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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CORNELIA ROEGER-GOEPFERT,
ROMAN BENEDIKT RAETHER, CHARLOTTE EMNET,
ALEXANDRA HAAG, and DIETER MAYER¹

Appeal 2018-008677
Application 13/260,173
Technology Center 1700

Before KAREN M. HASTINGS, CHRISTOPHER C. KENNEDY, and
DEBRA L. DENNETT, *Administrative Patent Judges*.

KENNEDY, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 16–25 and 36–43. An oral hearing was held on November 1, 2019. 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(a). Appellant identifies the real party in interest as BASF SE. App. Br. 1.

BACKGROUND

The subject matter on appeal is directed to compositions for metal plating. *E.g.*, Spec. at 1:1–2; Claim 16. Claim 16 is reproduced below from page 36 (Claims Appendix) of the Appeal Brief:

16. A composition for superfilling submicron features on a substrate surface with a metal deposit without substantially forming voids, comprising:

a source of at least one metal ion; and

at least one suppressing agent obtained by a method comprising reacting

a) an amine compound comprising at least three active amino functional groups with

b) a mixture of ethylene oxide and at least one compound selected from the group consisting of a C3 alkylene oxide and a C4 alkylene oxide to form a random copolymer of the ethylene oxide and the C3 and/or C4 alkylene oxide,

wherein a content of ethylene oxide and any C3 to C4 alkylene oxide in the at least one suppressing agent is from 30 to 70 wt%,

wherein the content of ethylene oxide in the random copolymer of the ethylene oxide and the C3 and/or C4 alkylene oxide is 35 to 95% by weight, and

wherein the percentage of voids in the submicron features on the substrate filled with the metal deposit using said composition is less than the percentage of voids in the submicron features on the same substrate filled by a composition comprising said source of at least one metal ion and either: (1) at least one suppressing agent obtained by reacting an amine compound comprising no more than two active amino functional groups with the same random copolymer of ethylene oxide and C3 and/or C4 alkylene oxide; or (2) at least one suppressing agent obtained by reacting the same amine compound comprising at least three active amino

functional groups with a block copolymer having the same content of ethylene oxide and C3 and/or C4 alkylene oxide.

REJECTIONS ON APPEAL

The claims stand rejected as follows:

1. Claims 16–21, 24, 25, 36–38, 40, 42, and 43² under 35 U.S.C. § 102(b) as anticipated by Panecasio '875 (US 2007/0289875 A1, published Dec. 20, 2007). Final Act. 2.
2. Claims 16–21, 24, 25, 36–38, 40, 42, and 43 under 35 U.S.C. § 103(a) as unpatentable over Panecasio '875.³ Final Act. 2.
3. Claims 22, 23, and 39 under 35 U.S.C. § 103(a) as unpatentable over Panecasio '875. Final Act. 6.
4. Claim 41 under 35 U.S.C. § 103(a) as unpatentable over Panecasio '875 and Panecasio '697 (US 2007/0178697 A1, published Aug. 2, 2007). Final Act. 7.

ANALYSIS

After review of the cited evidence in the appeal record and the opposing positions of the Appellant and the Examiner, we determine that the Appellant has not identified reversible error in Rejections 2–4. Accordingly,

²² The Examiner's header setting forth this rejection omits claims 21, 42, and 43. *See* Final Act. 2. However, the Examiner's analysis addresses those claims, and the Appellant does not assert that they are not subject to the rejection. Accordingly, the incomplete header is harmless error, and we consider claims 21, 42, and 43 to be subject to this ground of rejection.

³ The Examiner lists Rejections 1 and 2 as a single rejection in the alternative; i.e., claims 16–21, 24, 25, 36–38, 40, 42, and 43 are rejected under § 102(b) or, in the alternative, under § 103(a). *See* Final Act. 2. For clarity, we have listed two separate rejections.

we affirm those rejections for reasons set forth below, in the Final Action dated October 5, 2017, and in the Examiner's Answer. We decline to reach Rejection 1.

Rejection 1

In view of our disposition of Rejections 2–4, we decline to address Rejection 1.

Rejections 2 and 3

The Appellant argues the claims subject to Rejections 2 and 3 as a group. We select claim 16 as representative, and the remaining claims will stand or fall with claim 16.

