

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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REACTIVE SURFACES LTD., LLP,  
Petitioner,

v.

TOYOTA MOTOR CORPORATION,  
Patent Owner.

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Case IPR2018-01194  
Patent 9,193,873 B2

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Before SUSAN L.C. MITCHELL, CHRISTOPHER M. KAISER, and  
MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

MITCHELL, *Administrative Patent Judge*.

DECISION  
Denying Institution of *Inter Partes* Review  
35 U.S.C. § 314(a)

## I. INTRODUCTION

Reactive Surfaces Ltd., LLP (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–5 of U.S. Patent 9,193,873 B2 (the “’873 patent”). Paper 2 (“Pet.”). Toyota Motor Corporation (“Patent Owner”)<sup>1</sup> filed a Preliminary Response to the Petition. Paper 7 (“Prelim. Resp.”).

We have authority under 35 U.S.C. § 314(a) to determine whether to institute an *inter partes* review. To institute an *inter partes* review, we must determine that the information presented in the Petition shows “a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). On April 24, 2018, the Supreme Court held that a decision to institute under 35 U.S.C. § 314(b) may not institute review on less than all claims challenged in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1355–56 (2018). Also, in accordance with USPTO Guidance, “if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition.” *See Guidance on the Impact of SAS on AIA Trial Proceedings* (April 26, 2018) (available at <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial>).

Applying those standards, and upon consideration of the information presented in the Petition and the Preliminary Response, we conclude that Petitioner has not established a reasonable likelihood that it would prevail in showing the unpatentability of any challenged claim of the ’873 patent. Therefore, we do not institute an *inter partes* review of claims 1–5 of the ’873 patent.

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<sup>1</sup> Patent Owner identifies the Regents of the University of Minnesota as a co-assignee of the subject patent. *See* Paper 6, 1.

A. *Related Proceedings*

Patent Owner identifies a declaratory judgment action filed by Petitioner against Patent Owner in district court concerning a declaration of rights with respect to the application that resulted in the '873 patent. *See* Paper 6, 2 (citing *Reactive Surfaces Ltd. LLP v. Toyota Motor Corporation*, Case No. 1:14-CV-1009-LY (W.D. Tex.)). Patent Owner states that the complaint was dismissed without prejudice. *Id.* Petitioner identifies a second case that it filed against Patent Owner also seeking declaratory judgment with regard to certain rights in the '873 patent: *Reactive Surfaces Ltd. LLP v. Toyota Motor Corporation*, Case No. 1:13-CV-1098-LY (W.D. Tex.). Pet. 2.

Patent Owner also identifies three other petitions for *inter partes* reviews that Petitioner has filed concerning other patents owned or co-owned by Patent Owner: IPR2016-01462 (U.S. Patent No. 8,324,295 B2); IPR2016-01914 (U.S. Patent No. 8,394,618 B2); and IPR2017-00572 (U.S. Patent No. 8,252,571 B2), which Petitioner states the Board instituted. Paper 6, 2; Pet. 2.

B. *The '873 Patent (Ex. 1001)*

The '873 patent describes a protein-polymer composite material for removing bioorganic stains from a surface produced by mixing an aqueous solution containing bioactive proteins, such as amylases, with an admixture of a polymer resin, a surfactant, and a non-aqueous organic solvent. Ex. 1001, Abst., 1:33–56. The resulting emulsion from such a mixture is then mixed with a crosslinker producing a curable composition that, when

cured, produces a protein-polymer composite material that is useful for facilitating removal of bioorganic stains. *Id.*

Figure 1B of the '873 patent, shown below, illustrates a flow diagram of a process to manufacture a bioactive material according to an embodiment of the claimed invention.

