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Paper 56
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ORGANIK KIMYA AS,
Petitioner,

v.

ROHM AND HAAS COMPANY,
Patent Owner.

Case IPR2014-00185
Patent 6,020,435

Before TONI R. SCHEINER, LORA M. GREEN, and ERICA A. FRANKLIN, *Administrative Patent Judges.*

FRANKLIN, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Organik Kimya AS ("Petitioner") filed a Corrected Petition (Paper 10, "Pet.") to institute an *inter partes* review of claims 1–5 of U.S. Patent No. 6,020,435 (Ex. 1001, "the '435 patent"). Patent Owner, Rohm and Haas Company, did not file a Preliminary Response to the Petition.

In an Institution Decision (Paper 11, "Inst. Dec."), an *inter partes* review of claims 1–5 was instituted. After the Institution Decision, Patent Owner filed a Response (Paper 30, "PO Resp.") and a contingent Motion to Amend Claims (Paper 31, "Mot. Amend"). In response, Petitioner filed a Reply (Paper 36, "Pet. Reply") and an Opposition to the Motion to Amend (Paper 37). Patent Owner then filed a Reply to Petitioner's Opposition (Paper 45). Patent Owner also filed a Motion for Observations on Cross-Examination of Petitioner's Reply Witness, Dr. Robert K. Prud'homme (Paper 48). Petitioner filed a Response to the Motion for Observations (Paper 50). The parties presented arguments at an oral hearing (Paper 55, "Tr.").[1]

The Board has jurisdiction under 35 U.S.C. § 6(c). In this Final Written Decision, issued pursuant to 35 U.S. C. § 318(a) and 37 C.F.R. § 42.73, we determine Petitioner has not shown by a preponderance of the evidence that challenged claims 1–5 are unpatentable.

[1] Petitioner and Patent Owner have filed Objections to Demonstrative Exhibits (Papers 53 and 54). In this Final Written Decision, we have not considered any arguments presented in the demonstrative exhibits that were not presented previously and/or are not supported by the record.

A. Related Matters

According to Petitioner and Patent Owner, the '435 patent is involved in a case titled *Rohm and Haas Co. v. Organik Kimya San. Ve Tic. A.S.*, Case No. 13-cv-898-RGA, filed in the U.S. District Court for the District of Delaware, currently stayed; and in an investigation at the U.S. International Trade Commission titled *In the Matter of Certain Opaque Polymers*, Inv. No. 337-TA-883 (USITC). Pet. 2–3; Paper 9, 2–3 (Related Matters).

B. The '435 Patent (Ex. 1001)

The invention of the '435 patent is directed to a process for preparing multi-stage emulsion polymers having low dry-bulk density that are useful in coating compositions, such as paints and paper coatings. Ex. 1001, Abstract. Emulsion polymers, such as "hollow" or "voided" emulsion polymers, "are generally prepared by swelling a core/shell emulsion polymer in such a way that one or more voids form in the interior of the emulsion polymer particle. These voids contribute, among other things, to the opacity of coatings and films prepared with the hollow emulsion polymer." *Id*. at 1:25–31. In some applications, it is desirable to minimize the weight of an applied coating. *Id.* at 1:32–33. "Accordingly, it is desirable to provide lightweight, low density additives for coatings, such as voided latex particles." *Id*. at 1:37–38. The '435 patent explains that voided latex polymers are prepared by several known processes, such as by swelling the core of a core-shell emulsion polymer. *Id*. at 1:37–45. The '435 patent states:

> The present invention seeks to overcome the deficiencies in the previously known processes by providing low density voided emulsion polymers and a process for preparing them.

Id. at 1:54–56.

Specifically, the ’435 patent discloses preparing the multi-stage emulsion polymer by sequential emulsion polymerization, which includes charging the monomers that form the shell. *Id*. at 7:29–31. “At, or near, the conclusion of charging the monomers which form the shell, the contents of the reactor include the multistage polymer, water and unreacted monomer.” *Id*. at 7:31–34. Under the conditions of emulsion polymerization, even if no additional monomer or initiator is added, there is an appreciable free-radical content in the system that keeps the polymerization process going until there is no longer an appreciable free-radical content. *Id*. at 7:34–39. When no appreciable free-radical content remains, no substantial amount of polymerization will occur. *Id*. at 7:39–42.

The ’435 patent states: “We have discovered that by providing an aqueous emulsion of the multi-stage emulsion polymer, monomer and swelling agent under conditions wherein there is no substantial polymerization of the monomer, we can enhance the extent of swelling of the multistage emulsion polymer.” *Id*. at 7:56–60.

