<table>
<thead>
<tr>
<th>APPLICATION NO.</th>
<th>FILING DATE</th>
<th>FIRST NAMED INVENTOR</th>
<th>ATTORNEY DOCKET NO.</th>
<th>CONFIRMATION NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>13/670,889</td>
<td>11/07/2012</td>
<td>Reinhold J. Leyrer</td>
<td>074048-0075-US (287507)</td>
<td>8845</td>
</tr>
</tbody>
</table>

Drinker Biddle & Reath LLP (WM)
222 Delaware Avenue, Ste. 1410
Wilmington, DE 19801-1621

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DBRIPDocket@dbr.com
IPDocketWM@dbr.com
The claims in this appeal are directed a thickener prepared by inverse emulsion polymerization. The Examiner rejected the claims under 35 U.S.C. § 103 as obvious. Pursuant to 35 U.S.C. § 134, Appellants appeal the Examiner’s determination that the claims are unpatentable. We have jurisdiction for the appeal under 35 U.S.C. § 6(b). The Examiner’s decision is affirmed-in-part.

STATEMENT OF THE CASE

The claims stand rejected by the Examiner as follows:


Final Act. 10–11.

Independent claim 22 is reproduced below.

22. A thickener prepared by a process which comprises obtaining a cationic polymer by inverse emulsion polymerization of
   a) 20 to 99.99% by weight, based on the cationic polymer, of at least one water soluble ethylenically unsaturated monomer comprising at least one cationic monomer, wherein the cationic monomer is a compound of the formula (II)

\[
\begin{align*}
\text{R}_1 &\text{C=CH}_2 \text{X=NR}_3 \text{N}^\pm \text{R}_5 \\
\text{R}_2 \text{O} &\text{R}_4 \text{Y}^- \\
\text{R}_6
\end{align*}
\]

wherein
- \( R_1 \) is H or C\(_1\)-C\(_4\)-alkyl,
- \( R_2 \) is H or methyl,
- \( R_3 \) is C\(_1\)-C\(_4\)-alkylene,
- \( R_4 \), \( R_5 \) and \( R_6 \) are each independently H or C\(_1\)-C\(_{30}\)-alkyl,
- \( X \) is -O- or -NH-, and
- \( Y \) is Cl, Br, I, hydrgensulfate, or methosulfate,

b) 0.01 to 80% by weight, based on the cationic polymer, of at least one ethylenically unsaturated associative monomer, wherein the ethylenically unsaturated associative monomer is a compound of the formula

(I) \( R\text{-O-(CH}_2\text{-CHR'}\text{-O})_n\text{-CO-CR"=CH}_2 \) (I)

wherein
- \( R \) is C\(_6\)-C\(_{50}\)-alkyl,
- \( R' \) is H or C\(_1\)-C\(_4\)-alkyl,
- \( R'' \) is H or methyl, and
- \( n \) is an integer from 0 to 100,

c) 0 to 0.3% by weight, based on the cationic polymer, of at least one crosslinker, and
d) 0 to 0.3% by weight, based on the cationic polymer, of at least one chain transfer agent,
the temperature being kept constant during the inverse emulsion polymerization and being at least 40°C and, after the inverse emulsion polymerization has ended, an activator is added to obtain the thickener.

CLAIM 22

Claim 22 is directed to a thickener which is a cationic polymer. The thickener is prepared by inverse emulsion polymerization of:

a) 20 to 99.99% by weight of “at least one water soluble ethylenically unsaturated monomer comprising at least one cationic monomer” of formula II;

b) 0.01 to 80% by weight of “at least one ethylenically unsaturated associative monomer” of formula I;

c) 0 to 0.3% by weight of at least one crosslinker, and

d) 0 to 0.3% by weight of at least one chain transfer agent.

The claim requires that the temperature is “kept constant during the inverse emulsion polymerization and being at least 40°C” and that an activator is added to obtain the thickener after the inverse emulsion polymerization has ended.

