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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LIPING ZHENG, STEVEN M. GASWORTH,
JAMES E. PICKETT, HAIYING WANG, ZHEN LIU, QIJIA FU,
YANG DONG, and HONGXIA XI

Appeal 2019-003308
Application 14/938,023
Technology Center 1700

Before CHRISTOPHER L. OGDEN, BRIAN D. RANGE, and
LILAN REN, *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 1–10, 12, and 21. We have jurisdiction under 35 U.S.C. § 6(b). We AFFIRM.

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 SABIC GLOBAL TECHNOLOGIES B.V. Appeal Br. 2.

CLAIMED SUBJECT MATTER²

Appellant describes the invention as relating to, for example, a coating for automobile windows that is transparent, absorbs infrared radiation, and resists abrasion. Spec. ¶¶ 2–7. Claim 1 is illustrative:

1. A composition, comprising:
 - a coating matrix, comprising a partial condensate of a silanol of the formula $R_nSi(OH)_{4-n}$, where n equals 1 or 2, and wherein R is selected from a C_{1-3} alkyl radical, a vinyl radical, a 3,3,3-trifluoropropyl radical, a gamma-glycidoxypropyl radical, and a gamma-methacryloxypropyl radical, wherein the silanol comprises greater than or equal to 70 wt% of $CH_3Si(OH)_3$;
 - colloidal silica; and
 - ITO having a mean particle size of less than or equal to 60 nm as determined by dynamic light scattering.

REFERENCES

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

<u>Name</u>	<u>Reference</u>	<u>Date</u>
Factor et al. (“Factor”)	US 4,863,520	Sept. 5, 1989
Patel	US 4,990,376	Feb. 5, 1991
Iacovangelo	US 6,261,694 B1	July 17, 2001
Anderson	US 2010/0080983 A1	Apr. 1, 2010
Kumon et al. (“Kumon”)	US 2010/0227159 A1	Sept. 9, 2010
Dave	US 2012/0040179 A1	Feb. 16, 2012
Kodaira et al. (“Kodaira”)	US 2013/0071669 A1	Mar. 21, 2013
Liu et al. (“Liu”)	CN102153948	Aug. 17, 2011

² In this Decision, we refer to the Final Office Action dated May 14, 2018 (“Final Act.”), the Appeal Brief filed October 15, 2018 (“Appeal Br.”), the Examiner’s Answer dated January 24, 2019 (“Ans.”), and the Reply Brief filed March 22, 2019 (“Reply Br.”).

REJECTIONS

- The Examiner maintains (Ans. 3) the following rejections on appeal:
- A. Claims 1–10, 12, and 21 under 35 U.S.C. § 112 as failing to comply with the written description requirement. Final Act. 3–5.
 - B. Claims 1–10, 12, and 21 under 35 U.S.C. § 112 as indefinite.
Id. at 5–6.
 - C. Claims 1, 3–7, and 12 under 35 U.S.C. § 103 as obvious over Liu (as evidenced by Kodaira), Kumon (as evidenced by Anderson), and Iacovangelo. *Id.* at 6.
 - D. Claim 2 under 35 U.S.C. § 103 as obvious over Liu (as evidenced by Kodaira), Kumon (as evidenced by Anderson), and Iacovangelo further in view of Patel. *Id.* at 12.
 - E. Claims 8–10 under 35 U.S.C. § 103 as obvious over Liu (as evidenced by Kodaira), Kumon (as evidenced by Anderson), and Iacovangelo and further in view of Factor. *Id.* at 14.
 - F. Claim 21 under 35 U.S.C. § 103 as obvious Liu (as evidenced by Kodaira), Kumon (as evidenced by Anderson), and Iacovangelo and further in view of Dave. *Id.* at 15–16.

OPINION

Rejection B, indefiniteness. We first address indefiniteness because evaluation of the written description and obviousness rejections depends upon properly construing the claims.

The Examiner rejects claim 1 as indefinite. Final Act. 5–6. During prosecution, “[a] claim is indefinite when it contains words or phrases whose meaning is unclear.” *Ex parte McAward*, Appeal No. 2015-006416, at 11

(PTAB Aug. 25, 2017) (precedential) (quoting *In re Packard*, 751 F.3d 1307, 1310 (Fed. Cir. 2014) (per curium)). Our reviewing court has emphasized that claim language should be “as precise as the subject matter permits” and has explained that the USPTO has an important role in ensuring that patent claims are clear and unambiguous. *In re Packard*, 751 F.3d at 1313; accord *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 899 (2014) (“Section 112’s definiteness requirement must take into account the inherent limitations of language,” yet mandates clarity to the extent possible under the circumstances). Importantly, 35 U.S.C. § 112 paragraph 2 “puts the burden of precise claim drafting squarely on the applicant.” *In re Morris*, 127 F.3d 1048, 1056 (Fed. Cir. 1997); see also *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1255 (Fed. Cir. 2008) (“[T]he patent drafter is in the best position to resolve the ambiguity in the patent claims, and it is highly desirable that patent examiners demand that applicants do so in appropriate circumstances so that the patent can be amended during prosecution rather than attempting to resolve the ambiguity in litigation.”).