The ’435 patent explains that suitable swelling agents may be volatile or fixed bases, or combinations thereof, and “include, are those which, in the presence of the multistage emulsion polymer and monomer are capable of permeating the shell and swelling the core.” *Id*. at 8:40–44.

C. Illustrative Claim

Independent claim 1 of the ’435 patent is illustrative of the claims at issue:

> 1. A process for preparing emulsion polymer particles comprising:
>
> (a) providing an aqueous emulsion of
>
> (i) multi-stage emulsion polymer, comprising a core stage polymer and a shell stage polymer, wherein the

core stage polymer comprises, as polymerized units, from 5 to 100 percent by weight, based on the weight of the core stage polymer, of hydrophilic monoethylenically unsaturated monomer, and from 0 to 95 percent by weight, based on the weight of the core stage polymer, of at least one nonionic monoethylenically unsaturated monomer; and

wherein the shell stage polymer comprises, as polymerized units, at least 50 percent by weight of nonionic monoethylenically unsaturated monomer;

(ii) monomer at a level of at least 0.5 percent by weight based on the weight of the multi-stage emulsion polymer; and

(iii) swelling agent under conditions wherein there is no substantial polymerization of the monomer; and

(b) reducing the level of monomer by at least fifty percent.

D. The Prior Art

Toda et al., US 5,360,827, issued November 1, 1994 (Ex. 1003) ("Toda").

Touda et al., US 5,077,320, issued December 31, 1991 (Ex. 1004) ("Touda").

E. The Instituted Grounds of Unpatentability

Trial was instituted for Petitioner's challenges to claims 1–5 of the '435 patent on the following grounds:

Reference	Basis	'435 Claims Challenged
Toda	§ 102(b)	1–5
Touda	§ 103(a)	1–5

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable constructions in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 778 F.3d 1271, 1280 (Fed. Cir. 2015). Under the broadest reasonable construction standard, claim terms are presumed to be given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An inventor may rebut that presumption by providing a definition of the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Stated differently, a "claim term will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002).

The parties' arguments center on the construction of the following claim term and phrase:

1. "swelling agent"

Claim 1 requires the inclusion of a swelling agent in the aqueous emulsion. The Specification states,

> Suitable swelling agents include, are those which, in the presence of the multistage emulsion polymer and monomer, are capable of permeating the shell and swelling the core. Swelling agents may be aqueous or gaseous, volatile or fixed bases or combinations thereof.

> Suitable swelling agents include volatile bases such as ammonia, ammonium hydroxide, and volatile lower aliphatic amines, such as morpholine, trimethylamine, and triethylamine, and the like; fixed or permanent bases such as potassium hydroxide, lithium hydroxide, zinc ammonium complex, copper ammonium complex, silver ammonium complex, strontium hydroxide, barium hydroxide and the like.

Ex. 1001 at 8:40–52. The Specification explains,

> The core polymer of the multistage emulsion polymer swells when the core is subjected to a basic swelling agent that permeates the shell to at least partially neutralize the hydrophilic-functionality of the core, preferably to a pH of at least about 6 to at least about 10, and thereby result in swelling by hydration of the hydrophilic core polymer.

Id. at 9:10–15.

Patent Owner asserts that that a person of ordinary skill in the art would understand from the Specification that the term "swelling agent" means

> an ingredient that is capable of permeating the shell and swelling the core of the multi-stage emulsion polymer (ingredient (i) of step (a)) in the presence of the swelling monomer (ingredient (ii) of step (a)) under conditions of no substantial polymerization, <u>in the process in which the ingredient in question is being employed as a "swelling agent."</u>

PO Resp. 21. For example, according to Patent Owner, sodium hydroxide, a fixed base, may be a swelling agent in some processes, while not in others. *Id*. Patent Owner reasons that such a neutralizing agent "may or may not also be a 'swelling agent' depending on the conditions of the specific process where it is used." *Id*. at 21–22. Patent Owner asserts, "[t]o contend that 'swelling agent' does not have to involve any amount of swelling ignores the functional aspects of the plain and ordinary meaning of term."

Id. at 27. Patent Owner's position is supported by the Declaration of Patent Owner's declarant, F. Joseph Schork, Ph.D. *See* Ex. 2011 ¶¶ 68–70.