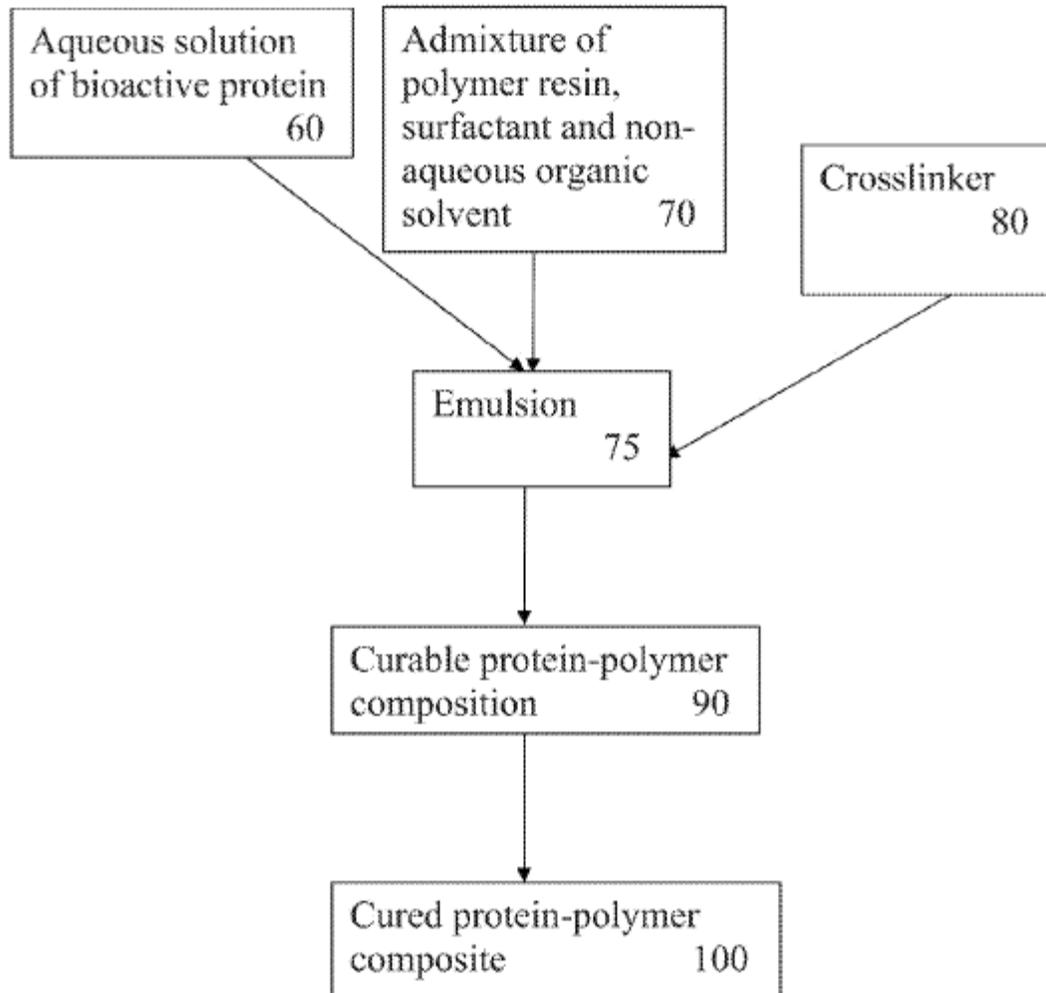


Figure 1B depicted above shows the creation of an emulsion with a bioactive protein to which a crosslinker is added, and the resulting mixture is

then cured to make the protein-polymer composite. *See* Ex. 1001, 9:48–56.

The Specification of the '873 patent further states:

Curable protein-polymer compositions according to embodiments of the present invention include two-component solvent-borne (2K SB) compositions optionally where the two components are mixed shortly before use, for instance, application of the curable protein-polymer composition to a substrate to form a bioactive coating such as a bioactive clear coat. Generally described, the first component contains a crosslinkable polymer resin and the second component contains a crosslinker. Thus for example, referring to FIG. 1B, the emulsion **75** is a first component containing a crosslinkable resin and the crosslinker **80** is a second component, mixed together to produce the curable protein-polymer composition.

*Id.* at 10:4–16.

The Specification of the '873 patent defines a “bioorganic stain” as “a stain mark, or residue left behind after an organic material contacts a surface.” *Id.* at 3:38–40. Some examples include food, such as starch containing foods; insect wings, legs, or other appendages; bird droppings; and fingerprints. *Id.* at 3:40–50.

The Specification of the '873 patent describes the active agent as one or more amylases or analogues thereof that can aid in removal of one or more starches. *Id.* at 3:50–54. Specifically, it is disclosed that:

It was unexpectedly discovered that amylases are superior proteins for incorporation into protein-polymer materials. Amylases are both stable in polymeric materials and show unexpectedly high activity toward particular bioorganic stains such as stains from foods. More surprisingly, amylases show significant heat and time stability when incorporated into 2K solvent borne (SB) coatings as compared to other coating types such as water borne (WB) coatings. This unexpectedly high stability is particularly observed in 2K solvent-borne polyurethane coatings.

*Id.* at 3:55–64.

C. *Illustrative Claim*

Petitioner challenges claims 1–5 of the '873 patent. Claim 1 is illustrative and reproduced below:

1. A protein-polymer composite material, comprising:  
one or more amylases dispersed in a two component non-aqueous organic solvent-borne polymer resin, said amylase in the form of a particle with an average particle size, wherein said average particle size in the protein-polymer composite material is in the range of 10  $\mu\text{m}$  (average diameter) or less.