In response to an election requirement, Appellants elected TMAEMC (2-trimethylammonioethyl methacrylate chloride) as a) and C16E025Mac (C16-C18-fatty alcohol-(ethylene glycol)25 ether methacrylate) as b).

Response to Species Election Requirement (May 14, 2013).

REJECTION 1 BASED ON CREAMER

The Examiner found that Creamer describes a polymer comprising a monomer of the elected species a) in an amount encompassed by the claimed range. Final Act. 3; Creamer ¶¶ 25, 29. The Examiner also found that
Creamer describes an ethylenically unsaturated associative monomer (“alkoxy poly(ethyleneoxy)ethyl methacrylate) as required by b) of claim 22, but not the specifically elected species Cl6E025Mac. To meet this deficiency, the Examiner cited the disclosure in Moraes of the elected species C16E025Mac, identified in Moraes under its commercial name “PLEX 6954-O.” The Examiner found that Moraes describes that the addition of “an associative monomer to acrylate copolymers leads to associations between the polymer chains which enhance the viscosity.”

The Examiner further relied upon the teachings in Blondel and Vanderhoff for describing reverse emulsion polymerization at the claimed temperature.

Appellants argue that Creamer does not describe the copolymer as a thickening agent. A thickening agent or thickener is used to increase the viscosity of a solution.

Appellants argue that Creamer describes the purpose of its polymer is to form a stable hair fixative agent which is compatible with a thickener, but not a thickener, itself. Appellants contend there would have been no reason to alter the polymers described in Creamer “purportedly suggested by Moraes and Blondel” because “those references are specific to thickening polymers, whereas the polymer relied upon by the Examiner in Creamer is not a thickening polymer.”
Appellants points to Examples 14–27 of Creamer which all show polymers having a pH of below 5. Appeal Br. 10. In contrast, Appellants argue that Moraes teaches that its polymers only thicken at a pH value above 7. *Id.* Appellants explain that Moraes discloses that at pH above 7 “the thickening of the HASE thickener results from repulsion of carboxylate anions along the polymer backbone” and that “the disclosed associative monomers only exhibit viscosity-increasing properties as long as the polymers have anionic groups.” *Id.*

Discussion

Creamer describes its invention as “directed to styling and conditioning compositions for modifying and fixing hair comprising one or more solution polymers.” Creamer 1. Creamer discloses its polymer are “multi-functional polymers for modifying hair.” *Id.* at ¶ 6. Creamer teaches that the polymers “are compatible when combined with additives including neutralizers, surfactants and thickeners.” *Id.* at ¶¶ 6, 8. Creamer further discloses:

The present invention provides multifunctional solution polymers that have utility for modifying hair, said polymers having an excellent balance of moisture (water) resistance versus water sensitivity, polymers having good color stability, good water stabilities, polymers that are non-flaking after application, and polymers that are compatible with thickeners. . . . providing clear, non-hazy hair formulations having stable formulation viscosities over time. Moreover, the formulations provide a smooth coating on hair, provide better adhesion to hair follicles and skin surfaces, and improve the sheen and glossiness of hair treated with the invented polymers. Inventors discovered that the formulation compatibility, clarity and viscosity stability problems associated with anionic emulsion
polymers of the prior art are solved utilizing critical amounts of one or more acid-containing monomers in the polymer.

Creamer ¶ 31 (emphasis added).

Based on these disclosures from Creamer, we find that Appellants’ argument that Creamer does not disclose that its polymer is a thickener is supported by a preponderance of the evidence. Creamer describe the polymers as solving “viscosity stability problems,” but not as serving as a thickener, itself. Table 1 of Creamer (at pages 16–17) identified by the Examiner as evidence that Creamer’s polymer is a thickener (Ans. 3–4), shows that different polymers produced by Creamer have different viscosities, but does not demonstrate that the polymer is being used as a thickener to increase the solution’s viscosity. Rather, the polymer is described as a hair fixative which provided a smooth coating on hair, better adhesion to hair follicles and skin surfaces, and improved sheen and glossiness of hair. Creamer ¶ 31 (see paragraph reproduced above).