Petitioner asserts that the claims do not require the recited "swelling agent" to be an ingredient that "'must be capable of permeating the shell and swelling the core.'" Pet. Reply 3. Petitioner asserts that the Specification "merely identifies exemplary types of swelling agents" without defining or limiting the term. *Id*. at 4. In support of this assertion, Petitioner notes that the Specification uses the term "include" in its description of suitable swelling agents, i.e., "[s]uitable swelling agents *include*, are those which, in the presence of the multistage emulsion polymer and monomer, are capable of permeating the shell and swelling the core." Ex. 1001, 8:40–44 (emphasis added); Pet. Reply 4. According to Petitioner, by using the term "include," the Specification "makes clear that swelling agents that are not capable of permeating the shell and swelling the core also fall within the scope of the invention." Pet. Reply at 5. Petitioner asserts that Patent Owner's proposed claim construction disregards the Specification's use of the term "include" in an attempt "to completely change the meaning of the '435 patent's disclosure" and to impart impermissibly a "swelling step" into claim 1. *Id*. at 4–5.

We disagree with Petitioner that the Specification's use of the term "include," when describing suitable swelling agents, "makes clear" that bases that are not capable of permeating the shell and swelling the core also fall within the scope of the invention. Rather, the Specification's use of the word "include," in this instance, is modified by the phrase immediately following it, i.e., "are those which," suggesting that suitable swelling agents include only those which exhibit the functional characteristic thereafter

described. *See* Ex. 1001, 8:40. In contrast, the following paragraph of the Specification describes the structural requirement for suitable swelling agents using the word "include," without modifying it with a restrictive phrase. Instead, when disclosing the volatile, fixed and permanent bases, the word "include" is coupled with the phrases "such as" and "and the like," signaling open-ended or inclusive categories of these bases. *See id*. at 8:45–52.

Further, we agree with Patent Owner that the Specification describes a swelling agent not merely as being capable of permeating a shell and swelling the core of a multistage emulsion polymer in the abstract, but specifically under the conditions of the specific process for which the agent is to be used. Indeed, the Specification explains that in its process for preparing emulsion polymers, the core polymer of the multistage emulsion polymer swells when it "is subjected to a basic swelling agent that permeates the shell to at least partially neutralize the hydrophilic-functionality of the core." Ex. 1001, 9:10–15.

Based on the foregoing discussion, in light of the '435 patent Specification, we construe the claim term "swelling agent" as expressing a structural element, i.e., "an aqueous or gaseous, volatile or fixed base, or combinations thereof," in functional terms, i.e., "capable of permeating the shell and swelling the core, in the presence of the multistage polymer and monomer, under the conditions of the specific process for which the agent is to be used." *See Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996) (structural elements, e.g., "filter" and "brake," may be expressed in functional terms).

2. "under conditions wherein there is no substantial polymerization of the monomer"

Claim 1 requires the inclusion of a swelling agent in the aqueous emulsion "under conditions wherein there is no substantial polymerization of the monomer." Although the Specification does not disclose a quantitative amount of polymerization that meets (or exceeds) the recited "no substantial polymerization" limitation, the Specification does disclose that "[t]here are many means for providing that no substantial polymerization of monomer is occurring." Ex. 1001, 7:61–62. Those means include:

> [T]he addition of one or more polymerization inhibitors, the addition of one or more reducing agents, waiting for a sufficient period of time until there are no longer an appreciable number of free-radicals by virtue of them terminating, cooling the contents of the reactor to limit the reactivity of the free-radicals, and combinations thereof.

Id. at 7:62–8:1.

In our Institution Decision, we interpreted the claim phrase "under conditions wherein there is no substantial polymerization of the monomer" as including, but not being limited to, conditions wherein one or more of these means specifically disclosed in the '435 patent exist. Inst. Dec. 8.

Patent Owner "agrees with the construction adopted by the Board." PO Resp. 18. However, Patent Owner asserts that "whatever means are used to achieve the required condition of 'no substantial polymerization,' a [person of ordinary skill in the art] would understand that those means must, in fact, create the stated condition." *Id*. at 19. In other words, Patent Owner asserts that "under conditions wherein there is no substantial polymerization of the monomer" requires more than just the existence of one or more of the means for establishing this condition disclosed in the Specification. *Id*.

Instead, according to Patent Owner, the claim phrase requires that the end result of implementing such means "must be to create a condition of 'no substantial polymerization of the monomer.'" *Id*.

Petitioner asserts that Patent Owner's proposed interpretation "produces an unworkable result," as the Specification does not provide a quantitative way for determining whether the condition actually exists. Pet. Reply 6. However, as counsel for Patent Owner explained at the Oral Hearing, the Specification discusses no substantial polymerization existing when there is a depletion of free-radicals. *See* Tr. 41:11–22. Indeed, the Specification states, "[w]hen there is no appreciable free-radical content, in other words, when the radical flux is very low or approaches zero, then no substantial amount of polymerization will occur." Ex. 1001, 7:39–42.

