEN MURPHY

Appeal 2019-000990
Application 14/806,543
Technology Center 1700

Before MONTÉ T. SQUIRE, MICHAEL G. McMANUS, and
SHELDON M. McGEE, *Administrative Patent Judges*.

SQUIRE, *Administrative Patent Judge*.

DECISION ON APPEAL¹

¹ In this Decision, we refer to the Specification filed July 22, 2015 (“Spec.”); Final Office Action dated Nov. 8, 2017 (“Final Act.”); Appeal Brief filed June 7, 2018 (“Br.”); and Examiner’s Answer dated Sept. 6, 2018 (“Ans.”). There is no reply brief.

Appellant² appeals under 35 U.S.C. § 134(a) from the Examiner's decision finally rejecting claims 1–13, 15, and 17–24.³ We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

The Claimed Subject Matter

Appellant's disclosure relates to liquid compositions comprising lithium nickel oxides, methods for preparing lithium nickel oxide compositions adapted for thin film deposition onto a substrate for forming multi-layer electrochromic structures, and methods for preparing multi-layer structures comprising such films. Spec. ¶ 1; Abstract.

Claim 1 is illustrative of the claimed subject matter on appeal and is reproduced below from the Claims Appendix to the Appeal Brief:

1. A process for preparing a multi-layer electrochromic structure, the process comprising: ***depositing a film of a liquid mixture comprising lithium, nickel, and at least one bleached state stabilizing element onto a surface of a substrate, and treating the deposited film to form an anodic electrochromic layer comprising a lithiated nickel oxide***, wherein

(i) the atomic ratio of lithium to the combined amount of nickel and the bleached state stabilizing element in the anodic electrochromic layer is at least 0.4:1,

(ii) the atomic ratio of the amount of the bleached state stabilizing element to the combined amount of nickel and the bleached state stabilizing elements in the anodic electrochromic layer is at least 0.025:1,

² We use the word "Appellant" to refer to "Applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies Kinestral Technologies, Inc. as the real party in interest. Br. 1.

³ Claims 14 and 16 are withdrawn. Br. 29–30; Final Act. 1.

(iii) the bleached state stabilizing element is selected from the group consisting of Y, Ti, Zr, Hf, V, Nb, Ta, Mo, W, B, Al, Ga, In, Si, Ge, Sn, P, Sb and combinations thereof, and

(iv) *the liquid mixture comprises a dispersed phase and a continuous phase*, the dispersed phase comprising a dispersed species having a number average size of 5 nm to 200 nm,

wherein the dispersed species is metal oxide particles, metal hydroxide particles, metal alkoxide particles, metal alkoxide oligomers, metal alkoxide gels, or a combination thereof.

Br. 28.

The References

The Examiner relies on the following prior art references as evidence in rejecting the claims on appeal:

Uchida et al. (“Uchida”)	US 2007/0292758 A1	Dec. 20, 2007
Kim et al. (“Kim”)	US 2008/0054332 A1	Mar. 6, 2008
Campazzi et al. (“Campazzi”)	US 2009/0202815 A1	Aug. 13, 2009
Nomura et al. (“Nomura”)	US 2011/0250494 A1	Oct. 13, 2011
Gillaspie et al. (“Gillaspie”)	US 2013/0182307 A1	July 18, 2013
Kawasato et al. (“Kawasato”) ⁴	JP2012201539 A	Oct. 22, 2012

The Rejections

On appeal, the Examiner maintains (Ans. 3) the following rejections:

1. Claims 1–8, 13, and 17 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Gillaspie in view of Kawasato and Uchida (“Rejection 1”). Final Act. 2.

⁴ The Examiner relies on the English translation of the Kawasato reference.

2. Claims 9–12 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Gillaspie in view of Kawasato and Uchida, and further in view of Campazzi (“Rejection 2”). Final Act. 4.

3. Claim 15 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Gillaspie in view of Kawasato and Uchida, and further in view of Kim (“Rejection 3”). Final Act. 4.

4. Claims 1–4, 7, 8, 13, and 17–24 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Gillaspie in view of Nomura and Uchida (“Rejection 4”). Final Act. 5.

5. Claims 9–12 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Gillaspie in view of Nomura and Uchida, and further in view of Campazzi (“Rejection 5”). Final Act. 7.

6. Claim 15 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Gillaspie in view of Nomura and Uchida, and further in view of Kim (“Rejection 6”). Final Act. 8.