Ex. 1001, 20:8–14.

Claim 1 is the only independent claim, and claims 2–5 directly depend from claim 1. *Id.* at 20:15–22.

D. *The Asserted Grounds of Unpatentability*

Petitioner contends that the challenged claims are unpatentable under 35 U.S.C. §§ 102 and 103 based on the following grounds. Pet. 31.

| Reference[s]                                  | Basis    | Claims challenged |
|---|----------|-------------------|
| McDaniel <sup>2</sup> and Selvig <sup>3</sup> | § 103    | 1–5               |
| Schneider <sup>4</sup>                        | § 102(b) | 1, 4, 5           |
| Schneider and Adams <sup>5</sup>              | § 103    | 2, 3              |

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<sup>2</sup> C. Steven McDaniel, US 2004/0109853 A1, published June 10, 2004 (“McDaniel”). Ex. 1004.

<sup>3</sup> Thomas Allan Selvig, Richard Irwin Leavitt, Warren Paul Powers, U.S. Patent No. 5,919,689, issued July 6, 1999 (“Selvig”). Ex. 1005.

<sup>4</sup> Ib Schneider and Knud Allermann, US 2005/0147579 A1, published July 7, 2005 (“Schneider”). Ex. 1006.

<sup>5</sup> Jerome T. Adams et al., US 2007/0282070 A1, published Dec. 6, 2007 (“Adams”). Ex. 1007.

Petitioner also relies on the Declaration of J. David Rozzell, Ph.D. (“Rozzell Declaration”). Ex. 1008; *see generally* Pet. 8–52.

## II. ANALYSIS

### A. *Application of 35 U.S.C. § 325(d)*

Patent Owner asks that we use our discretion under 35 U.S.C. § 325(d) to deny an *inter partes* review of the ground involving McDaniel and Selvig. Prelim. Resp. 2–3, 15–16, 25–28. Patent Owner disputes Petitioner’s conclusion that it would have been obvious to combine Selvig, which teaches the use of amylase, with McDaniel by dispersing an amylase in a two-component, non-aqueous, organic solvent-borne polymer resin. Prelim. Resp. 26. Patent Owner asserts that the portions in Selvig on which Petitioner relies teach the use of amylase in materials that contain no organic solvents. *Id.* Patent Owner asserts that we should exercise our discretion to deny an *inter partes* review based on the McDaniel and Selvig ground because the Office has considered already and was not persuaded by the argument “that the dispersion of amylase in *non-aqueous, organic solvent-borne* polymers would have been obvious over a prior art disclosure[, such as Selvig,] teaching the use of amylase only in *organic solvent-free* materials.” *Id.*

In further briefing that we authorized, *see* Paper 8, Petitioner refutes Patent Owner’s assertion that Selvig does not teach a dispersion of amylase in non-aqueous organic solvent-borne polymer systems. Paper 9, 1–4. Patent Owner counters that

While Selvig’s materials are not water-borne . . . , Petitioner has still not shown that Selvig teaches *organic solvent-borne* formulations . . . . Nor has Petitioner explained why a reference teaching the use of amylase in a solvent-free system (i.e., a system with *no* aqueous *or* organic solvent) is any stronger than

one teaching the use of amylase in a water-borne system (i.e., a system with an aqueous, but *no organic*, solvent), where the relevant issue is the existence of a motivation and a reasonable expectation of success for dispersing amylase in *organic solvent-borne* polymers.

Paper 10, 2.

We find that instead of analyzing whether there are differences between the art asserted in this Petition and that discussed during prosecution of the '873 patent, it is more efficient to resolve our decision on institution on the merits presented in the Petition. Because we find that Petitioner has no reasonable likelihood of prevailing on any ground presented in the Petition and, therefore, deny institution, we decline to exercise our discretion under 35 U.S.C. § 325(d) to deny the Petition.

B. *Person of Ordinary Skill in the Art*

Petitioner's declarant, Dr. Rozzell, asserts that a person having ordinary skill in the art ("POSITA") at the time of the '873 patent's invention "would have at least a bachelor's degree plus 5 or more years of experience, or a Masters or Ph.D. degree with 2 or more years of experience in chemistry, biochemistry, biochemical engineering, or a related discipline." Ex. 1008 ¶ 30. Patent Owner disagrees with this definition "to the extent that it requires no specialized knowledge and training in the formulation of protein-polymer materials." See Prelim. Resp. 12; Ex. 2001 ¶ 21.