Accordingly, based on the foregoing discussion, in light of the '435 patent Specification, we determine that the broadest reasonable interpretation of the claim phrase "under conditions wherein there is no substantial polymerization of the monomer" includes, but is not limited to, conditions wherein one or more of the means specifically disclosed in the '435 patent exist, and/or wherein no appreciable free-radical content remains in the reactor including the multistage polymer and unreacted monomer.

B. Anticipation by Toda

Petitioner asserts that claims 1–5 are anticipated by Toda (Ex. 1003) under 35 U.S.C. § 102(b). Pet. 5, 20–34.

Toda discloses:

> A process for preparation of latex of a hollow polymer which comprises adding a base, in the presence of a monomer, to latex containing carboxy-modified copolymer particles to make the pH of the latex 8 or more; adding a carboxyl group-containing

> monomer to make the pH of the latex 7 or less; and then polymerizing these monomers.

Ex. 1003, Abstract.

Toda discloses, in Example 9, a process for preparing hollow polymer particles comprising the steps of forming a center layer, an intermediate layer, and a surface layer. *Id*. at 11:59–68. The center layer is formed by placing in a reactor 400 parts of deionized water, 0.3 part of monomer mixture (a), i.e., 60% of methyl methacrylate ("MMA"), 5% of butyl acrylate ("BA") and 35% of methacrylic acid ("MAA")), and 0.3 part of an emulsifier; heating the mixture to 80° C and stirring to prepare an emulsion; adding 7 parts of aqueous 3% potassium sulfate ("KPS") solution; subjecting the mixture to polymerization at 80° C for 0.5 hour to obtain seed particles; adding 0.5 part of an emulsifier; continuously adding the residual monomer mixture (a) over a period of one hour; and carrying out polymerization for 2 hours, resulting in a conversion of monomer mixture (a) of 98%. *Id*. at 11:59–62, 12:13–26. An intermediate layer is formed by adding to the reactor 7 parts of KPS; continuously adding monomer mixture (b), i.e., 85% of MMA, 10% of BA and 5% of MAA; and carrying out polymerization for 4 hours, resulting in a conversion of mixture (b) of 98%. *Id*. at 11:63–66, 12:26–31. The surface layer is formed by adding 7 parts of KPS to the reactor; continuously adding monomer mixture (c), i.e., 95% of styrene and 5% of MMA; and carrying out polymerization for 4 hours, lowering the temperature to 20° C to obtain latex-containing polymer particles, wherein the conversion of monomer mixture (c) was 98%. *Id*. at 11:66–68, 12:31–37.

In particular, Toda discloses in Example 9 obtaining hollow polymer particles by (i) adding 3 parts of styrene to the obtained latex-containing

polymer particles to soften the particles, and then adding 30 parts of aqueous 10% potassium hydroxide solution and heating to 80° C for 3 hours (base treatment); (ii) adding 80 parts of aqueous 5% MAA and 50 parts of styrene and stirring the mixture at 80° C for 3 hours (acid treatment); and (iii) adding 10 parts of aqueous 3% KPS solution, stirring the mixture of unreacted monomers at 80°C for 2 hours to carry out copolymerization, resulting in a polymerization conversion at this final stage of 99%. *Id*. at 12:38–59.

Petitioner asserts that Toda discloses, in at least Example 9, each and every element of claim 1 of the '435 patent. Pet. 22–26. We agree with Petitioner that Toda discloses in Example 9 that: (1) the core stage polymer (center layer polymer) comprises 35% of MAA, a hydrophilic monoethylenically unsaturated monomer, as well as 60% of MMA and 5% of BA, both of which are nonionic monoethylenically unsaturated monomers (*id*. at 22–23); (2) the shell stage polymer (surface layer) comprises 95% of styrene and 5% of MMA, both of which are nonionic monoethylenically unsaturated monomers (*id.* at 23, 29); and (3) a separate monomer comprised 3 parts of styrene, wherein the 3 parts was at least 0.5% by weight based on the weight of the multi-stage emulsion polymer (*id*. at 24).

