



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
12/066,262 03/08/2008 Andrew C. Strange entrotech 06-0003-US 8326

36032 7590 12/13/2016
THE GRIFFITH LAW FIRM, A P.C.
991C Lomas Santa Fe Drive
Suite 450
Solana Beach, CA 92075

Table with 1 column: EXAMINER

LOPEZ, RICARDO E.

Table with 2 columns: ART UNIT, PAPER NUMBER

1786

Table with 2 columns: NOTIFICATION DATE, DELIVERY MODE

12/13/2016

ELECTRONIC

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):

lgriffith@griffithpc.com

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

*Ex parte* ANDREW C. STRANGE and JAMES E. MCGUIRE JR.<sup>1</sup>

---

Appeal 2015-007093  
Application 12/066,262  
Technology Center 1700

---

Before WESLEY B. DERRICK, CHRISTOPHER L. OGDEN, and  
CHRISTOPHER C. KENNEDY, *Administrative Patent Judges*.

KENNEDY, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) from the Examiner's decision to reject claims 1–5, 8–10, 23, 27–34, 43–45, and 47–49. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

BACKGROUND

The subject matter on appeal relates to resin compositions for preparation of braid-reinforced composites. *E.g.*, Spec. ¶ 2; Claim 1.

---

<sup>1</sup> According to the Appellants, the real party in interest is “entrotech, inc.” *See* Supplemental Appeal Brief dated May 31, 2016 (captioned “Communication re: Real Party in Interest”).

Claim 1 is reproduced below from page 93 (Claims Appendix) of the Appeal Brief:

1. A resin composition for preparation of a braid-reinforced composite, the composition comprising:
  - an essentially uncured initial resin comprising at least one thermosetting resin and, optionally, at least one thermoplastic resin;
  - an amount of at least one curative for the thermosetting resin, which amount of curative effectuates cure of the resin composition within about 45 to about 60 minutes when heated to 120°C.; and
  - at least one viscosity modifier;wherein viscosity of the initial resin in the resin composition is less than about 6 Pa·s when tested at 25°C;
- wherein the resin composition is capable of impregnating a braid form using hot-melt processing; and
- wherein the resin composition is capable of remaining impregnated throughout the braid form, without partial curing, until final cure of the resin composition to form the braid-reinforced composite.

#### REJECTIONS ON APPEAL

1. Claim 48 stands rejected under 35 U.S.C. § 112, ¶ 1, for failure to comply with the written description requirement.
2. Claims 1–5, 8, 23, 27–29, 31–34, 43–45, 47, and 49<sup>2</sup> stand rejected under 35 U.S.C. § 103(a) as unpatentable over Kalnin et al. (US 3,674,581,

---

<sup>2</sup> The Examiner's Answer lists claim 50 as being subject to Rejection 2. *See* Ans. 5. Claim 50, however, was withdrawn by the Appellants in claim amendments following the Final Office Action, *see* Claim Amendments dated September 15, 2014, at 7, and is not before us in this appeal.

issued July 4, 1972) in view of Weigel et al. (US 6,007,917, issued Dec. 28, 1999).

3. Claims 9 and 10 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Kalnin in view of Weigel, further in view of Nejhad et al. (US 2007/0142548 A1, published June 21, 2007).

4. Claim 30 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Kalnin in view of Weigel, further in view of Kamae et al. (US 2004/0044147 A1, published Mar. 4, 2004).

## ANALYSIS

With the exception of claim 44 (subject to Rejection 2), on this record, we find the Appellants' arguments unpersuasive and, accordingly, we affirm the Examiner's rejections for reasons set forth below, in the Final Action, and in the Examiner's Answer. *See generally* Final Act. 2–13; Ans. 3–22.

### *I. Rejection 1*

In claim amendments dated April 16, 2014, the Appellants added new claim 48, which then depended from claim 1 and further recited “with the proviso that the composition does not include a fluorene amine curative.” *See* Claim Amendments dated Apr. 16, 2014, at 6. In claim amendments dated September 15, 2014 (following the Final Office Action), the Appellants converted claim 48 to an independent claim by amending it to include the limitations of claim 1, while maintaining the limitation “with the proviso that the composition does not include a fluorene amine curative.” *See* Claim Amendments dated September 15, 2014, at 6.

The Examiner determines that the limitation “with the proviso that the composition does not include a fluorene amine curative” is a negative

limitation that lacks written description support in the Specification. *See* Ans. 3–4.