The Examiner's statement of the rejection appears at pages 2–4 of the Final Action. Of particular relevance to the issues on appeal, the Examiner finds that Paneccasio '875 teaches compositions for superfilling submicron features on a substrate, and that Paneccasio '875 teaches each individual component of the composition of claim 16. *See* Final Act. 2–3. As to the claimed “source of at least one metal ion,” the Examiner relies on Paneccasio '875's disclosure of compositions comprising “a source of Cu ions.” *See* Paneccasio '875 ¶ 22.

As to the claimed suppressing agent, the Examiner relies on paragraphs 23–26 of Paneccasio '875. Paragraph 23 discloses that “[p]referred suppressors” comprise “polyether groups covalently bonded to a cationic species.” Paneccasio '875 ¶ 23. It further discloses that “[e]xemplary cationic species comprising a nitrogen atom include primary, secondary, *tertiary*, and *quarternary amines*,” *id.* (emphasis added), which

the Examiner finds corresponds to the claimed “amine compound.” Final Act. 3.

Paragraph 25 of Paneccasio '875 discloses that the polyether preferably “comprises a chain of repeat units formed by the polymerization of both ethylene oxide [“EO”] monomer and propylene oxide [“PO”] monomer.” Paneccasio '875 ¶ 25. It further discloses a range of suitable ratios of EO to PO, including a ratio of “about 1:1.” *Id.* The Examiner finds that PO falls within the scope of the term “a C3 alkylene oxide and a C4 alkylene oxide,” as recited by claim 16. Final Act. 3.

Paragraph 26 of Paneccasio '875 discloses that “[t]he polyether preferably comprises EO repeat units and PO repeat units in random, alternating, or block configurations. In a random configuration, the EO repeat units and PO repeat units have no discernable linear pattern along the polyether chain.” Paneccasio '875 ¶ 26.

In view of those and other findings, the Examiner determines that a composition comprising the elements recited by claim 16 would have been obvious to a person of ordinary skill in the art. *See* Final Act. 2–4.

As to the “wherein the percentage of voids” recitation of claim 16, in the Final Action, the Examiner states that “the limitation is tied to a result of the composition and [is] not a property of the composition, where the result further limits the intended use of the composition tied to the preamble.” Final Act. 4. In the Answer, the Examiner further explains that, “if the prior art teaches the identical chemical structure, in the instant case the composition, the properties applicant discloses and/or claims are necessarily present.” Ans. 10–11. Thus, the Examiner indicates that the “wherein the percentage of voids” recitation of claim 16 is a property or result that

naturally flows from the composition when used to fill voids, and that, because Paneccasio '875 renders obvious compositions that fall within the scope of claim 16, the recited property or result would flow naturally from compositions rendered obvious by Paneccasio '875. *See In re Best*, 562 F.2d 1252, 1255–56 (CCPA 1977) (“Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product.”); *Ex parte Obiaya*, 227 USPQ 58, 60 (BPAI 1985) (“The fact that appellant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious.”); *see also In re Kubin*, 561 F.3d 1351, 1357 (Fed. Cir. 2009) (“Even if no prior art of record explicitly discusses the [limitation], [applicants’] application itself instructs that [the limitation] is not an additional requirement imposed by the claims on the [claimed invention], but rather a property necessarily present in [the claimed invention].”).

Accordingly, the Examiner concludes that the subject matter of claim 16 would have been obvious to a person of ordinary skill in the art.

The Appellant argues that “[a] prima facie case of obviousness has not been established in view of the broad Paneccasio '875 disclosure.” App. Br. 17. The Appellant observes, for example, that Paneccasio '875 discloses compositions comprising diamines (rather than triamines) and polyethers in block configuration (rather than random configuration) as examples. *Id.* at 17–18.

Those arguments are not persuasive of reversible error in the rejection. As set forth above, Paneccasio '875 unambiguously discloses suppressors comprising polyether groups covalently bonded to a cationic species. Paneccasio '875 ¶ 23. Paneccasio '875 unambiguously discloses that the polyether group may be a “random configuration” of EO and PO repeat units, it defines what it means by “random configuration,” and it discloses ratios of EO/PO of, for example, 1:1. *Id.* ¶¶ 25–26. As to the amine, Paneccasio '875 unambiguously states that exemplary cationic species include “primary, secondary, *tertiary*, and *quarternary amines*.” *Id.* ¶ 23 (emphasis added). In combination, those disclosures unambiguously suggest suppressors in which the amine compound has at least three active amino functional groups and in which the polyether is a mixture of EO/PO in random configuration that falls within the scope of claim 16. *See id.* ¶¶ 23–26. That the working examples of Paneccasio '875 may use diamines and polyethers in block configuration does not negate the unambiguous disclosures of Paneccasio '875 described above. *See In re Mills*, 470 F.2d 649, 651 (CCPA 1972) (“[A] reference is not limited to the disclosure of specific working examples.”); *see also See Merck & Co. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989) (“That the [prior art] patent discloses a multitude of effective combinations does not render any particular formulation less obvious.”).