Moraes, on the other hand, describes polymers which are thickeners. Specifically, Moraes describes “a hydrophobically-modified alkali soluble emulsion (HASE) thickener” which is produced by grafting an associative monomer to a polymer backbone. Moraes 19 (col. 1). Moraes discloses:

When hydrophobic macromonomers, referred to as the associative monomers (AM), are grafted in small amounts to the polymer backbone, the hydrophobic moieties interact among themselves, creating rheological modifiers called associative polymers. The incorporation of AM enhances the thickening power with respect to unmodified polymers of similar molecular weight and therefore has been a source of many studies in the last decades.

Moraes 19 (col. 1) (emphasis added).
The Examiner found it would have been obvious to one of ordinary skill in the art to have used the associative monomer PLEX 6954-O (the elected monomer species) of Moraes to increase the viscosity and “thickening ability” of Creamer’s polymers. Final Act. 7. The weakness of this argument is that Creamer does not teach that its polymers are thickeners or that it would be “advantageous” to make them more viscous as found by the Examiner. *Id.* at 6. It was not disputed by Appellants that PLEX 6954-O is within the genus of monomers disclosed by Creamer as being “usefully employed in the solution polymers of the invention.” Creamer ¶ 27. But the monomer is used in Creamer to prepare a copolymer by solution polymerization (Creamer ¶ 22), and is not described as being “grafted” to a polymer backbone as it is in Moraes to allow the hydrophobic moieties to interact (Moraes 19). Creamer also recognizes “associative thickeners” (Creamer ¶ 77), but does not characterize its own inventive polymer as one, referring to it instead as a solution polymer (Creamer ¶ 79). For these reasons, the Examiner’s statement of the motivation to utilize Moraes’s associative monomer in Creamer’s polymer is not persuasive.

Appellants argue that Moraes discloses that its polymers thicken at a pH above 7, while Creamer teaches a pH value below 7. Appeal Br. 10. Appellants argue that one of ordinary skill in the art would not have used Moraes’s associative monomer in the acid environment of Creamer. *Id.* at 11.

Appellants’ argument is supported by a preponderance of the evidence. The Examiner acknowledges that Creamer only exemplifies acidic pHs, but states that a specific pH range is not required by Creamer. Ans. 6. While we agree with this statement, the only guidance on pH
provided by Creamer is in Examples 14–27 of Creamer, each which show a polymer having a pH of below 5. Appeal Br. 10. Furthermore, Creamer discloses that its inventors “discovered” that “utilizing critical amounts of one or more acid-containing monomers in the polymer” solved “the formulation compatibility, clarity and viscosity stability problems associated with anionic emulsion polymers of the prior art.” Creamer ¶ 31; see also Reply Br 2. On the other hand, Moraes expressly teaches “HASE polymers thicken at a pH above 7 through repulsion of carboxylate anions along the polymer backbone” (Moraes 19 (col. 1)) and provides evidence that “[n]o significant changes in viscosity was observed in the range from 4 to 7” (Moraes 24 (col. 1). See also Moraes, Fig. 8. The Examiner did not adequately explain why one of ordinary skill in the art would have chosen an associative monomer which works at a pH above 7 to use in the polymer described by Creamer that comprises critical acid-containing monomers in which all the exemplified polymers are at an acid pH below 5.

In sum, while Moraes describes a monomer within the scope of monomers described by Creamer, Moraes is using the elected monomer for a different purpose than described by Creamer for its monomers and at a different pH range. The Examiner has not adequately established that one of ordinary skill in the art would have sought to use Moraes’s associative monomer grafted on to polymer backbone in Creamer’s solution polymer.

The rejection of claims 22–28, 30, 31, 33, 35–40, 45 and 46 as obvious based on Creamer is reversed.
REJECTION 4 BASED ON BLONDEL, MORAES, AND VANDERHOFF

Rejection

The Examiner found that Blondel describes thickeners made by inverse emulsion polymerization, where the thickener comprises “the cationic monomer” as claimed. Final Act. 11. Appellants do not dispute this cationic monomer of Blondel meets a) of claim 22.