Dr. Dordick, Patent Owner's declarant, states that "[t]he '873 Patent is directed to *enzyme-containing* materials, and processes of preparing the same. . . . However, Dr. Rozzell's definition of one [of] ordinary skill in the art could include a person without experience in preparing, characterizing and using *enzyme-containing* materials." Ex. 2001 ¶ 22. Dr. Dordick

concludes that such a “person lacking such experience would not be familiar with the complications and associated specialized techniques for distributing and stabilizing bioactive materials such as proteins (e.g., enzymes) or peptides in nonaqueous formulations, such as the bioactive materials involved in the claims of the ’873 Patent.” *Id.*; *see* Prelim. Resp. 12–13 (stating that processing conditions under which a protein is immobilized may introduce structural changes that can diminish or deactivate the protein’s catalytic activity). Dr. Dordick’s definition of a POSITA requires experience in research and development of bioactive materials. *Id.*

On this record and at this stage of the proceeding, we agree with Petitioner’s definition of a POSITA as Dr. Rozzell’s testimony supports. *See* Ex. 1008 ¶¶ 29–30. Dr. Rozzell testifies that when defining a POSITA, he considered the types of problems encountered by those working in the field and prior art solutions thereto, the sophistication of the technology in question, the rapidity with which innovations occur in the field, and the education levels of active workers in the field and of the inventors. *Id.* at ¶ 29. We agree with Dr. Rozzell based on our assessment of these factors that a POSITA would have at least a bachelor’s degree plus 5 or more years of experience, or a Masters or Ph.D. degree with 2 or more years of experience in chemistry, biochemistry, biochemical engineering, or a related discipline, but would not necessarily have the years of experience in “research and development of bioactive materials” that Dr. Dordick states a POSITA must possess.

The ’873 patent discloses that known methods of use for bioactive materials are employed, and such methods are not so unpredictable as to require such a single-minded focus by a POSITA in an area of research and development of bioactive materials. *See* Ex. 1001, 4:53–54 (“Methods of

screening for protein enzymatic activity are known and standard in the art.”), 6:38–43 (“The importance of the hydrophobic amino acid index in conferring interactive biologic function on a polypeptide is generally understood in the art. It is known that certain amino acids can be substituted for other amino acids having a similar hydrophobic index or score and still result in a polypeptide with similar biological activity.”). Also, it is not clear from the record evidence what “complications and associated specialized techniques for distributing and stabilizing bioactive materials such as proteins in nonaqueous formulations” Dr. Dordick is referencing to require a POSITA to possess specific, sustained years of involvement in research and development of bioactive materials.

At this stage of the proceeding and based on the record before us, we find that one of skill in the art “would have at least a bachelor’s degree plus 5 or more years of experience, or a Masters or Ph.D. degree with 2 or more years of experience in chemistry, biochemistry, biochemical engineering, or a related discipline,” and also find on this record that Drs. Rozzell and Dordick are at least of ordinary skill under this standard. *See* Ex. 1008 ¶¶ 11–23; Ex. 1015; Ex. 2001 ¶¶ 8–19, Appendix A.

We further note that the prior art itself demonstrates the level of skill in the art at the time of the invention. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining that specific findings regarding ordinary skill level are not required “where the prior art itself reflects an appropriate level and a need for testimony is not shown”) (quoting *Litton*

*Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)).

### C. Claim Construction

In an *inter partes* review, the Board interprets claim terms in an unexpired patent according to the broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R.

§ 42.100(b) (2016);<sup>6</sup> *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142 (2016) (affirming applicability of broadest reasonable construction standard to *inter partes* review proceedings). “Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history.” *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016). Any special definitions for claim terms must be set forth with reasonable clarity, deliberateness, and precision. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Only terms in controversy must be construed and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner provides a proposed construction of the claim term “two component non-aqueous organic solvent-borne polymer resin,” which Patent Owner does not dispute at this stage of the proceeding. *See* Pet. 10–16;

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<sup>6</sup> The Final Rule changing the claim construction standard to the federal court claim construction standard that is used to construe a claim in a civil action under 35 U.S.C. § 282(b) does not apply here, as the Petition was filed before the effective date of the Final Rule, November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,340, 51,344 (Oct. 11, 2018).

Prelim. Resp. 14. According to Petitioner, this claim term means “a non-aqueous organic solvent-borne polymer resin capable of being combined with another material composition to cause a change in the final composition of the polymer resin.” Pet. 16 (citing Ex. 1008 ¶¶ 80–83). Petitioner points to two disclosures in the Specification of the ’873 patent, the first describing two component solvent-borne compositions and the second describing amylase being dispersed within a polymer resin or a two component material composition comprising a polymer resin. See Pet. 12–15 (quoting Ex. 1001, Abst., 1:57–59, 9:37–63, 14:54–64, 2:10–11, 14:45–46, 9:9–14, 9:30–36, 18:3–5).