However, based on our construction of the term "swelling agent," and in consideration of the arguments and evidence, we disagree with Petitioner's assertion that the process disclosed in Toda Example 9 includes adding a "swelling agent." According to Petitioner, Toda's addition of 30 parts of aqueous 10% potassium hydroxide solution to the reaction mixture meets this claim limitation. Pet. 24, 31. In the Petition, Petitioner supports this position by referring to Toda's disclosure of adding potassium

hydroxide solution in the process of Example 9 (Pet. 24 (citing Ex. 1003 at 12:40–43)), and to the testimony of Petitioner's declarant, Dr. Marek W. Urban, who explains that potassium hydroxide "is a fixed base expressly identified by the '435 patent as a possible swelling agent" (*id*. (citing Ex. 1002 ¶ 68)).

In the Response, Patent Owner asserts that Petitioner's argument is based entirely on inherency, rather than any express disclosure by Toda that the potassium hydroxide used in Example 9 is a "swelling agent," or is "capable of permeating the shell and swelling the core." PO Resp. 36–37. Further, Patent Owner asserts that Petitioner has not established that such inherency exists by providing, for example, data or experimental evidence that the potassium hydroxide used in Toda's Example 9 is capable of permeating the shell and swelling the core of the multi-stage emulsion polymer "*each and every time*." *Id*. at 37–38.

In the Reply, Petitioner argues that Toda discloses a "swelling agent" expressly, not inherently, by disclosing potassium hydroxide in Example 9. Pet. Reply 7.

We disagree with Petitioner. We have construed the claim term "swelling agent" as encompassing a structure, i.e., a base, and a function, i.e., being capable of permeating the shell and swelling the core, in the presence of the multistage polymer and monomer, under the conditions of the specific process for which the agent is to be used. Petitioner has neither asserted nor shown that Toda *expressly* teaches that potassium hydroxide permeates the shell and swells the core of the multi-stage polymer in Toda's Example 9. Instead, Petitioner asserts that potassium hydroxide permeates the shell and swells the core of the polymer particles in Toda because the

same polymer particles are described in the '435 patent as suitable for swelling. Pet. Reply 14 (citing Ex. 1002 ¶¶ 62–66). In other words, Petitioner's argument is that Toda *inherently* discloses that potassium hydroxide is capable of permeating the shell and swelling the core of the polymer particles in Toda's Example 9.

With respect to Petitioner's inherency argument, what is missing is some consideration of the reaction conditions in the process of Toda's Example 9. In Toda's Example 9, the potassium hydroxide was added to the mixture after the temperature of the mixture was lowered to 20° C and styrene was added to soften the polymer particles. Ex. 1003, 12:35–42. Patent Owner provides persuasive evidence, through the Declaration of Dr. Schork, that a person of ordinary skill in the art would have understood that the shell would be too hard at this temperature for potassium hydroxide to be capable of permeating the shell and swelling the core. PO Resp. 39 (citing Ex. 2011 ¶ 92). Petitioner has not argued persuasively otherwise. *See, e.g.*, Pet. Reply 13–14.

Further, in Toda's Example 9, after adding the potassium hydroxide, the mixture is heated to 80 °C. Ex. 1003, 12:41–44. Patent Owner provides persuasive evidence, also through the Declaration of Dr. Schork, that, based on the teachings of Toda, a person of ordinary skill in the art would not expect potassium hydroxide to permeate the shell and swell the core at that temperature either. PO Resp. 39 (citing Ex. 2011 ¶¶ 86, 92); *see also* Ex. 2011 ¶ 93 (explaining why a person of ordinary skill would not consider potassium hydroxide a "swelling agent" when the reaction temperature of Toda Example 9 is increased to 80 °C). Here again, Petitioner has not argued persuasively otherwise. *See, e.g.,* Pet. Reply 13–14.

Additionally, Patent Owner provides persuasive experimental evidence that the potassium hydroxide solution used in Toda's Example 9 is not capable of permeating the shell and swelling the core. *See* PO Resp. 38. Dr. Schork attempted to replicate Toda's Example 9 twice and observed each time that potassium hydroxide was not capable of permeating the shell and swelling the core of the multi-stage emulsion polymer. Ex. 2011 ¶¶ 89–94). According to Dr. Schork, results of those replications did not provide any swelling during the base treatment of Example 9, suggesting that potassium hydroxide did not perform as a swelling agent under the conditions of Toda's Example 9, as required by claims 1–5 of the '435 patent. *See id*. ¶¶ 94, 102–103.