The Appellant also argues that unexpected results support a conclusion of nonobviousness in this case. *See App. Br.* 19.

The burden of showing that unexpected results rebut a *prima facie* case of obviousness rests with the Appellant. *In re Huang*, 100 F.3d 135,

139 (Fed. Cir. 1996). The Appellant has not shown that unexpected results support a conclusion of nonobviousness in this case for several reasons.

First, we discern no persuasive showing that any alleged unexpected results are in comparison to the closest prior art. *See In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991) (“[W]hen unexpected results are used as evidence of nonobviousness, the results *must be shown to be unexpected* compared with the closest prior art.” (emphasis added)). The Appellant’s discussion of this is brief, and we observe that the comparative examples of Table 1 (*see* Spec. 18) involve (1) a diamine rather than a triamine (Suppressor 5), or (2) an EO-PO polymer in block configuration rather than in random configuration (Suppressor 6). As set forth above, Paneccasio ’875 alone unambiguously suggests triamine and quarternary amine compounds in combination with EO-PO polyethers in random configuration. The Appellant has not persuasively explained why the selected comparative examples should be considered to be the closest prior art.

Second, “it is not enough to show that results are obtained which differ from those obtained in the prior art: that difference must be shown to be an *unexpected* difference.” *In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972) (emphasis in original). “[A]ny superior property must be *unexpected* to be considered as evidence of non-obviousness.” *See Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1371 (Fed. Cir. 2007) (emphasis in original). “[I]t is well settled that unexpected results must be established by factual evidence. ‘Mere argument or conclusory statements in the specification does not suffice.’” *In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997) (quoting *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1994)). Here, we

discern no persuasive showing that any relied-upon results would have been considered “unexpected” as opposed to merely “superior.” *See generally* App. Br.; *see also In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) (“Attorney’s argument in a brief cannot take the place of evidence.”)

Third, the relied-upon results must be commensurate in scope with the claims. *In re Peterson*, 315 F.3d 1325, 1329–31 (Fed. Cir. 2003).

“Establishing that one (or a small number of) species gives unexpected results is inadequate proof, for ‘it is the view of [the CCPA] that objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.’” *In re Greenfield*, 571 F.2d 1185, 1189 (CCPA 1978) (quoting *In re Tiffin*, 448 F.2d 791, 792 (CCPA 1971)). Although the Appellant asserts that the compositions that yielded the alleged unexpected results are a fair representation of the entire scope of claim 16, *see* App. Br. 23–24, we discern no persuasive evidence to support that. For example, we observe that claim 16 is not limited as to the amine compound beyond requiring at least 3 active amino functional groups. The Appellant does not identify the number of different amine compounds represented by the examples. As another example, the scope of the “mixture of ethylene oxide and at least one compound” term is broad, but the Appellant does not identify the number of different mixtures represented by the examples in the Specification. In short, the breadth of the claim appears to be vast relative to the examples provided, and beyond attorney argument, we discern no evidence or persuasive reasoning as to why a person of ordinary skill in the art would have considered the limited number of examples to be commensurate with the full scope of the claim.

To the extent that the Appellant argues that the scope of the claim is narrowed by the “wherein the percentage of voids” recitation, we discern no persuasive evidence from the Appellant that the “wherein the percentage of voids” recitation is an additional meaningful limit on the scope of the composition, as opposed to a result or characteristic that flows naturally from the recited composition.

On this record, the Appellant has not shown that unexpected results support a conclusion of nonobviousness.

The Appellant also argues the Examiner erred in not attributing more weight to Shih (US 2006/0213780 A1, published Sept. 28, 2006), which the Appellant asserts teaches an EO-PO mixture in which at least 70% of the mixture is PO, while “Applicant’s claims require no more than 65% PO in the EO-PO copolymer.” App. Br. 26–27.