Based on the record before us and review of the cited teachings in the Specification of the ’873 patent, we agree with Petitioner that the term “two component non-aqueous organic solvent-borne polymer resin” means “a non-aqueous organic solvent-borne polymer resin capable of being combined with another material composition to cause a change in the final composition of the polymer resin.”

We determine that we need not expressly construe any other terms for purposes of determining whether to institute an *inter partes* review in this case. See *Vivid Techs.*, 200 F.3d at 803.

#### D. *Principles of Law*

To establish anticipation, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008); *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). “A reference anticipates a claim if it discloses the claimed invention ‘such that a skilled artisan could take its teachings in combination with his

own knowledge of the particular art and be in possession of the invention.” *In re Graves*, 69 F.3d 1147, 1152 (Fed. Cir. 1995) (internal citation and emphasis omitted). Moreover, “it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.” *In re Preda*, 401 F.2d 825, 826 (CCPA 1968); *see Eli Lilly v. Los Angeles Biomedical Res. Inst.*, 849 F.3d 1073, 1074–75 (Fed. Cir. 2017).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). “Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant’s disclosure.” *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988).

In that regard, an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 550 U.S. at 418; *see Translogic*, 504 F.3d at 1259. In *KSR*, the Supreme Court also stated that an invention may be found obvious if trying a course of conduct would have been obvious to a person having ordinary skill.

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

550 U.S. at 421. “*KSR* affirmed the logical inverse of this statement by stating that § 103 bars patentability unless ‘the improvement is more than the predictable use of prior art elements according to their established functions.’” *In re Kubin*, 561 F.3d 1351, 1359–60 (Fed. Cir. 2009) (citing *KSR*, 550 U.S. at 417).

We analyze the asserted grounds of unpatentability in accordance with the above-stated principles.

#### E. *Obviousness over McDaniel and Selvig*

Petitioner asserts that claims 1–5 of the ’873 patent are unpatentable as obvious over McDaniel and Selvig. Pet. 34–42. Patent Owner advances several arguments in response to Petitioner’s assertions. Prelim. Resp. 14–33.

##### 1. *McDaniel (Ex. 1004)*

McDaniel “relates generally to the field of biological molecules as components of coatings conferring an activity or other advantage to the coating proteinaceous molecule related to the biological molecule.” Ex. 1004 ¶ 3. More specifically, McDaniel describes “compositions and methods for incorporating biological molecules into coatings in a manner to retain biological activity conferred by such biological molecule.” *Id.* ¶ 21.

The coating that McDaniel teaches “comprises a bioactive molecule such as an enzyme composition that retains activity after being admixed with

paint” and “still retains activity after the paint is applied to a surface, and renders the surface bioactive.” *Id.* ¶ 23. McDaniel teaches that, in general, “the coating comprises a binder, a liquid component, a colorant, an additive, or a combination thereof.” *Id.* ¶ 46. In a detailed description of the invention, McDaniel offers a compendium of biomolecules, such as enzymes, and recombinant processes for producing such enzymes, as well as a compendium of the components of coatings using such biomolecules. *See generally id.*

### 2. *Selvig (Ex. 1005)*

Selvig relates to marine antifouling methods, paints, and compositions. Ex. 1005, 1:4–5. Selvig states the following:

Compositions and/or paints according to the invention may include various hydrolytic enzymes, although it is possible to practice the invention without such hydrolytic enzymes. Examples of suitable enzymes include proteases, amylases, and other hydrolytic enzymes known in the art. The hydrolytic enzymes selected should act to prevent or reduce attachment by unwanted or undesirable marine organisms. The hydrolytic enzymes chosen should be able to survive and flourish in the marine environment to which they will be exposed.

*Id.* at 6:8–17.

Selvig provides examples of such marine coatings or paints using alpha-amylases. *See id.* at 6:65–8:15 (Example 1), 10:27–60 (Example 7); 12:9–50 (Example 10).