Petitioner challenges the probative value of Dr. Schork's experimental data by asserting that Dr. Schork "only tried to reproduce Example 9 of Toda twice," and that he did not "adequately replicate" the process. Pet. Reply 12. More specifically, Petitioner asserts that Dr. Schork did not accurately replicate Example 9 of Toda because: (1) his reaction produced almost a thousand times more particles than a person of ordinary skill in the art would expect; and (2) he used a different device to add the KPS to the reaction mixture. In support of these assertions, Petitioner relies on the Declaration of Petitioner's declarant, Dr. Robert K. Prud'homme (Ex. 1021). Pet. Reply 12 (citing Ex. 1021 ¶¶ 26, 41).

According to Dr. Prud'homme, "if a skilled artisan trying to replicate Example 9 does not achieve the estimated number of particles or required particle size, he would readily understand what factors to adjust to reproduce Example 9." Ex. 1021 ¶ 29. Dr. Prud'homme acknowledged that Dr. Schork disagreed with this opinion. *See id*. (citing Ex. 1020, 135 (Schork

Deposition)).

Further, in Dr. Prud'homme's opinion, Dr. Schork's use of a sub-surfacing metering device to add the KPS to the reaction mixture, instead of using a separating funnel as described in Toda's Example 9, led to a more uniform addition than in Toda, and resulted in a higher overall nucleation. *Id*. ¶ 41. According to Dr. Prud'homme, "[a] less uniform addition, like the one that would occur with a separatory funnel, would lead to 'bursts' of radical initiation. Such bursts may lead to radical termination, which leads to decreased numbers of particles." *Id*. ¶ 40. Additionally, Petitioner asserts, and Dr. Prud'homme explains, that Dr. Schork's elimination of all of the oxygen from the reaction increased the nucleation rate. Pet. Reply 13 (citing Ex. 1020 ¶ 34).

Petitioner asserts also that "Dr. Schork may have used almost four times the amount of emulsifier than what a skilled artisan would have used given the number of particles he obtained when attempting to replicate Example 9 of *Toda*." Pet. Reply 13 (citing Ex. 1021 ¶¶ 38–39). However, in his Declaration, Dr. Prud'homme states that Dr. Schork's approach was "not unreasonable." Ex. 1021 ¶ 39. Dr. Prud'homme merely offered a different approach which would have resulted in using less emulsifier, stating, "it is also entirely reasonable to read Example 9 to mean 0.3 parts of a 23% solution of SDBS." *Id*.

Although we recognize Dr. Prud'homme's expertise in the field of emulsion polymerization, we do not accord his testimony, or Petitioner's arguments based on that testimony, persuasive weight. Dr. Prud'homme has not provided experimental data demonstrating that a different manner of performing the process of Example 9 would have provided results that differ

from those observed in Dr. Schork's replications. Nor has the Petitioner provided any experimental data or evidence establishing that the process of Toda's Example 9 inherently disclosed a "swelling agent," as required by claims 1–5 of the '435 patent. *See MEHL/Biophile Int'l. Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999) (quoting *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981)) ("Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient."); *see also Glaxo Inc. v. Novopharm Ltd*., 52 F.3d 1043, 1047 (Fed. Cir. 1995) (inherency precluded where patentee's chemist twice produced different crystals from the same method).

Accordingly, after considering the arguments and evidence, and based upon our construction of the term "swelling agent," we find that Petitioner has not shown that Toda discloses potassium hydroxide as a "swelling agent" in the process of Example 9.

Based on the foregoing discussion and the record, we conclude that Petitioner has not shown by a preponderance of the evidence that Toda anticipates claims 1–5. *See In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997) ("To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently.").

C. Obviousness over Touda

Petitioner contends that claims 1–5 would have been obvious over Touda (Ex. 1004) under 35 U.S.C. § 103(a). Pet. 5, 34–47. Touda discloses:

> A process for producing polymer particles containing one microvoid or two or more discrete microvoids, which comprises (1) adding a base to a latex of a carboxyl-modified copolymer containing 0.1 to 1000 parts of an organic solvent per 100 parts by weight of the carboxyl-modified copolymer to neutralize at

> least part of the carboxyl groups in the copolymer, and (2) adding an acid to the latex to adjust the pH of the latex to not more than 7.

Ex. 1004, Abstract. Touda explains that:

> [T]he present inventors have found that if the polymer particles are swollen with a base in the presence of an organic solvent, microvoid-containing polymer particles can be obtained easily with a short period of time, and microvoid-containing particles of a polymer having a high glass transition temperature can be obtained, and that this process can also give polymer particles having a plurality of microvoids.

Id. at 2:41–48.

