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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* XIANG H. WANG, JIAN HUA MA, CHENGLIANG JIANG,  
and HOWARD KAPLAN

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Appeal 2018-001303  
Application 14/733,067  
Technology Center 1700

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Before KAREN M. HASTINGS, GEORGIANNA W. BRADEN, and  
WESLEY B. DERRICK, *Administrative Patent Judges*.

DERRICK, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE<sup>1</sup>

Appellant<sup>2</sup> seeks review under 35 U.S.C. § 134(a) from the Examiner's maintained rejections under 35 U.S.C. § 112, first paragraph of claims 1–3, 5–8, 10–13, and 19–25 as failing to comply with the written description requirement and 35 U.S.C. § 103 of claim 25 as obvious over

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<sup>1</sup> We refer to the Specification filed June 8, 2015 (“Spec.”), the Final Office Action mailed May 23, 2016 (“Final Act.”), the Appeal Brief filed May 24, 2017 (“Br.”), and the Examiner’s Answer mailed Sept. 19, 2017 (“Ans.”).

<sup>2</sup> The Appellant, Enzymatic Deinking Technologies, L.L.C., is also identified as the real party in interest. Br. 2.

Wang<sup>3</sup> in view of Lund,<sup>4</sup> as evidenced by Smook.<sup>5</sup> We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

#### CLAIMED SUBJECT MATTER

Appellant's invention relates to treating wood pulp "with an esterase formulation in combination with a metal ion or cationic polymer to increase the stability or activity or both of esterase enzymes . . . in order to enhance the reduction of pitch problems . . . in the manufacture of paper." Spec., Abstract.

Claims 1 and 25 are independent, and are reproduced below.

1. A method of enhancing the reduction of pitch deposition or controlling pitch related problems during the pulp and paper making process, the method comprising:

treating a pitch-containing pulp stock at a temperature from 80°C to 98°C with an enzyme formulation consisting essentially of one or more esterases (EC 3.1.1),

treating the pitch-containing pulp, prior to or during the treatment with the enzyme formulation, with one or more aluminum salts in an amount effective to stabilize the one or more esterases,

treating the pitch-containing pulp at a temperature below 80°C with one or more esterases.

25. A method of enhancing the reduction of pitch deposition or controlling pitch related problems during the pulp and paper making process, the method comprising:

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<sup>3</sup> Wang et al., US 2007/0261806 A1, published November 15, 2007.

<sup>4</sup> Lund et al., US 2005/0003516 A1, published January 6, 2005.

<sup>5</sup> Gary A. Smook, HANDBOOK FOR PULP & PAPER TECHNOLOGISTS, 222 (2d Ed., 1992).

treating a pitch-containing pulp stock at a temperature from 80°C to 98°C with one or more esterases (EC 3.1.1) and at a temperature below 80°C with one or more esterases, and

treating the pitch-containing pulp prior to or during the esterase treatment at a temperature from 80°C to 98°C with one or more aluminum salts, cationic polymer, or both in an amount effective to stabilize the one or more esterases.

Br. 21, 24 (Claims App.).

Claim 19, depending from claim 1, further recites “wherein the one or more esterases used to treat the pitch-containing pulp at a temperature below 80°C further comprise cellulose, hemicellulose, pectinase, amylase, or a combination thereof.” *Id.* at 23.

## DISCUSSION

We review the appealed rejection for error based upon the issues identified by appellants and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072 (BPAI) (precedential), cited with approval in *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.”). Upon consideration of the evidence and opposing contentions of Appellant and the Examiner, we are not persuaded that Appellant has identified harmful error in the Examiner’s decision rejecting the claims.

### *Written Description*

A Specification complies with the 35 U.S.C. § 112, first paragraph written description requirement if it “reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Ariad Pharm., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (citation omitted). Whether the written

description suffices is a question of fact. *Id.* A “description that merely renders the [claim] obvious does not satisfy the requirement.” *Id.* at 1352 (citing *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571–72 (Fed. Cir. 1997)). It is also not enough that the claims are enabled; “requiring a written description of the invention . . . curtail[s] claims that do not require undue experimentation to make and use, and thus satisfy enablement, but that have not been invented, and thus cannot be described.” *Id.*

The Examiner finds that the Specification does not have written description “support for two different enzyme formulations being applied and the enzyme formulations being applied at different temperatures.” Final Act. 5. In particular, the Examiner finds support lacking for the second-recited enzyme treatment set forth in independent claim 1, reciting “treating pitch-containing pulp, at a temperature below 80°C with one or more esterases,” and in independent claim 25, reciting “at a temperature below 80°C with one or more esterases.” *Id.* The Examiner further finds support lacking “for the second enzyme formulation contents” recited by claim 19 (*id.* at 6), discounting disclosure of such enzymes in the Specification because “they are not discloses [sic] as part of a second formulation at a temperature below 80 degrees C in addition to the first formulation at 80 to 98 degrees C” (*id.* at 4 (citing Spec. 8:14–24)).