The Examiner further found that “Blondel does not teach an ethylenically unsaturated associative monomer of C16E025Mac (C16-C18-fatty alcohol-(ethylene glycol)25 ether methacrylate) as elected [for b) of claim 22] or that the polymer is obtained at a constant temperature of at least 40°C.” Final Act. 11–12. The Examiner found that “[t]hese deficiencies are made up for by the teachings of Moraes et al. and Vanderhoff et al.” Id.

The Examiner found that Moraes teaches “the addition of an associative monomer to acrylate copolymers leads to associations between the polymer chains which enhance the viscosity.” Final Act. 12. The associative monomer is b) of claim 22.

Claims 22 further recites: “the temperature being kept constant during the inverse emulsion polymerization and being at least 40°C and, after the inverse emulsion polymerization has ended, an activator is added to obtain the thickener.”

The Examiner found that Vanderhoff investigated the kinetics of inverse emulsion polymerization and described conditions in which the temperature is kept constant throughout the polymerization, which begins after the addition of the initiator. Final 12–13. The Examiner also found

---

2 We considered Rejection 4, before Rejections 2 and 3, for clarity.
that “Vanderhoff et al. further teach that the molecular weight and rate of polymerization of the polymers increase with increasing temperature, with 70°C providing most increased rate of reaction and 50°C, 60°C, and 70°C providing high molecular weight (e.g. Figures 4 and 5; pages 39 and 40).” Final Act. 13.

The Examiner stated that “One of ordinary skill in the art would have been motivated to select C16-C18-fatty alcohol-(ethylene glycol)25 ether methacrylate [the elected species b) of claim 22] as it is taught to be an advantageous thickener and was shown to have improved transparency.” Final Act. 13.

The Examiner found that it would be obvious to keep the polymerization reaction at constant temperature as required by the rejected claims because “Vanderhoff et al. teach the temperature is maintained during the polymerization and demonstrate that by selecting the polymerization temperature between 40–70°C one can control the rate of polymerization and the molecular weight.” Final Act. 13. The Examiner concluded:

One of ordinary skill in the art would have been motivated to select the temperatures of 50°C, 60°C, or 70°C in order to increase the molecular weight of the polymers of Blondel as this would increase the viscosity of the resulting solution and therefore increase the thickening ability of the invention (e.g. page 2, lines 8–11).

Ans. 14.

Species a) and b) of claim 22

Appellants state in the Appeal Brief that they “traverses the rejection for at least the reasons discussed” in the rejection based on Creamer. Appeal Br. 15. However, Appellants had argued that the rejection based on Creamer was defective because Creamer does not described its polymers as
thickeners. This defect is not present in this rejection because the Examiner relied on Blondel for its teaching of the claimed polymer and these polymers are characterized by Blondel as thickeners ("This invention relates to the technical field of cationic cross-linked polymers and their uses as a thickening agent." Blondel 1:3–4.) Other arguments depended on the combination of Creamer with other cited publications, and Creamer is not a part of this rejection.

Constant temperature

Appellants contend that "Vanderhoff merely presents a series of kinetic measurements at fixed temperatures in order to determine the rate constant $k_t$ of the inverse emulsion polymerization of the above described monomers" and that because "the rate constant $k_t$ is heavily dependent on the reaction temperature, it is obvious to the skilled person that the measurements shown in Vanderhoff have to avoid any heating steps which would hamper the calculation of $k_t$." Appeal Br. 13. For this reason, Appellants contend that while "the skilled artisan would appreciate that the temperature should be kept constant during kinetic measurements, nothing in Vanderhoff would have motivated or suggested one skilled in the art to carry out emulsion polymerization reactions at one specific constant temperature." Id. Appellants also argue that that Vanderhoff doesn’t teach the advantages of polymerizing at a constant temperature. Appeal Br. 14.

This argument does not persuade us that the Examiner erred.