Here, the Examiner rejects claim 1 as unclear because the claim has two reasonable interpretations. Final Act. 5–6. The Examiner maintains that Claim 1 could be read as reciting “[a] composition” (recited in the preamble) that comprises three things: (1) “a coating matrix, comprising a partial condensate . . . CH₃Si(OH)₃,” (2) “colloidal silica;” and (3) “ITO having . . . light scattering.” Alternatively, claim 1 could be read as reciting “[a] composition” comprising “a coating matrix” where the “coating matrix” comprises three things: (1) “a partial condensate . . . CH₃Si(OH)₃,” (2) “colloidal silica;” and (3) “ITO having . . . light scattering.” *Id.*

Appellant argues that claim 1's "meaning is clear by the punctuation and spacing of the claim, where each of the three components is indented and have semi-colons separating the respective components." Appeal Br. 6–7. This argument persuades of Examiner error. The preamble's recitation of "[a] composition, comprising:" ends with a colon. In typical claim drafting style, the colon is often used to indicate an upcoming list where items in the list are then often separated by semicolons. The colon here, therefore, indicates that the preamble's "composition" comprises the list of things (each separated by a semicolon) following the colon. In contrast, the recitation "a coating matrix, comprising a partial . . ." does not include any punctuation after "comprising." The "a coating matrix, comprising a partial . . ." recitation, therefore, does not indicate that the recited "coating matrix" would comprise all elements of the list separated by semicolons.

Accordingly, we determine that the Examiner erred in rejecting claim 1 for indefiniteness. We construe claim 1 as requiring "[a] composition" (recited in the preamble) that comprises three things: (1) "a coating matrix, comprising a partial condensate ... $\text{CH}_3\text{Si}(\text{OH})_3$;" (2) "colloidal silica;" and (3) "ITO having . . . light scattering." Likewise, claims depending from claim 1 are not indefinite merely due to their dependence on claim 1.

The Examiner separately rejects claims 3, 4, and 21 as indefinite and provides additional rationales as to why these dependent claims are unclear. Final Act. 5–6. Appellant does not dispute these rejections (Appeal Br. 6–7), and we, therefore, sustain the Examiner's rejection of these claims for the Examiner's stated reasons.

We must also assess whether indefiniteness hinders our ability to assess the Examiner's other rejections of claims 3, 4, and 21. The Examiner

rejects claims 3 and 4 as indefinite because the recited “the coating composition” lacks an antecedent basis. To resolve other patentability issues before us and to avoid piecemeal appellate review, it is possible to make a reasonable, conditional interpretation of claims 3 and 4. In the interest of administrative and judicial economy, this course is appropriate wherever reasonably possible. *See Ex parte Saceman*, 27 USPQ2d 1472, 1474 (BPAI 1993); *Ex parte Ionescu*, 222 USPQ 537, 540 (Bd. App. 1984). We, therefore, conditionally interpret claims 3 and 4 as follows: the recited “coating composition” refers to the composition recited as “[a] composition” in claim 1 and in the preamble of claims 3 and 4.

Claim 21, however, is too ambiguous for us to conditionally interpret. It is entirely unclear what claim 21’s recited “the infrared radiation absorbing coating mixture” refers to. *See In re Steele*, 305 F.2d 859, 862 (CCPA 1962).

Rejection A, written description. The Examiner rejects all claims on appeal as lacking adequate written description. Final Act. 3–4. In particular, the Examiner determines that the recited “composition” (appearing, for example, as “[a] composition” in the preamble of claim 1) provides a broad genus and that the written description only indicates invention of, for example, the narrower genus of “a coating composition. *Id.* at 3. Appellant argues that this rejection is in error because the Specification, as filed, conveys that Appellant possessed the invention defined by the claim. Appeal Br. 4–6.