We have considered the Appellant’s argument concerning Shih, and we accord it some weight. However, even assuming the Appellant has accurately characterized Shih as requiring at least 70% PO in Shih’s EO-PO polymer, we are not persuaded that a person of ordinary skill practicing the disclosure of Paneccasio ’875 would have rejected Paneccasio ’875’s own disclosures in favor of the disclosure of a different reference—Shih. As set forth above, Paneccasio ’875 unambiguously discloses EO-PO polymers in which the EO-PO ratio can range from 1:9 to 9:1, and it specifically teaches preferred embodiments in which “the ratio is between about 2:3 and about 3:2, such as about 1:1.” Paneccasio ’875 ¶ 25. “In [a] preferred embodiment, the polyether comprises about 7 or 8 EO repeat units and about 9 PO repeat units.” *Id.* Even assuming that the Appellant is correct that a person of ordinary skill in the art would have been aware of Shih and would

have considered its disclosures in practicing the disclosure of Paneccasio '875, we are not persuaded that the disclosure in a different reference (Shih) of a preferred ratio of at least 70% PO units would have dissuaded a person of ordinary skill in the art from using the unambiguously disclosed ratios of Paneccasio '875. In that regard, even assuming that Shih itself “teach[es] away” from the claimed EO-PO ratio, *see* App. Br. 29, the Examiner is not relying on Shih in support of the rejection, and Paneccasio '875 does not teach away. On the contrary, and as set forth above, Paneccasio '875 teaches EO-PO ratios that fall within the scope of claim 16.

We have carefully considered the Appellant's arguments, but we are not persuaded of reversible error in the Examiner's rejection of claim 16. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (“[I]t has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections . . .”).

Rejection 4

Claim 41 depends indirectly from claim 16 and further requires, *inter alia*, that “the suppressing agent comprises 60 to 180 ethylene oxide units and 60 to 180 propylene oxide units per molecule.”

The Examiner finds that Paneccasio '697 teaches a suppressing agent similar to that of Paneccasio '875, and that Paneccasio '697 “discloses wherein the number of EO units may be between 1 and 120 and the PO units between 1 and 120.” Final Act. 7. The Examiner determines that it would have been obvious “to have used the amounts of EO/PO copolymers as taught by Paneccasio '697 . . . because said amounts are recognized for their

intended use as random copolymers of EO/PO i[n] a suppressor where the EO/PO units are provided for the same intended use in each suppressor.” *Id.*

The Examiner also provides an alternative rationale regarding claim 41:

Furthermore, it would have been obvious to one of ordinary skill in the art to optimize the EO/PO units in the suppressor of Paneccasio because the PO is recognized as providing a polarizing film over a copper seed layer due to its hydrophobicity and the EO is recognized as providing the hydrophilicity to impart solubility to the suppressor (Paneccasio [0028] and [0030], Paneccasio '697 [0039] and [0041] and MPEP 2144.05 II).

Id. at 7–8. We understand that discussion to be a finding by the Examiner that the number of EO/PO units per molecule is a known result-effective variable that affects the hydrophobicity/hydrophilicity of the suppressor, and that it would have been obvious to optimize the number of units per molecule to obtain desired results. *See id.*

The Appellant’s arguments against claim 41 concern only the Examiner’s first rationale; i.e., that Paneccasio '697 teaches or suggests the claimed number of EO/PO units per molecule. *See App. Br. 30–33.*

Even assuming we were to agree with the Appellant’s arguments concerning Paneccasio '697, because the Appellant does not persuasively address the Examiner’s alternative rationale based on optimization, we are not persuaded of reversible error in the Examiner’s rejection. *See Jung*, 637 F.3d at 1365.

The Appellant also reiterates arguments concerning unexpected results, which, similar to above, we find unpersuasive at least because (1) the Appellant has not persuasively addressed whether the relevant comparison

was made to the closest prior art, and (2) the Appellant has not persuasively established that the relied-upon results would have been considered unexpected as opposed to superior.

We have carefully considered the Appellant's arguments, but we are not persuaded of reversible error in the Examiner's rejection of claim 41.

CONCLUSION

In summary:

| Claims Rejected | 35 U.S.C. § | Basis | Affirmed | Reversed |
|----------------------------------|--------------------|----------------------------------|----------------------------------|-----------------|
| 16-21, 24, 25, 36-38, 40, 42, 43 | 102(b) | Paneccasio '875 | | |
| 16-21, 24, 25, 36-38, 40, 42, 43 | 103(a) | Paneccasio '875 | 16-21, 24, 25, 36-38, 40, 42, 43 | |
| 22, 23, 39 | 103(a) | Paneccasio '875 | 22, 23, 39 | |
| 41 | 103(a) | Paneccasio '875, Paneccasio '697 | 41 | |
| Overall Outcome | | | 16-25, 36-43 | |

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