### 3. *Analysis*

Petitioner provides an analysis of how each claim limitation of the challenged claims is met by the disclosure of McDaniel and Selvig. *See Pet.* 32–42. For instance, Petitioner states that McDaniel teaches “one or more amylases dispersed in a two component non-aqueous organic solvent-borne

polymer resin” by pointing to coatings whose components are provided in a multi-pack format and admixed prior to or during application of the coating, and to a polymeric composition like paint that has a proteinaceous molecule, such as a hydrolase, dispersed therein by known methods. *See id.* at 35– 37 (citing e.g., Ex. 1004, 32:5–7, 83:1–15, 100:1–18, 101:1–12, 359:28–34, 299:2–7, 299:36–43).<sup>7</sup>

Petitioner specifically points to McDaniel’s disclosure regarding a polyamide-epoxy coating, comprising a two-pack coating of polyamide resin and epoxy resin, as teaching a two component solvent-borne (2KSB) polymer resin composition. *Id.* at 22–23, 35 (citing Ex. 1004 ¶ 437:22–30). Petitioner also relies on McDaniel’s teaching concerning smaller particle size being conducive to a higher gloss property of a coating, along with Dr. Rozzell’s testimony that controlling particle size with dispersion of such particles was known, to teach the average claimed particle size for amylase. *Id.* at 38–39.

Finally, Petitioner notes that although it may have been obvious from McDaniel’s disclosure that the enzyme would be amylase, McDaniel does not explicitly disclose that the enzyme in the protein-polymer composite material would be amylase or alpha amylase. *Id.* at 37. Petitioner, instead, relies on Selvig for such an explicit teaching of alpha amylase. *Id.* at 37–38.

Petitioner proposes that a POSITA would have combined the teachings of McDaniel and Selvig to arrive at the claimed invention because “Selvig teach[es] that enzymes used within a protein-polymer composition thereof, which can be alpha-amylase, are useful in marine antifouling

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<sup>7</sup> Petitioner’s citations to McDaniel refer to the particular paragraph and line numbers of that paragraph.

compositions and McDaniel similarly teach[es] that examples of uses of protein-polymer compositions thereof include marine coatings that resist fouling.” *Id.* at 38 (citations omitted). Petitioner also asserts that such a reason to combine the teachings of McDaniel and Selvig is shown by Dr. Rozzell’s testimony that “it was known prior to the time of filing of the ’873 patent that ‘Amylases are within the sub-category of hydrolases,’ the ‘hydrolases are well known and have been extensively studied,’ and that an amylase would be expected to function under conditions similar to those under which other hydrolases are able to function.” Pet. 38 (citing Ex. 1008 ¶¶ 55–57, 70).

Patent Owner first asserts that McDaniel does not teach the claimed polymer composite material and that it never teaches dispersing proteins in a two-component, non-aqueous, organic solvent-borne polymer resin. Prelim. Resp. 18–25. We agree with Patent Owner that McDaniel’s description of the three-pack coating does not identify a component other than a “microorganism based particulate material,” and the two-pack example does not specify any protein. *See* Ex. 1004 ¶¶ 299, 437; Prelim. Resp. 19. We also agree with Patent Owner that Petitioner fails to show where McDaniel discloses a “non-aqueous organic solvent” as a component of the cited multi-pack coating. *See* Pet. 35–38; Ex. 1004 ¶¶ 299, 437; Prelim. Resp. 19; *see also* Ex. 1008 ¶ 48 (Dr. Rozzell stating that the “solvent-borne coatings disclosed by McDaniel are broad in scope. In his description of solvent-borne coatings, McDaniel discloses liquid components that may be water or non-aqueous, and may include both water and non-aqueous components.”). We also agree that Petitioner falls short of identifying where McDaniel teaches that proteins are dispersed in a two-component non-aqueous organic

solvent-borne polymer resin. *See* Prelim. Resp. 21–25; Ex. 1008 ¶¶ 47–48, 51–53 (discussing two-component solvent-borne coatings and resins).

Patent Owner also asserts that in addressing whether McDaniel teaches dispersing enzymes in a two-component non-aqueous organic solvent-borne polymer resin,

Petitioner merely picks and chooses individual coating components from McDaniel’s 115-page disclosure while appearing to suggest that these components could somehow be combined together to achieve the ‘dispersion’ of enzymes in a ‘two-component non-aqueous organic solvent-borne polymer resin.’ But Petitioner completely fails to explain either *how* a person of ordinary skill in the art would actually implement such a combination or *why* the PHOSITA would even pursue it.

Prelim. Resp. 1–2.

We agree with Patent Owner that Petitioner fails to provide a persuasive explanation as to why one of skill in the art would have combined the teachings from disparate portions of McDaniel, and then added the use of amylase as Selvig teaches, to arrive at the claimed invention. For instance, in demonstrating whether McDaniel teaches “one or more amylases dispersed in a two component non-aqueous organic solvent-borne polymer resin,” Petitioner relies on McDaniel’s teaching of a three-pack coating “wherein the first container and the second container contain coating components separated to reduce[] film formation during storage and a third container comprises microorganism based particulate material and wherein the components of such a multi-pack coating are admixed prior to and/or during application.” Pet. 35 (citations and emphasis omitted). Petitioner then cites to a more specific disclosure concerning a polyamide-epoxy coating comprising a two-pack coating with the polyamide resin in one container and the epoxy resin in the other ostensibly to show a teaching of a

two-component, non-aqueous, solvent-borne polymer resin. *Id.* (citing Ex. 1004 ¶ 437:22–30); Ex. 1008 ¶¶ 48, 66.