As to claims 1–3, 5–8, 10–13, and 20–24, Appellant contends there is “adequate written description support of the claimed limitation of treating pitch-containing pulp with enzymes at two different temperatures.” Br. 9. Appellant relies on the Specification disclosing that “[t]he pulp methods described in the [S]pecification . . . ‘work at a temperature range from about 70 °C to 98 °C,’” “that certain enzyme formulations have a ‘working

temperature range . . . from about 55 °C to 85 °C, with an optimum from 65 °C to 80 °C,” and on “Examples 3 and 4 . . . describ[ing] the treatment with an enzyme formulation with and without alum ‘at different temperatures from 65 to 85 °C’ . . . and at ‘high temperatures from 75 to 90 °C.’” *Id.* (citing Spec., 5:9–12, 8:14–24; 12:6–9, 12:22–23). Appellant argues the written description suffices both because it is set forth “in such full, clear, concise, and exact terms as to enable any person skilled in the art . . . to make and use the same” and because “a person skilled in the art would recognize that one can treat pitch-containing pulp with enzymes at a temperature of 80°C to 98C and at a temperature below 80°C.” *Id.* Appellant relies on the Specification “not limit[ing] treating pitch-containing pulp(s) with a single enzyme at temperatures above 80C” and that “[t]he skilled artisan would recognize it would be advantageous to treat pitch-containing pulp(s) with enzymes . . . at their respective working or optimum conditions.” *Id.* at 9–10 (citing Spec. 5:1–12, 10:2–6).

On this record, we are not persuaded the Examiner erred in finding a lack of written description for the claimed limitation of treating pitch-containing pulp with enzymes at two different temperatures because Appellant’s arguments go to whether the disclosure would enable the skilled artisan to make and use the same, that is, to practice the claimed method, and to whether it would have been obvious in light of the Specification’s disclosure, neither of which suffice to meet the written description requirement. *Ariad*, 598 F.3d at 1351–52.

As to dependent claim 19, requiring that “the one or more esterases used to treat the pitch-containing pulp at a temperature below 80°C further comprise cellulose, hemicellulose, pectinase, amylase, or a combination

thereof,” Appellant relies on page 8, lines 14 to 24, of the Specification. Br. 10. The cited portion of the Specification points to the use of EnzOx® products and discloses that they “contain principally esterases, cellulases, hemicellulose, amylases, and pectinases.” Spec. 8:14–17. The Examiner does not squarely address Appellant’s argument as to claim 19, but relies instead on the lack of written description for a second enzyme formulation (or treatment), which is essentially the written description rejection of claim 1, discussed above. *See* Final Act. 4. In effect, claim 19 stands rejected for lack of sufficient written description because it depends from independent claim 1.

As to claim 25, Appellant simply relies on its contentions as to claims 1–3, 5–8, 10–13, and 20–24. Br. 10–11. As discussed above, Appellant fails to persuade us that the Examiner erred in finding the written description requirement is not met.

We affirm the written description rejection of claims 1–3, 5–8, 10–13, and 19–25 on the basis that there is not sufficient written description support for independent claims 1 and 25 as set forth by the Examiner.

*Obviousness Rejection of Claim 25*

Wang relates to methods of treating pulp stocks with enzyme formulations, including those containing esterases. Wang, Abstract. The Examiner relies on Wang for “disclos[ing] treating pulp which has been treated with alum with esterases. Final Act. 7 (citing Wang ¶ 8). The Examiner notes that alum is an aluminum metal salt, specifically, an aluminum sulfate, as evidenced by Smook. *Id.* (citing Smook, 222). As to the recited temperature range of 80°C to 98°C for treatment with one or more esterases, the Examiner relies further on Wang for disclosing an overlapping

temperature range of 30 to 95 degrees C and an abutting temperature range of 50 to 80 degrees C. *Id.* (citing Wang ¶ 8). The Examiner relies on the overlapping range supporting the prima facie obviousness of the recited temperature range. Ans. 4–5. As to the aluminum salts being provided in an amount effective to stabilize the one or more esterases, the Examiner relies on Wang’s treatment of the pulp “with enough alum to reach a pH of 4.5–5,” and on this pH range as stabilizing the enzymes. *Id.* at 8; see Wang ¶ 8.