Vanderhoff describes carrying out the inverse emulsion polymerization at a constant ("fixed") temperature as acknowledged by Appellants. Appeal Br. 13. Even if the purpose of the experiments was to study the kinetics of inverse emulsion polymerization, Appellants have not
Appeal 2018-005830
Application 13/670,889

presented sufficient evidence that one of ordinary skill in the art would not have recognized such conditions as useful for making a polymer by emulsion polymerization. Appellants only provided attorney argument which is unsupported by objective evidence. An argument made by counsel in a brief does not substitute for evidence lacking in the record. Estee Lauder, Inc. v. L’Oréal, S.A., 129 F.3d 588, 595 (Fed. Cir. 1997).

Vanderhoff does not have to provide advantages of the constant temperature as argued by Appellants. The constant temperature conditions described in Vanderhoff are useful to carry out inverse emulsion polymerization and do not have to be advantageous or better than other alternatives in the art as long as they are operable to carry out inverse emulsion polymerization, which Vanderhoff established they are. “[J]ust because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes.” In re Mouttet, 686 F.3d 1322, 1334 (Fed. Cir. 2012). A “finding that the prior art as a whole suggests the desirability of a particular combination need not be supported by a finding that the prior art suggests that the combination claimed by the patent applicant is the preferred, or most desirable, combination.” In re Fulton, 391 F.3d 1195, 1200 (Fed. Cir. 2004). Nonetheless, the Examiner provided a well-reasoned explanation as to why Vanderhoff’s conditions would have been adopted: to control the polymer’s molecular weight and resulting viscosity and thickening ability. Ans. 14.

Appellants further argue with respect to Vanderhoff that:
the polymerization at higher temperatures of 60 or 70 °C results in lower induction periods, an overall higher polymerization rate, and a faster conversion rate, but also a smaller number of polymer particles (see e.g., page 38, 2nd paragraph, pages 40

13
Appeal 2018-005830
Application 13/670,889

and 45, Figure 12). Based on these data, the skilled person would have naturally chosen a temperature profile of variable temperatures to exploit the advantages and to circumvent the disadvantages of only a single polymerization temperature.

Appeal Br. 13–14.

Claim 22 recites that “the temperature being kept constant during the inverse emulsion polymerization and being at least 40°C.” Vanderhoff describes fixed temperatures above this range of 50°C, 60°C, and 70°C, meeting the claimed limitation. Vanderhoff 37. Appellants did not establish that the temperatures in Vanderhoff were not being kept constant as required by the claims. Appellants’ argument that the skilled worker would have “chosen a temperature profile of variable temperatures to exploit the advantages and to circumvent the disadvantages of only a single polymerization temperature” because Vanderhoff allegedly describes disadvantages at certain temperatures is not supported by objective evidence. Specifically, Appellants did not provide objective evidence or an explanation as to why such particle sizes would have discouraged one of ordinary skill in the art from using the temperatures in Vanderhoff and that a variable temperature would have been used instead. Attorney argument alone is insufficient to establish this deficiency in Vanderhoff in the absence of evidence that one of ordinary skill in the art would have implemented a variable temperature to avoid the alleged disadvantages.

Blondel also is consistent with Vanderhoff. While Blondel may not have used a constant temperature throughout the entire process, Blondel does disclose holding the emulsion at 65°C for 60 minutes. Blondel 6:1–2; Final Act. 5. Accordingly, despite Appellants’ arguments about the disadvantages of these temperatures and holding the reaction constant for
fixed periods of time, these conditions were known to be effective for inverse emulsion polymerization.

**Different solubility**

Appellants also argue that “Blondel and Vanderhoff concern polymers of very **different solubility** and thus one skilled in the art would not have combined Blondel and Vanderhoff.” Appeal Br. 15–16.