Pointing to various portions of the Specification, the Appellants essentially argue that, because the Specification does not positively recite a fluorene amine curative or disclose any working examples that include a fluorene amine curative, “it is clear that the invention of claim 48 was described throughout the originally filed Specification in a manner evidencing that Appellants had possession of the claimed subject matter.” *See* App. Br. 14–15.

We agree with the Examiner that claim 48 fails to comply with § 112, ¶ 1. “[T]he test for [compliance with § 112, ¶ 1] is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). The mere absence of a positive recitation is not sufficient basis for exclusion. *See Santarus, Inc. v. Par Pharmaceutical, Inc.*, 694 F.3d 1344, 1351 (Fed. Cir. 2012) (“Negative claim limitations are adequately supported when the specification describes a reason to exclude the relevant limitation.”).

In this case, the Appellants rely on disclosure merely describing compositions that do not include a fluorine amine curative, but identify nothing in the Specification for why it would be excluded. There is no indication, accordingly, that the inventors had possession, at the time the original Specification was filed, of the negative limitation of claim 48. The Appellants do not identify in the Specification any discussion of fluorene amine curatives at all. The Appellants added the negative limitation to

overcome the prior art. *See generally* Office Action Response dated April 16, 2014.

The Appellants' Specification discloses that "[a]ny suitable curative can be used in resin compositions of the invention." Spec. ¶ 37. At the time of the invention, fluorene amine curatives were known curatives for use in compositions similar to that claimed by the Appellants. *See, e.g.,* Weigel at 5:25. As noted above, the Appellants identify nothing in the record persuasively indicating that the inventors had possession of or otherwise contemplated affirmative exclusion of known fluorene amine curatives until the April 16, 2014 claim amendments were filed. Standing alone, the fact that the Specification's working examples do not use fluorene amine curatives is not a sufficient written description, given that the Appellants do not identify in the Specification any discussion of fluorene amine curatives or any "reason to exclude the relevant limitation." *See Santarus*, 694 F.3d at 1351.

On this record, the Appellants have not persuasively identified reversible error in the Examiner's rejection. We affirm the § 112, ¶ 1 rejection of claim 48.

## *II. Rejection 2*

The Appellants' arguments focus on limitations appearing in claims 1, 4, 5, 8, 33, 43, 44, and 45. We limit our discussion to those claims. Claims 2, 3, 23, 27–29, 31, 32, 34, 47 and 49 depend from claim 1 and will stand or fall with claim 1.

A. Claim 1

The Examiner finds, *inter alia*, that Kalnin teaches fiber reinforced composites comprising a resin composition that includes an epoxy resin having a viscosity of less than 6 Pa·s and an aliphatic amine curing agent. *See* Ans. 5. The Examiner further finds that Kalnin teaches the addition of “conventional modifiers or diluents” to control the “flowable properties” of the resin. *See* Kalnin at 5:2–7; Ans. 5.

The Examiner finds, *inter alia*, that Weigel teaches curable resin compositions comprising at least one aromatic polyepoxide and at least one fluorene amine curative. Ans. 6. The Examiner further finds that Weigel teaches “that various adjuvants can also be added to the composition to alter the characteristics of the cured composition,” including “thixotropic agents (known viscosity modifiers) such as fumed silica.” *Id.* at 6. The Examiner concludes that “it would have been obvious . . . to select a particular rheology modifier for Kalnin[’s] epoxy resin composition, including a thixotropic silica fumes with reasonable expectations of success when it is desired to modify the flow properties of the uncured epoxy resin.” *Id.*

The Examiner also finds that both Kalnin and Weigel teach fiber reinforcement of “a variety of configurations” including “woven structure[s] constructed by interlacing yarns, fibers or filaments to form patterns such as plain, harness satin or leno weaves” and “nonwoven structure[s] or planar textile structure[s] produced by loosely compressing together fibers, yarns, and the like,” but that “said prior art combination does not specifically recite that the reinforcing fibers have a braid configuration.” *Id.* at 6–7. The Examiner finds that “Kalnin in view of Weigel meets the compositional and/or chemical limitations set forth and there is nothing on record to

evidence that the prior art product could not function in the desired capacity [i.e., impregnating a braid form].” *Id.* at 7. The Examiner concludes that the composition of claim 1 is obvious in view of Kalnin and Weigel.

The Appellants first argue that the prior art does not teach, suggest, or otherwise render obvious a composition “wherein the resin composition is capable of remaining impregnated through the braid form, *without partial curing*, until final cure of the resin composition to form the braid-reinforced composite” (emphasis added), as recited by claim 1. *See* App. Br. 17–18. In particular, they argue that Kalnin “teaches away” from that limitation because Kalnin “stresses the need for partial curing” prior to final curing. *Id.* at 18.