Further, Touda teaches that "[t]here is no particular limitation on the method of obtaining polymers containing carboxyl groups," and discloses that the method may include copolymerizing carboxyl-containing monomers, which "is advantageous to production." *Id*. at 2:66–3:4. Touda discloses that exemplary carboxyl-containing monomers that can be used in the invention include ethylenically unsaturated carboxylic acids, such as methacrylic acid, and that exemplary monomers, which are copolymerizable with carboxyl-containing monomers, include aromatic vinyl monomers, such as styrene. *Id*. at 3:5–8, 25–29.

Additionally, Touda teaches that "[t]here is no particular restriction on the method of including an organic solvent in the carboxyl-modified copolymer latex," and the method may, for example, involve adding an organic solvent to a latex obtained by polymerization. *Id*. at 3:61–64. The organic solvent used in the invention also is not particularly limited, as long as it "can fully swell the copolymer particles." *Id*. at 3:66–4:1. Touda discloses specific examples of solvents, including toluene. *Id*. at 4:1–3. "When an organic solvent is added to the latex after preparation of the latex

of the carboxyl-modified copolymer, at least one of polymerizable organic solvent may be used . . . such as styrene . . . ." *Id*. at 4:16–21.

Petitioner asserts that Touda discloses each and every element of claim 1 of the '435 patent. Pet. 35. According to Petitioner, "*Touda* expressly discloses all but one of the elements of claim 1 of the '435 patent in a single example – Example 1 (combination of Examples 1S, 1A and 1B)." *Id*. at 36 (citing Ex. 1002 ¶ 80). Petitioner asserts that the one element not disclosed in Touda Example 1 is taught expressly elsewhere in the disclosure of Touda. *Id*.

Touda discloses in Example 1S the "[s]ynthesis of a seed latex," comprising: placing 300 parts of deionized water in a reactor, along with 95 parts of styrene (i.e., 95% of a nonionic monoethylenically unsaturated monomer), and 5 parts of MAA (i.e., 5% of a hydrophilic monoethylenically unsaturated monomer); heating and stirring the mixture; allowing the temperature of the mixture to reach 70° C and then adding 17 parts of a 3% aqueous solution of potassium persulfate; and maintaining the reaction mixture at 70° C for three hours to complete the polymerization reaction, resulting in a polymerization conversion of 99%. Ex. 1004, 6:33–49; Pet. 36.

Touda discloses in Example 1A the "[p]roduction of a filled polymer latex," comprising: charging the same reactor used in the production of the seed latex with 518 parts of deionized water and 3.4 parts of seed latex; allowing the temperature of the reactor to reach 80° C and then adding 30 parts of a 3% aqueous solution of potassium persulfate; adding a monomeric mixture composed of 94 parts of styrene (i.e., at least 50% by weight of nonionic monoethylenically unsaturated monomer), and 6 parts of acrylic

acid over the course of 6 hours; maintaining the reaction mixture at 80° C for two hours to complete polymerization, resulting in a polymerization conversion of 97%. Ex. 1004, 6:51–67.

In particular, Touda discloses in Example 1B the "[p]roduction of a microvoid-containing latex," comprising: charging the same reactor used in the production of the seed latex with 870 parts of deionized water, 100 parts of the filled polymer latex, 1 part of sodium dodecyl-benzenesulfate, 30 parts of toluene, and 33 parts of a 10% aqueous solution of sodium hydroxide ("NaOH"); stirring the mixture at 80° C for three hours; adding 300 parts of a 1% aqueous solution of hydrochloric acid; stirring the mixture at 80° C for 3 hours; cooling the reaction mixture to room temperature; and removing the organic solvent under reduced pressure. *Id*. at 7:4–24; Pet. 37.

Petitioner asserts that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have modified the process of Touda's Example 1 by substituting styrene, a polymerizable organic solvent, in place of the organic solvent toluene. Petitioner reasons that the artisan would have been motivated to make this modification because Touda teaches that a polymerizable organic solvent, such as styrene, may be used when the organic solvent is added to the latex after preparation of the latex of the carboxyl-modified copolymer (*id*. at 4:16–21), as in the process of Example 1B (*see id*. at 7:6–10).

Patent Owner argues, among other things, that Touda does not disclose expressly all but one of the elements of claim 1 of the '435 patent in Example 1. PO Resp. 50. In particular, Patent Owner asserts that Touda does not disclose expressly sodium hydroxide, or any other base, as a

"swelling agent," i.e., being capable of permeating the shell and swelling the core of the emulsion polymer under the conditions of Example 1. *Id*.

In the Reply, Petitioner asserts that Touda discloses a "swelling agent" expressly, not inherently, by disclosing sodium hydroxide in Example 1. Pet. Reply 7.