Appellant’s argument identifies error. Appellant identifies, for example, paragraphs 9 and 28 as describing the recited composition. Appeal Br. 2. Paragraph 9, for example, refers to a “silicone coating composition,”

and claim 1 is directed to a “composition” that comprises, among other things, colloidal silica. The word “coating” in the Specification indicates an intended use for the composition; the Examiner has not adequately explained why a “coating composition” would be physically different than a “composition” in this context such that the Specification merely indicates the inventor’s possession of a subset of the claim 1’s recited “composition.” We, thus, do not sustain the Examiner’s rejection of claim 1 (and claims depending on claim 1) based on lack of written description.

The Examiner provides a second and distinct rationale as to why dependent claim 21 lacks adequate written description support. Final Act. 4–5. Because the scope of claim 21 is unclear (as explained above), comparison of the claim to the Specification’s disclosure requires undue speculation. As a formal matter, we reverse the Examiner’s rejection of claim 21 without assessing the merits of the rejection. *Cf. In re Steele*, 305 F.2d at 862 (“[W]e do not think a rejection under 35 U.S.C. § 103 should be based on such speculations and assumptions.”).

Rejection C, obviousness of claims 1, 3–7, and 12. The Examiner rejects claims 1, 3–7, and 12 as obvious over Liu, Kodaira, Kumon, Anderson, and Iacovangelo. The Examiner finds that Liu teaches a thermal insulation material for automotive glass comprising an organic silica sol solution. Final Act. 6–7. The Examiner finds that “Liu does not expressly disclose that the indium tin oxide and silane slurry has hydrolysis and condensation or polymeric dispersant or catalyst.” *Id.* at 8. The Examiner finds that Kumon teaches a coating formed from hydrolysis and determines that a person of skill would have combined the hydrolysis teachings of Kumon with the coating of Liu. *Id.* at 10.

The Examiner finds that modified Liu does not expressly disclose use of silanol that is 70% by weight $\text{CH}_3\text{Si}(\text{OH})_3$. Final Act. 10. The Examiner finds, however, that Iacovangelo teaches that its silicone hardcoat composition has silanol comprising 70% by weight $\text{CH}_3\text{Si}(\text{OH})_3$. *Id.* at 10–11. The Examiner determines that it would have been obvious to use a composition with 70% by weight $\text{CH}_3\text{Si}(\text{OH})_3$ with Liu in order to “have an infrared radiation reflecting and ultraviolet radiation absorbing coating formed over a polymeric substrate with a silicone hardcoat.” *Id.* at 11.

In addressing this rejection, Appellant’s argument groups the claims as follows: claim 1 (Appeal Br. 7–10), claims 3 and 4 (*id.* at 10–11), and claims 6 and 7 (*id.* at 11). Appellant does not argue claim 12 separately. In our discussion below, we group claims 1 and 12 together, group claims 3 and 4 together, and group claims 6 and 7 together. 37 C.F.R. § 41.37(c)(1)(iv) (2013).

With respect to claim 1, Appellant first argues that the silica sol of Liu is not necessarily a colloidal silica as claim 1 recites. Appeal Br. 8. The preponderance of the evidence does not support Appellant’s position. We agree with the Examiner’s finding that Liu teaches, for instance in its Example 1, that compounding chemicals such as ethanol are added to its silicon to form silica sol. Ans. 10; Liu 5 (identifying ethanol as an excellent dispersant), 11 (“add the pre-dispersion to nanometer silicone resin stirred at a high speed slowly, then add other compounding chemicals [i.e., ethanol] . . . and nanometer silica sol are dispersed”). Also, the Examiner cites persuasive evidence that silica sols are colloidal by definition. Ans. 10–11 (citing Ullmann’s Encyclopedia of Industrial Chemistry, Vol. 32, 421, 455–456 (2012)).

Appellant next argues that a person of skill in the art would have no reason to reach a coating mixture comprising a partial condensate of silanol that comprises greater than 70 wt% of $\text{CH}_3\text{Si}(\text{OH})_3$. The Examiner, however, finds that Liu teaches an automobile silica coating with “ultrahigh film hardness” (Final Act. 7 (citing Liu)) and finds that Iacovangelo teaches that a typical silicone hardcoat includes silanol with 70 wt% $\text{CH}_3\text{Si}(\text{OH})_3$. Ans. 15–16. In other words, the Examiner finds that Liu teaches a silicone hardcoat, and Iacovangelo suggests what is typical for such a silicone hardcoat. The Examiner’s position is supported by the preponderance of the evidence. *See, e.g.*, Liu 1 (teaching silica hardcoat); Iacovangelo 3:63–4:7 (“Typically, at least 70 weight percent of the silanol comprises $\text{CH}_3\text{Si}(\text{OH})_3$.”).