We are not persuaded by that argument largely for reasons set forth by the Examiner in the Answer. *See* Ans. 15. The Appellants rely on a portion of Kalnin that states that “[i]t is possible . . . to partially cure a thermosetting matrix-forming material . . . to a B-stage or prepreg consistency.” *See* App. Br. 18 (citing Kalnin at 7:7–21 (emphasis added)). Thus, as the Examiner explains, Kalnin “teach[es] that partial curing is optional prior to final curing.” *See* Ans. 15.

The Appellants also rely on Kalnin’s teaching that, “[u]pon the passage of time even at room temperature, a B-stage thermosetting resin will assume a C-stage consistency.” App. Br. 18–19; Kalnin at 7:19–21. That teaching, however, also applies to compositions that are subject to optional partial curing. *See* Kalnin at 7:7–21. The Appellants do not persuasively explain why a person of ordinary skill in the art would have expected that statement to apply to compositions of Kalnin that are not partially cured prior to final curing.

For a reference to “teach away,” it must criticize, discredit, or otherwise discourage the claimed solution. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). Given that Kalnin states that partial curing “is possible,” rather than required, the Appellants have not persuasively identified a disclosure in Kalnin that “teaches away” from the “without partial curing” limitation of claim 1.

The Appellants also argue that Kalnin does not expressly disclose braids forms, which allegedly “are known to pose unique challenges when impregnating the same.” App. Br. 20–21. However, Kalnin teaches a composition comprising (1) the initial resin of claim 1 described as “particularly favorable” by the Specification, i.e., an epoxy resin, *compare* Spec. ¶ 35 *with* Kalnin at 1:18, (2) a curative described by the Specification as being suitable for use with epoxy resins, i.e., aliphatic amine curatives, *compare* Spec. ¶ 37 *with* Kalnin at 5:59, and (3) a “conventional modifier or diluent” to achieve desired “flowable properties” of the resin, *see* Kalnin at 5:2–7.

Concerning the “modifier or diluent,” Kalnin teaches that, “[i]f possible, it is preferred, however, to avoid the use of a non-reactive diluent which must be removed by evaporation.” Kalnin at 6:51–53. The Appellants’ Specification expresses a similar preference. *See* Spec. ¶ 42 (“While common diluents can be used to reduce a resin composition’s viscosity, their presence in the final cured resin may negatively impact its properties . . . .”). The Appellants’ Specification states that “[a]ny suitable viscosity modifier can be used in the invention, with the understanding that such viscosity modifiers differ from common diluents.” Spec. ¶ 41. Given that Kalnin teaches the use of both “modifiers” and “diluents” for the

purpose of achieving desired “flowable properties” of the resin,” *see* Kalnin at 5:2–7, and that Kalnin and the Appellants’ Specification disclose similar concerns about the use of certain diluents, we understand the Examiner’s rejection to consider Kalnin’s “modifiers,” as distinct from common “diluents,” to fall within the scope of claim 1’s “viscosity modifier.” The Appellants unexplained, unsupported statement to the contrary, *see* App. Br. 23 (“Nor would the ‘conventional modifiers or diluents’ referenced by Kalnin be understood to encompass viscosity modifiers of Appellants’ claim 1.”), is unpersuasive. *See In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (explaining that, even if the examiner had failed to make a prima facie case, the Board would not have erred in framing the issue as one of reversible error because “it has long been the Board’s practice to require an applicant to identify the alleged error in the examiner’s rejections”); *cf. also In re Lovin*, 652 F.3d 1349, 1357 (Fed. Cir. 2011) (“naked assertions” without substantive argument typically are not persuasive).

Thus, resin compositions taught or suggested by Kalnin appear not only to fall within the scope of the resin composition of claim 1, but to use ingredients that are described by the Specification as preferred (i.e., epoxy resins and aliphatic amines). The Appellants do not persuasively explain why Kalnin’s compositions would not be suitable for use with braid forms, why Kalnin’s compositions would not be “capable of impregnating a braid form using hot-melt processing,” or why Kalnin’s compositions would not be “capable of remaining impregnated throughout the braid form, without partial curing, until final cure of the resin composition,” as recited by claim 1. *See* Ans. 7 (“Kalnin in view of Weigel meets the compositional and/or chemical limitations set forth and there is nothing on record to evidence that

the prior art product could not function in the desired capacity.”); *cf. In re Schreiber*, 128 F.3d 1473, 1477–79 (Fed. Cir. 1997) (“[W]here the Patent Office has reason to believe that a functional limitation . . . may . . . be an inherent characteristic of the prior art, it [may] require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on.”).