OPINION

Rejection 1

The Examiner determines the combination of Gillaspie, Kawasato, and Uchida suggests a process for preparing a multi-layer device satisfying all of the steps of claim 1 and concludes the combination would have rendered the claim obvious. Final Act. 2–3 (citing Gillaspie, Abstract, ¶¶ 115, 127; Kawasato ¶ 14; and Uchida ¶¶ 6, 21, 37).

Regarding the recitation “the liquid mixture comprises a dispersed phase and a continuous phase,” the Examiner relies on Kawasato for teaching or suggesting this element of the claim. *Id.* at 3. In particular, the

Examiner finds Kawasato teaches mixing an aqueous solution of nickel and precursor of zirconium with lithium raw material powder to form a liquid mixture, and then applying the mixture to a substrate. *Id.* at 3 (citing Kawasato ¶ 14).

Appellant argues the Examiner's rejection should be reversed because the Examiner does not adequately explain why a person of ordinary skill in the art would have combined the teachings of the cited art in the manner claimed. Br. 5–6, 8–10. In particular, Appellant argues one of ordinary skill in the art would have had “no reasonable motivation to combine the teachings of [Gillaspie] with those of [Kawasato]” because “these references are directed to different applications and to different complex metal oxides.” *Id.* at 5. Appellant contends Gillaspie is directed to specific types of electrochromic devices and materials that change their optical properties in response to application of an electrical potential. *Id.* at 5 (citing Gillaspie ¶ 3). In contrast, Appellant contends Kawasato is directed to lithium secondary batteries. *Id.* at 5–6 (citing Kawasato ¶ 1).

The weight of the evidence supports Appellant's arguments. On the record before us, the Examiner has not established by a preponderance of the evidence that one of ordinary skill in the art would have had reason to combine the teachings of Gillaspie, Kawasato, and Uchida to arrive at Appellant's claimed invention. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992) (holding the examiner bears the initial burden of establishing a prima facie case of obviousness).

As Appellant correctly points out (Br. 5–6), the Examiner does not direct us to persuasive evidence or provide an adequate technical reason explaining why one of ordinary skill would have combined Gillaspie's

electrochromic nickel oxide device and process (Gillaspie, Abstract, ¶¶ 3, 11, 12, 127) with Kawasato's process for manufacturing a "lithium content composite oxide" for lithium secondary batteries (Kawasato, Abstract, ¶¶ 1, 2, 14). Although paragraph 14 of Kawasato describes a method of manufacturing a lithium content composite oxide that contains nickel for a secondary lithium battery, there is no teaching or suggestion that the disclosed method would have resulted in the same or substantially similar material to the claimed electrochromic lithiated nickel oxide material, and would have been suitable for use in electrochromic applications. For example, Gillaspie teaches the preparation of films for nickel oxide-based anodic electrodes having a thickness as thin as 80 nanometers (Gillaspie ¶ 127); while Kawasato teaches the particle size of the manufactured lithium content composite oxide itself being preferably "2–25 micrometers" (Kawasato ¶ 47), which differs by an order of magnitude from the thickness Gillaspie discloses.

The Examiner also does not adequately explain why Gillaspie's disclosure regarding an electrochromic nickel oxide device would have led one of ordinary skill to Kawasato's process for manufacturing a secondary lithium battery. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (requiring "reasoning with some rational underpinning to support the legal conclusion of obviousness"). The Examiner's assertions that "the electrode in [a] lithium battery has the same function and made of [the] same materials (lithium nickel complex oxides) . . . to release and store lithium ions" (Ans. 3) and "both electrodes . . . function the same and relate[] to solid state devices" (*id.* at 3) are conclusory and, without more, insufficient to sustain the Examiner's rejection. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)

(holding that rejections “cannot be sustained by mere conclusory statements”).

Moreover, the Examiner does not provide any findings or discussion, for example, regarding the technical feasibility of combining Gillaspie’s electrochromic nickel oxide device and process with Kawasato’s process for manufacturing a lithium content composite oxide for lithium secondary batteries; the impact that would have on the operation of the Gillaspie’s device; or why one of ordinary skill in the art would have had a reasonable expectation of success in making such modification. For example, the Examiner provides no discussion regarding what impact such a modification would have on Gillaspie’s electrochromic properties, which is a feature that Gillaspie teaches is required for its device (*see* Gillaspie ¶¶ 3, 8).