Appellant also argues that a person of skill in the art would not have reason to add Iacovangelo’s adhesion layer to Liu and that adding an additional layer to Liu would be outside the scope of claim 1. Appeal Br. 8–10; Reply Br. 4–6. These arguments are unpersuasive because they do not squarely address the Examiner’s rejection. The Examiner relies on Iacovangelo as teaching what is typical for a silicone hardcoat; the Examiner’s rejection does not depend on bodily incorporating Iacovangelo’s adhesion layer into Liu. Ans. 16. Because Appellant’s arguments do not identify error, we sustain the Examiner’s rejection of claims 1 and 12.

Claims 3 and 4 recite the composition of claim 1 where, for example, the composition comprises either “less than or equal to 0.05 parts by mass polymeric dispersant” (claim 3) or “0 parts by mass polymeric dispersant” (claim 4). Appeal Br. 15 (Claims App.). The Examiner finds that Kumon discloses a silicone coating composition with no polymeric dispersant that is

useful for a heat ray shielding vehicle glass that generates no abnormal noise by friction due to up-and-down movement. The Examiner determines that a person of skill in the art would have considered it obvious to combine the teachings of Kumon with the teachings of Liu in order to have “heat ray shielding glass or resinous substrate usable as a vehicle glass [with] no abnormal frictional noise and movement of the coated substrate up-and-down.” Final Act. 8–10; *see also* Ans. 20–21 (further explaining rationale to combine teachings of Kumon and Liu).

Appellant argues that a person of skill in the art concerned with agglomeration would not consider modifying Liu with Kumon. Appeal Br. 10–11. Appellant’s argument is unpersuasive because it does not refute the rationale for combining the teachings of Liu and Kumon stated by the Examiner (for example, to reach a vehicle glass that lacks abnormal frictional noise). Moreover, Appellant does not provide evidence that agglomeration concerns would have dissuaded a person of skill in the art from pursuing such a combination. Appeal Br. 10–11; *cf. Estee Lauder Inc. v. L’Oreal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997) (“[A]rguments of counsel cannot take the place of evidence lacking in the record.” (quoting *Knorr v. Pearson*, 671 F.2d 1368, 1373 (CCPA 1982))).

Appellant also argues that Appellant surprisingly discovered that agglomeration can be avoided without using a polymeric dispersant. Appeal Br. 10–11. Our reviewing court has explained that “an applicant may overcome a *prima facie* case of obviousness by establishing that the [claimed] range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.” *In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003) (internal quotes and citation omitted).

Evidence of unexpected results must be reasonably commensurate with the scope of the claims. *In re Peterson*, 315 F.3d at 1330–31 (explaining that showing of unexpected results “must be commensurate in scope with the claims which the evidence is offered to support” (internal quotes and citation omitted)). “If an applicant demonstrates that an embodiment has an unexpected result and provides an adequate basis to support the conclusion that other embodiments falling within the claim will behave in the same manner, this will generally establish that the evidence is commensurate with scope of the claims.” *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011).

Here, we have carefully considered Appellant’s evidence and arguments, but the proffered evidence of unexpected results is unpersuasive. In particular, we agree with the Examiner’s finding that Appellant has not provided evidence to establish unexpected results for ITO that has not been aged. Ans. 20. In particular, claim 1 is open to aged or non-aged ITO, and Appellant does not establish unexpected results for both instances. We also note that Appellant does not present evidence that its preferred results are unexpected. Superior results alone are not sufficient to show that results are unexpected. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1371 (Fed. Cir. 2007) (“[A]ny superior property must be *unexpected* to be considered as evidence of non-obviousness.”). Appellant, thus, has not established unexpected results commensurate in scope with claims 3 and 4. We sustain the rejection of claims 3 and 4.

Claims 6 and 7 recite that “greater than or equal to 90% of ITO [indium-doped tin oxide (Spec. ¶ 6)] particles have a diameter of less than 61 nm” and “greater than or equal to 95% of ITO particles have a diameter

of less than or equal to 71 nm” respectively. The Examiner finds that Liu teaches mean diameter of ITO particles of less of 20–50 nm. Final Act. 7 (citing Liu 7); *see also* Ans. 22.

Appellant argues that a mean diameter of 20 to 50 nm does not mean that 90% of the particles are less than 61 nm or that 95% of the particles are less than 71 nm. Appeal Br. 11. Appellant’s argument is unpersuasive because a “reference must be considered not only for what it expressly teaches, but also for what it fairly suggests.” *In re Baird*, 16 F.3d 380, 383 (Fed. Cir. 1994) (internal quotes and citation omitted). By teaching a mean diameter of 20 to 50 nm, Liu fairly suggests that a low percentage of particles should be significantly larger than the mean average. Liu thus suggests the recitations of claims 6 and 7, and we sustain the rejection of claims 6 and 7.