Petitioner then points to the general disclosure in McDaniel that “the biomolecular composition such as a microorganism based particulate material used in coating thereof can be a biomolecule and that proteinaceous molecules such as a protein and enzymes are examples of such a biomolecule[, and] that the protein can be a hydrolase . . . having a glycosyl released/transferred moiety.” Pet. 36 (citing Ex. 1004, 32:5–7, 90:1–4, 91:1–4, 27–7, 23:1–6, 1216:1–13, 289:1–18, 125:9–12, 129:1–6). And, with regard to the dispersal of amylases in the required resin, Petitioner states that

McDaniel discloses that ‘microorganism derived particulate material will also be a source of particulate material in a coating’ and ‘any technique used in the preparation of a coating that comprises a pigment, extender or any other form of particulate material described herein or would be known to one of ordinary skill in the art may be applied in the preparation of a coating comprising the microorganism derived particulate material of the present invention.

*Id.*

Finally, with regard to the claimed average particle size of the amylase dispersed in the resin, Petitioner points to McDaniel’s teaching that the size of particulate matter in a coating can affect gloss, and that smaller particle sizes are generally more conducive for a higher gloss property of a coating or film. Pet. 39. Petitioner relies on Dr. Rozzell’s testimony concerning the particle size of alpha-amylase and larger aggregates of alpha-amylase, and that “controlling bioactive protein size in a manner consistent with ‘dispersion’ of such bioactive protein particles was known prior to the filing date of the ’873 Patent.” *Id.* at 39 (citing Ex. 1008 ¶¶ 35–46).

We agree with Patent Owner that Petitioner does not provide a sufficient rationale as to why one of skill in the art would have looked to these disparate teachings in McDaniel and combined them with Selvig's teaching to use amylase to arrive at the claimed invention. Regardless of whether an obviousness challenge is based on the combination of disclosures from multiple references or a single reference, "[a]n obviousness determination requires finding both 'that a skilled artisan would have been motivated to combine the teachings of the prior art . . . and that the skilled artisan would have had a reasonable expectation of success in doing so.'" *In re Stephan Co.*, 868 F.3d 1342, 1346, 1346 n.1 (quoting *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016)). We agree with Patent Owner that "Petitioner merely identifies certain coating components and processing steps in McDaniel without offering any rationale, even one based on hindsight, as to how or why those components and steps would have been combined to achieve the claimed composite material." Prelim. Resp. 25. Petitioner merely offers a rationale as to why one of skill in the art would have combined the teachings of McDaniel and Selvig to arrive at the claimed invention, but offers no reason why one of skill in the art would have picked and chosen among McDaniel's teachings to combine them to arrive at the claimed invention. *See* Pet. 36–37.

We find that Petitioner has failed to show a reasonable likelihood that it would prevail in showing the unpatentability of claims 1–5 of the '873 patent based on McDaniel and Selvig.

F. *Anticipation by Schneider and Obviousness  
Over Schneider and Adams*

Petitioner asserts that claims 1, 4, and 5 of the '873 patent are unpatentable as anticipated by Schneider. Pet. 42–48, 51–52. Petitioner also

asserts that claims 2 and 3 of the '873 patent are unpatentable as obvious over Schneider and Adams. Patent Owner advances several arguments in response to Petitioner's assertions. Prelim. Resp. 33–34.

*1. Schneider (Ex. 1006)*

Schneider describes “a coating composition comprising at least one enzyme capable of acting on a compound, wherein said action results in the formation of an antifouling species comprising an antifouling activity, and wherein said compound does not form part of said coating composition.”

Ex. 1006, Abst. More specifically, Schneider states the following.

The coating compositions of the invention are capable of reducing and/or eliminating fouling in the form of microbial growth and/or the formation of bio-film on objects coated with the composition. . . .

In selecting the at least one enzyme of the coating composition one must take into consideration—among other things—the type of surface being protected, the environment in which the surface is found, and the organism against which protection is being sought.

*Id.* ¶¶ 125–126. Schneider further states that enzymes or precursor enzymes capable of degrading polysaccharides are desirable to combine with an oxidase the activity of which results in the production of peroxide. *Id.* ¶ 82. Schneider then mentions that “in a still further embodiment the at least one enzyme/precursor enzyme is a polysaccharide digesting enzyme, such as, but not limited to, alpha-amylase, beta-amylase, beta-glucosidase, glucosidase, glycosidase, cellulose, pectinase, hyaluonidase, beta-glucuronidase.” *Id.* ¶ 83.