Lund also relates to methods for treating a pulp that include an alkaline treatment and treatment with a pectin lyase and/or a pectate lyase. Lund, Abstract. Lund explains that pectin released from plant fibers during the pulping process “contribut[es] to a phenomenon known as anionic trash,” which “results in an over-consumption of cationic additives” used in the paper-making process. *Id.* ¶¶ 3–4. The Examiner relies on Lund for “disclos[ing] treating pulp with a pectin lyase” and for “disclos[ing] a preferred temperature of 40 to 70 degrees.” Final Act. 7 (citing Lund, Abstract, ¶ 68). The Examiner also relies on Lund for disclosing that use of pectin lyase decreases the cationic demand of the pulp. *Id.* (citing Lund ¶ 4).

The Examiner determines that one of ordinary skill in the art would have found it obvious at the time of the invention to combine the first enzyme treatment of Wang, which decreases pitch, with the second enzyme treatment of Lund, which decreases the cationic demand of the pulp. Final Act. 7.

Appellant contends that the cited prior art in combination does not teach every step of claim 25. Br. 15–16. Appellant argues that Lund’s temperature ranges fall within the temperature ranges of Wang, not outside of them, such that there is not disclosure of treating a pulp at two different

(opposing) temperature ranges. *Id.* at 16 (citing Lund, Abstract, ¶¶ 58, 68, 83, 120, 122, 124). Appellant also argues that the prior art fails to “teach or suggest the step of treating the pitch-containing pulp at a temperature from 80°C to 98°C with one or more aluminum salts in an amount effective to stabilize the one or more esterases” because “Wang is silent on the temperature required for the alum treatment” and “Lund and Smook are silent on enzymatic treatments including alum.” *Id.*

On this record, Appellant fails to establish the Examiner erred reversibly in determining that the cited combination teaches each step of claim 25. As explained by the Examiner, the temperature range of the first enzyme treatment is *prima facie* obvious on the basis of Wang’s disclosure of an overlapping range (Ans. 4–5), the temperature range of the second enzyme treatment is obvious on the basis of Lund’s disclosure of a second different enzyme treatment falling within that range (*id.* at 5), and Appellant fails to argue cogently that there is no motivation to combine the teachings (*id.*; *see generally* Br.). Also, as explained by the Examiner, Wang teaches addition of alum before enzyme addition, as well as during enzyme treatment, from which it follows that the pitch-containing pulp will be treated “during the esterase treatment at a temperature from 80°C to 98°C with one or more aluminum salts” upon the first enzyme treatment at the *prima facie* obvious temperature range of from 80 °C to 98 °C. Ans. 6 (citing Wang ¶¶ 8, 49).

Appellant also contends that the cited prior art provides no reasonable expectation of success because “one would not expect esterase enzymes to remain functional at temperatures between 80°C and 98°C.” Br. 17. Appellant relies on Lund’s disclosed examples “show[ing] that enzymatic

treatments occur at about 55°C” and its teaching deactivation of enzymes by “heat[ing] . . . above their optimal working temperatures, such as up to 85°C, and holding this temperature for 30 minutes.” *Id.* at 17–18 (citing Lund, Example 4). Appellant relies on Wang for teaching a preferred temperature range of “about 50°C to about 80°C” and using, in its examples, “temperatures of about 65C.” *Id.* at 18 (citing Wang ¶¶ 8, 52).

On this record, Appellant fails to establish that there is no reasonable expectation of success. As set forth by the Examiner, Wang explicitly discloses the range of 30 to 95 °C for its esterase treatment, which is sufficient even if a different range is preferred. Ans. 6–7. Also, as set forth by the Examiner, Lund’s teaching that a different enzyme with a different preferred temperature range does not counteract the teaching of Wang. *Id.* Further, claim 25 does not require “enhancing the reduction of pitch deposition,” as Appellant contends, for at least the reason that this is recited in the alternative in the preamble with “controlling pitch related problems.” This alternative purpose also appears met by the relied-on combination where there is no recited level of reduction in the level of pitch.