In view of our construction of the claim term "swelling agent," we disagree with Petitioner. As discussed previously, we have construed the claim term "swelling agent" as encompassing a structure, i.e., a base, and a function, i.e., being capable of permeating the shell and swelling the core, in the presence of the multistage polymer and monomer, under the conditions of the specific process for which the agent is to be used. Petitioner has neither asserted nor shown that Touda *expressly* teaches that sodium hydroxide permeates the shell and swells the core of the multi-stage polymer in Touda's Example 1. Nor has Petitioner asserted or shown that Touda *suggests* that sodium hydroxide is capable of functioning in this manner. Instead, Petitioner asserts that sodium hydroxide permeates the shell and swells the core of the polymer particles in Touda because the same polymer particles are described in the '435 patent as suitable for swelling. Pet. Reply 14 (citing Ex. 1002 ¶¶ 85–88). In other words, Petitioner's argument is that Touda *inherently* discloses that sodium hydroxide is capable of permeating the shell and swelling the core of the polymer particles in Touda's Example 1.

With respect to Petitioner's argument, Patent Owner asserts that a person of ordinary skill in the art would understand that the sodium hydroxide used in Example 1 is not capable of permeating the shell and swelling the core of the emulsion polymer under the conditions described in

Example 1. PO Resp. 50. In support of this assertion, Patent Owner relies on the Declaration of Patent Owner's declarant, Dr. Schork. *Id*. (citing Ex. 2011 ¶¶ 127–128). Dr. Schork explains that in Touda's Example 1, the core is only 5 parts (5%) methacrylic acid and the shell is only 6 parts (6%) acrylic acid, such that the core and the shell are only slightly acidic. Ex. 2011 ¶ 128. Dr. Schork states that a person of skill in the art "would understand that under these conditions, NaOH would at best neutralize the shell, not the core." *Id*. According to Dr. Schork, "[g]iven the low levels of acid, the NaOH would be unlikely to permeate and neutralize any part of the particle. Certainly, NaOH would not permeate the shell and swell the core. Instead, to the extent that any swelling occurred, it would take place in the shell." *Id*.

Additionally, Patent Owner provides persuasive experimental evidence that the sodium hydroxide solution used in Touda's Example 9 was not capable of permeating the shell and swelling the core. *See* PO Resp. 51. Dr. Schork replicated the process of Touda's Example 1. *Id*. (citing Ex. 2011 ¶¶ 139–151). According to Dr. Schork, his experiment resulted in "no observable swelling occurred during the reported 'swelling stage'" (Ex. 2011 ¶ 151), or any polymer particles with voids, which "demonstrates that the NaOH used in Example 1 is not capable of permeating the shell and swelling the core of the emulsion under the conditions described therein" (*id*. ¶ 130).

Petitioner challenges the probative value of Dr. Schork's experimental data by asserting that he "only tried to reproduce Example 1 of [Touda] twice," and that he did not "adequately replicate" the process. Pet. Reply 12. However, Petitioner has not explained how Dr. Schork's experiment did not

adequately replicate Touda's Example 1. *See* Pet. Reply 12. Nor has Petitioner provided any experimental data demonstrating that a different manner of performing the process would have provided results that differ from those observed from Dr. Schork's experiment. Indeed, Petitioner has not provided any experimental evidence contradicting Dr. Schork's results or supporting its position that Touda uses a "swelling agent," as required by claims 1–5 of the '435 patent.

Accordingly, after considering the arguments and evidence, and based upon our construction of the term "swelling agent," we find that Petitioner has not established that Touda teaches or suggests the invention of claims 1–5 of the '435 patent.

Based on the foregoing discussion and the record, we conclude that Petitioner has not shown by a preponderance of the evidence that claims 1–5 would have been obvious over Touda under 35 U.S.C. § 103(a).

III. MOTION TO AMEND

Patent Owner's Motion to Amend is contingent on claims 1–5 of the '435 patent being held unpatentable. Mot. Amend 2. Because these claims are not held to be unpatentable, there is no occasion to reach or decide the motion to amend.

IV. CONCLUSION

Petitioner has not demonstrated by a preponderance of the evidence that claims 1–5 instituted for *inter partes* review are unpatentable under 35 U.S.C. § 102(b) as anticipated by Toda, or under 35 U.S.C. § 103(a) as obvious over Touda.

ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner's request for cancellation of claims 1–5 of the '435 patent is *denied*;

FURTHER ORDERED that Patent Owner's Motion to Amend is *dismissed* as moot; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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