Concerning the components of its compositions, Schneider states that “compositions and/or paints may be polymeric, oligomeric, monomeric, and may contain cross-linkers or cure promoters as needed,” and “[a]ny suitable

surface coating material may be incorporated in the composition and/or coating of the present invention.” *Id.* ¶¶ 225, 253. Schneider provides examples of such trade-recognized coating materials. *Id.* ¶ 253.

## 2. Analysis

For the anticipation ground based on Schneider, Petitioner points to disparate disclosures in Schneider to cobble together teachings concerning the various limitations of the challenged claims. *See* Pet. 42–52. For instance, with regard to the claim requirement of “one or more amylases dispersed in a two component non-aqueous organic solvent-borne polymer resin,” Petitioner points to Schneider’s general teaching that the coating compositions are capable of reducing fouling, and that alpha-amylase is one of several examples of an enzyme that may be used in the compositions. *See id.* at 44 (citing Ex. 1006 ¶¶ 83, 125). Petitioner then points to a general description of the compositions and also a listing of trade-recognized coating materials as examples of the two component non-aqueous organic solvent-borne polymer resins. *Id.* at 45 (citing Ex. 1006 ¶¶ 225, 253).

For a teaching of the dispersion of amylases, Petitioner points to a statement that the coating can comprise a binder to immobilize a constituent, such as an enzyme, and an example that lists a “dispersion agent” and “a polysaccharide degrading enzyme” as part of Schneider’s composition. Pet. 46–47 (citing Ex. 1006 ¶¶ 247, 252, 302; Ex. 1008 ¶ 113).<sup>8</sup>

Petitioner concludes the following:

A POSITA would recognize that solvent-based acrylic resins and methacrylate resins (e.g., derivatives thereof including a

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<sup>8</sup> We also agree with Patent Owner that the mere listing of a dispersion agent here does not mean necessarily that it is included to achieve the dispersion of the enzyme. *See* Prelim. Resp. 37.

suitable functional group), and polyester resins, epoxy resins and urethane resins are all well-known to be components of a two component solvent-borne coating material (e.g., a paint). More specifically, a POSITA would recognize that the industry standard utilization of acrylic resins and methacrylic resins, polyester resins, and epoxy resins as the polymer resin component (e.g., component one) of a two component solvent-borne coating material.

*Id.* (citing Ex. 1008 ¶¶ 110–112).

Nowhere in Petitioner’s recitation of how the teachings of Schneider read on the challenged claims of the ’873 patent does Petitioner show where Schneider discloses each and every element in a challenged claim *arranged* as recited in that claim. *See* Prelim. Resp. 35 (stating Petitioner merely cites various portions of Schneider that separately reference amylase, solvent-borne resin coatings, and dispersions) (citations omitted). Petitioner merely points to disparate teachings in Schneider of what may be included in a particular composition, which in our view does not establish a likelihood that the teachings of Schneider anticipate the claims. We agree with Patent Owner that “to show anticipation, Petitioner merely picks and chooses from multiple, distinct teachings in Schneider in an effort to construct a hypothetical embodiment that is nowhere actually contemplated in the reference itself.” Prelim. Resp. 34. Such picking and choosing does not establish that one of skill in the art could take Schneider’s teachings in combination with his own knowledge of the particular art and be in possession of the invention. *See In re Graves*, 69 F.3d at 1152. Therefore, we find that Petitioner has failed to show that Schneider anticipates claims 1, 4, and 5.

For Petitioner’s obviousness challenge of claims 2 and 3 based on Schneider and Adams, Petitioner continues to rely on Schneider’s teachings

for the limitations claim 1 requires. As we have found, Petitioner points to disparate teachings in Schneider to show where Schneider teaches those claim limitations. We agree with Patent Owner that Petitioner has offered no separate obviousness theory for why a POSITA would have combined Schneider's disparate disclosures along with the teachings of Adams to arrive at the claimed invention. *See* Pet. 49–51 (providing only a reason a POSITA would have combined the teachings of Adams with Schneider for claims 2 and 3). Therefore, Petitioner's obviousness challenge to claims 2 and 3 based on the combined teachings of Schneider and Adams also fails.

### III. CONCLUSION

For the foregoing reasons, we conclude that Petitioner has not established a reasonable likelihood that it would prevail in showing the unpatentability of any challenged claim of the '873 patent.

### IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied* as to all challenged claims of the '873 patent and no trial is instituted.

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