Appellant contends that the results are unpredictable from the cited art, and relies on the increase in the enzyme’s effective working temperatures, and broader pH range, allowing greater effectiveness and other benefits. Pet. 18–19 (citing Spec., 5:14–22). Generally, Appellant emphasizes predictability as “key to determining obviousness.” *Id.* at 12 (citing *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 401 (2007)). Specifically, Appellant relies on Example 4 and Figures 3 and 4 demonstrating an improvement in enzyme thermostability. *Id.* at 19 (quoting Spec. 12:27–13:5). Appellant argues “[t]he cited art in

combination does not even hint at improving enzyme thermostability with metal ions or polymers.” *Id.* Appellant contends “Wang is silent as to the concentration of alum used . . . or the temperature at which alum is used” and that “Lund is silent on alum.” *Id.* Appellant argues it is “Appellant’s disclosure [that] provides that the addition of metal ions or cationic polymers to the pulp prior to enzyme treatment stabilizes the enzyme formulation and speed up the enzymatic reactions at high temperature and broader pH range.” *Id.* On these bases, Appellant contends “[n]othing in the cited art in combination makes claim 25 predictable, or provides a reasonable expectation that a method falling within the scope of claim 25 will be successful at enhancing the reduction of pitch deposition.” *Id.* at 20.

As to Appellant’s emphasis on predictability as “key to determining obviousness,” Appellant provides no argument that the combination would not reasonably be expected to provide both the benefit of an effective esterase treatment, as taught by Wang, and an effective pectin lyase treatment, as taught by Lund. We find, however, there is a basis for the combination to obtain the benefit of both enzyme treatments, as set forth by the Examiner, and discussed above.

Contrary to Appellant’s contention, claim 25 does not require “enhancing the reduction of pitch deposition” relative to enzyme treatment without alum stabilization, for at least the reason, discussed above, that it is recited in the alternative with “controlling pitch related problems.” As to “improving enzyme thermostability with metal ions or polymers” not being specifically disclosed by the cited prior art, the Examiner notes, correctly, both that no particular degree of stabilization is required and that the claim simply requires *stabilizing* the one or more esterases, not increasing their

*thermostability*. Ans. 8. Such “arguments fail from the outset because . . . they are not based on limitations appearing in the claims.” *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982).

On this record, further, we discern insufficient cogent argument that the addition of alum relied on by the Examiner would not stabilize the enzyme formulation, as Appellant contends only that the increased thermostability is not disclosed. Br. 19. This is not adequate to establish the Examiner erred. *Cf. In re Lovin*, 652 F.3d 1349, 1357 (Fed. Cir. 2011) (“[W]e hold that the Board reasonably interpreted Rule 41.37 to require more substantive arguments in an appeal brief than a mere recitation of the claim elements and a naked assertion that the corresponding elements were not found in the prior art. Because Lovin did not provide such arguments, the Board did not err in refusing to separately address claims 2–15, 17–24, and 31–34.”); *see also DeSilva v. DiLeonardi*, 181 F.3d 865, 867 (7th Cir. 1999) (“A brief must make all argument accessible to the judges, rather than ask them to play archaeologist with the record.”). Moreover, in not filing a Reply Brief, Appellant declined to respond to the Examiner’s further findings as to the stabilization of enzymes by adjusting the pH by addition of alum (Ans. 8), and these are not shown to be erroneous on this record. *Cf. In re Kunzmann*, 326 F.2d 424, 425 n.3 (CCPA 1964) (“Findings of the Examiner not shown to be erroneous may be accepted as fact.”).

Turning to Appellant’s further reliance on the results as unpredictable, we find them inadequate to rebut the prima facie case of obviousness. To establish patentability on the basis of unexpected results, Appellant must show that the claimed invention imparts unexpected results and that the unexpected results are reasonably commensurate with the scope of

protection sought by the claim on appeal. *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983); *In re Clemens*, 622 F.2d 1029, 1035 (CCPA 1980); *In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972). Appellant directs us to no basis for the results being unexpected. *See generally* Br. Critically, the test is not that the cited prior art does not teach the result, but rather that the result, at the time of invention, would have been unexpected. As to the results being commensurate with claim 25, Appellant fails to sufficiently explain how, or if, the tests performed including EnzOx® B treatment with alum addition establish unexpected results over the breadth of claim 25, which recites treatment with “one or more aluminum salts, cationic polymer, or both in an amount effective to stabilize the one or more esterases.” For these reasons, Appellant has not shown evidence of unexpected results commensurate with the scope of the claims. *See In re Harris*, 409 F.3d 1339, 1343 (Fed. Cir. 2005) (holding that the applicant must show unexpected results covering the scope of the claimed range or narrow the claims).

Accordingly, none of the arguments apprise us of reversible error in the rejection of claim 25 over Wang in view of Lund.

#### DECISION

The Examiner’s rejection of claims 1–3, 5–8, 10–13, and 19–25 under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement is affirmed.

The Examiner rejection of claim 25 under 35 U.S.C. § 103 is affirmed.

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

AFFIRMED