On the record before us, we are also not persuaded the Examiner has established by a preponderance of the evidence that the cited art teaches or suggests the “liquid mixture comprises a dispersed phase and a continuous phase” recitation of the claim. *Oetiker*, 977 F.2d at 1445. Contrary to what the Examiner’s findings seem to imply, the fact that Kawasato describes its lithium content composite oxide as a “mixed aqueous solution” (Kawasato ¶ 14), without more, does not teach or suggest “the liquid mixture comprises a dispersed phase and a continuous phase,” as required by the claim.

We, therefore, cannot sustain the Examiner’s rejection and determination that it would have been obvious to combine the teachings of Gillaspie, Kawasato, and Uchida to arrive at the claimed subject matter.

Accordingly, we reverse the Examiner’s rejection of claims 1–8, 13, and 17 under 35 U.S.C. § 103(a) as obvious over the combination of Gillaspie, Kawasato, and Uchida.

Rejections 2 and 3

The foregoing deficiencies in the Examiner's analysis and conclusion regarding Rejection 1 and the combination of Gillaspie, Kawasato, and Uchida are not remedied by the Examiner's findings regarding the additional references or combination of references cited in support of the second and third grounds of rejection.

Accordingly, we reverse the Examiner's Rejections 2 and 3 for principally the same reasons discussed above for reversing Rejection 1.

Rejection 4

For Rejection 4, the Examiner determines that the combination of Gillaspie, Nomura, and Uchida suggests a process for preparing a multi-layer device satisfying all of the steps of claim 1 and concludes the combination would have rendered the claim obvious. Final Act. 5–6. The Examiner makes similar findings regarding the teachings of Gillaspie, Nomura, and Uchida and relies on essentially the same rationale for why one of ordinary skill would have combined these references to arrive at the claimed invention, as previously relied upon and discussed above for Rejection 1. *Compare* Final Act. 5–6 (Rejection 4) *with*, Final Act. 2–3 (Rejection 1).

In particular, similar to the Examiner's findings regarding the disclosures of the Kawasato reference in Rejection 1, the Examiner relies on the Nomura reference for teaching or suggesting the “depositing a film of a liquid mixture . . . onto a surface of a substrate” and treating the deposited film to form an anodic electrochromic layer” steps of the claim. Final Act. 5–6 (citing Nomura ¶ 18, 24, 27, 60).

Appellant argues the Examiner's rejection based on the combination of Gillaspie, Nomura, and Uchida (Rejection 4) should be reversed for essentially the same reasons presented and discussed above in response to the Examiner's rejection based on the combination of Gillaspie, Kawasato, and Uchida. *See, e.g.*, Br. 15–16 (arguing Gillaspie is directed to electrochromic devices and materials that change their optical properties in response to application of an electrical potential and, in contrast, Nomura is “directed to non-aqueous lithium electrolyte secondary *batteries*, such as lithium ion batteries”).

We find that Nomura's disclosure is similar to the disclosure of the Kawasato reference relied upon by the Examiner in combination with Gillaspie and Uchida in Rejection 1. We also find the Examiner's analysis and reasoning regarding the combination of Gillaspie, Nomura, and Uchida rests on principally the same flawed findings and conclusions as discussed above for Rejection 1. Therefore, we cannot sustain Rejection 4 for principally the same reasons discussed above regarding Rejection 1.

Accordingly, we reverse the Examiner's rejection of claims 1–4, 7, 8, 13, and 17–24 under 35 U.S.C. § 103(a) as obvious over the combination of Gillaspie, Nomura, and Uchida.

Rejections 5 and 6

The foregoing deficiencies in the Examiner's analysis and conclusion regarding Rejection 4 and the combination of Gillaspie, Nomura, and Uchida are not remedied by the Examiner's findings regarding the additional references or combination of references cited in support of the fifth and sixth grounds of rejection.

Accordingly, we reverse the Examiner’s Rejections 5 and 6 for principally the same reasons discussed above for reversing Rejection 4.

CONCLUSION

In summary:

Claim(s) Rejected	Basis	Affirmed	Reversed
1–8, 13, and 17	§ 103(a) Gillaspie, Kawasato, and Uchida		1–8, 13, and 17
9–12	§ 103(a) Gillaspie, Kawasato, Uchida, and Campazzi		9–12
15	§ 103(a) Gillaspie, Kawasato, Uchida, and Kim		15
1–4, 7, 8, 13, and 17–24	§ 103(a) Gillaspie, Nomura, and Uchida		1–4, 7, 8, 13, and 17–24
9–12	§ 103(a) Gillaspie, Nomura, Uchida, and Campazzi		9–12
15	§ 103(a) Gillaspie, Nomura, Uchida, and Kim		15
Overall Outcome			1–13, 15, 17– 24

REVERSED