Rejection D, obviousness of claim 2. Claim 2 recites, “[t]he composition of Claim 1, wherein the colloidal silica comprises an ammonium-stabilized colloidal silica or an acid-stabilized colloidal silica.” Appeal Br. 15 (Claims App.). The Examiner rejects claim 2 as obvious over Liu, Kodaira, Kumon, Anderson, and Iacovangelo further in view of Patel. Final Act. 12–14. The Examiner finds that Patel teaches ammonium-stabilized colloidal silica for use in a silica-containing curable coating composition. *Id.* The Examiner determines that a person of skill in the art would have combined the ammonium-stabilized colloidal silica teachings of Patel with the teachings of Liu in order “to have a crack free coating.” *Id.* at 14.

Appellant argues that there would be no reason to combine the teachings of Patel and Liu. Appeal Br. 12. Appellant does not, however,

persuasively refute the Examiner's stated reason to combine or otherwise cite evidence as to why a reason to combine is lacking.

In the Reply Brief, Appellant argues that it is Patel's small particle size that reduces cracking and that Liu teaches a different particle size. Reply Br. 8. Appellant raises this argument for the first time on reply, the argument is not responsive to a new issue raised by the Examiner in the Answer, and Appellant does not identify good cause for first raising this argument on reply. Accordingly, we decline to consider the argument. 37 C.F.R. § 41.41(b)(2) (2011).³ We sustain this rejection.

Rejection E, obviousness of claims 8–10. Appellant argues claims 8–10 as a group (Appeal Br. 12–13), and we choose claim 8 as representative. 37 C.F.R. § 41.37(c)(1)(iv) (2013). Claim 8 recites, “[t]he composition of Claim 1, further comprising a quaternary ammonium salt of a carboxylic acid.”

The Examiner finds that claims are obvious over Liu, Kodaira, Kumon, Anderson, and Iacovangelo and further in view of Factor. Final Act. 14. The Examiner finds that Factor teaches an improved method for forming a protective silica coating on a substrate that makes use of a quaternary ammonium salt of a carboxylic acid. *Id.* at 14–15. The Examiner determines that a person of skill in the art would have combined the teachings of Factor

³ Consideration of new argument raised in reply is contrary to the cited regulation. We also note that consideration of arguments raised for the first time on reply would lead to procedurally imbalanced and unfair adjudication because the Examiner has no opportunity to address arguments raised in the reply brief.

and Liu “to achieve a desired amount of hardness . . . while avoiding inducing microcracking.” *Id.* at 15.

Appellant argues that Appellant surprisingly discovered a reduction of Taber delta haze with the addition of the quaternary ammonium salt of carboxylic acid. Appeal Br. 12–13; Reply Br. 8. The Examiner, however, identifies many reasons why Appellant’s evidence is not commensurate in scope with the claims. Ans. 24–25. We agree with the Examiner’s stated reasoning as to why the evidence is lacking. Appellant argues that a person of skill would understand that “improvements would occur over the range of cure catalysts and amounts provided in the claims” (Reply Br. 8), but this argument is unpersuasive because Appellant does not cite evidence to support this point. We also note that Appellant lacks evidence that the cited superior results are unexpected. We, thus, sustain this rejection.

Rejection F, obviousness of claim 21. Claim 21 is too ambiguous for us to engage in an obviousness analysis. Therefore, as a formal matter, we reverse the Examiner’s obviousness rejection of claim 21 without assessing the merits of this rejection. *In re Steele*, 305 F.2d at 862 (“[W]e do not think a rejection under 35 U.S.C. § 103 should be based on such speculations and assumptions.”).

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	References/Basis	Affirmed	Reversed
1–10, 12, 21	112	Written Description		1–10, 12, 21
1–10, 12, 21	112	Indefiniteness	3, 4, 21	1, 2, 5–10, 12

Claims Rejected	35 U.S.C. §	References/Basis	Affirmed	Reversed
1, 3-7, 12	103	Liu, Kodaira, Kumon, Anderson, Iacovangelo	1, 3-7, 12	
2	103	Liu, Kodaira, Kumon, Anderson, Iacovangelo, Patel	2	
8-10	103	Liu, Kodaira, Kumon, Anderson, Iacovangelo, Factor	8-10	
21	103	Liu, Kodaira, Kumon, Anderson, Iacovangelo, Dave		21
Overall Outcome			1-10, 12, 21	

TIME PERIOD FOR RESPONSE

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

AFFIRMED