This argument is not persuasive. Vanderhoff was only relied upon by the Examiner for teaching inverse emulsion polymerization at constant and fixed temperature and that controlling polymerization in such a way also controls the molecular weight of the resulting product. Final Act. 12–13. Appellants did not provide evidence that constant temperature conditions would not be effective in controlling the molecular weight, particularly when Blondel polymerizes at 65°C, a temperature which falls within the range of temperatures described in Vanderhoff. Thus, the Examiner found it obvious to carry out the inverse emulsion polymerization reaction at a constant temperature to control molecular weight and thickening ability as taught by Vanderhoff. Appellants did not provide objective evidence that one of ordinary skill in the art would have been dissuaded from applying Vanderhoff to Blondel, simply because the solubility of the polymers differed.

**Unexpected results**

Appellants contend that the thickeners described in Example 5 of the Specification establish unexpected results. Appellants state that “thickeners comprising cationic polymers prepared from both the ethylenically unsaturated monomer of component a) and from an ethylenically unsaturated associative monomer (Examples 5.2 and 5.3) exhibit a higher viscosity as
compared to thickeners comprising cationic polymers prepared only from component a) (Example 5.1).” Appeal Br. 14. Appellants state that the “viscosity of such thickener can be significantly increased even more when the polymerization is conducted at a constant temperature above 40°C, leading to an improvement in thickener performance of approximately 30%.” Id.

Appellants did not describe in the Appeal Brief the structure of the thickeners that were used to establish the asserted unexpected results. However, the Examiner found from reviewing the Specification that the polymers comprise elected monomer species, TMAEMC and C16E025Mac. See Spec. 24–25, Examples 1.1 and 1.2 in Table 2. Thus, only a single polymer (made with different concentrations of the monomers) was compared to the same polymer without the associative monomer.

Appellants have not explained how the results obtained from only one polymer species is sufficient to establish unexpected results for the full scope of the claim which includes a genus of polymers comprising the monomers of formulae II and I and a broad range of monomer amounts (20 to 99.99% by weight for formula II and 0.01 to 80% by weight for formula II. Unexpected results must be “commensurate in scope with the degree of protection sought by the claimed subject matter.” In re Harris, 409 F.3d 1339, 1344 (Fed. Cir. 2005). When unexpected results are proffered by an appellant to rebut a prima facie case of obviousness, the appellant must

---

3 Table 6 of the Specification states that example 5.2 is a “comparative example.” Spec. 30:5–7. However, Appellants state in the brief, as indicated above, that it is a polymer comprising an associative monomer within the scope of claim 22.
“provide[] an adequate basis to support the conclusion that other embodiments falling within the claim will behave in the same manner” in order to “establish that the evidence is commensurate with [the] scope of the claims.” *In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011). One data point is insufficient to “to ascertain a trend in the exemplified data which would allow [one having ordinary skill in the art] to reasonably extend the probative value thereof.” *In re Kollman*, 595 F.2d 48, 56 (CCPA 1979).

Here, Appellants must, therefore, demonstrate or explain why the result of the single polymer would establish the asserted unexpected result for the full scope of claim 22. We conclude they have not done so.

The Examiner set forth this objection in the Final Office Action on pages 15–16, including identifying other deficiencies in the data which we agree with but need not reiterate here. Appellants did not adequately respond to the Examiner’s well-reasoned statement as to why the data does not overcome the obviousness rejection. Accordingly, we conclude that, for the reasons stated here and by the Examiner, the data in the Specification is inadequate to establish the non-obviousness of the full scope of claim 22.

Summary

The foregoing reasons, the rejection of claim 22 as obvious based on Blondel, Moraes, and Vanderhoff is affirmed. Claims 23–28, 30, 31, 33, 35–40, 45–47 and 50 were not argued separately and fall with claim 22. 37 C.F.R. § 41.37(c)(1)(iv).
REJECTIONS 2 AND 3

Appellants did not provide separate arguments for claims 41–44. Creamer is relied upon in these rejections to meet the recited pH of the rejected claims. Final Act. 9–10. Because the Examiner did not make findings that such pH would have been obvious based on Blondel, Moraes, and Vanderhoff, which we found describe the claimed polymer, we are compelled to reverse rejections 2 and 3 of these claims, as well. The obviousness rejections of claims 41–44 are reversed.

TIME PERIOD

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-IN-PART