Accordingly, the Appellants have not persuaded us of reversible error in the Examiner’s rejection of claim 1.

#### B. Claims 4, 5, and 8

Claims 4, 5, and 8 depend from claim 1 and further limit the “viscosity modifier” of claim 1. Claim 4 recites “wherein the viscosity modifier comprises a thixotropic agent, a nanomaterial, or a combination thereof.” Claim 5 recites “wherein the viscosity modifier comprises a thixotropic agent.” Claim 8 recites “wherein the viscosity modifier comprises fumed silica.”

As noted above, the Examiner finds that Weigel teaches resins similar to those of claim 1, and that Weigel “teaches that various adjuvants can also be added to the composition to alter the characteristics of the cured composition.” Ans. 6. The Examiner finds that Weigel teaches “useful adjuvants are thixotropic agents (known viscosity modifiers) such as fumed silica.” *Id.* (citing Weigel at 8:59–63). The Examiner concludes that it would have been obvious to use Weigel’s known adjuvants to modify the flow properties of the compositions of Kalnin. Ans. 6.

The Appellants first argue that “Weigel teaches away” from the “without partial curing” limitation of the claims because “Weigel stresses the importance of partially melt dissolving the curatives therein, recognizing

that at least partial curing occurs simultaneously with the melt dissolution step described therein.” App. Br. 21.

We are not persuaded by that argument. The portion of Weigel relied upon by the Appellants states that Weigel’s resin composition “can be prepared by melt dissolving a portion of the fluorene amine curative . . . .” *See Weigel* at 8:8–11. Weigel teaches that the purpose of the melt dissolving process is to dissolve the curative, not to effect partial curing of the composition. *See id.* at 8:8–16. Weigel teaches that “substantial curing” is not desirable, but the Appellants do not identify where Weigel suggests that partial curing is desirable or necessary. *See id.* Nor do the Appellants provide persuasive evidence that Weigel’s dissolving process necessarily would result in partial curing. Even assuming that partial curing may occur in Weigel’s melt dissolution process, the Appellants provide no persuasive explanation how Weigel criticizes, discredits, or otherwise discourages a composition that does not involve partial curing. *See Fulton*, 391 F.3d at 1201.

The Appellants argue that Weigel’s Comparative Example 1 “illustrate[s] the unsuitability of a resin composition prepared without any melt dissolution of the fluorene amine curative (and partial curing of the epoxy resin composition) therein.” App. Br. 21–22. Like column 8 of Weigel, discussed above, Comparative Example 1 concerns dissolution of the curative in the in the polyepoxide component of the resin; on its face, it does not appear to suggest that partial curing is desirable or required. *See Weigel* at 15:10–20.

On this record, we are not persuaded that the portions of Weigel cited by the Appellants teach away from the “without partial curing” limitation of the claims.

The Examiner relies on Weigel principally for its teaching of known viscosity modifiers. As discussed above, Kalnin teaches the use of viscosity modifiers to achieve desired “flowable properties” of the resin. *See* Kalnin at 5:2–7. Kalnin teaches that “[n]umerous modifiers, diluents, or flexibilizers of both the reactive and non-reactive types are well known.” *Id.* at 7–9.

Weigel teaches that fumed silica is one such known viscosity modifier for use in resin compositions similar to those of Kalnin. Specifically, Weigel teaches the addition of thixotropic agents, including fumed silica, to its composition, *see* Weigel at 8:61–62, and the Examiner finds that “a thixotropic agent . . . will immediately be understood by one of ordinary skill in the art as a flow or viscosity modifier,” Ans. 15–16. The Appellants do not file a Reply Brief to dispute that finding. The Examiner’s obviousness rationale essentially proposes the substitution of Weigel’s viscosity modifier (i.e., fumed silica) for the viscosity modifier of Kalnin. *See* Ans. 6. Such substitutions typically do not result in nonobvious subject matter. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416–21 (2007) (“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”); *see also id.* at 416 (“[W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.”).

The Appellants argue that, because fumed silica is known to increase viscosity, while “Kalnin stresses the importance of increased flowability of the matrix-forming material . . . . [O]ne of ordinary skill in the art would not be motivated to use a thixotropic agent, including fumed silica, as a viscosity modifier in the compositions of Kalnin.” *See* App. Br. 22–23.

We are not persuaded by that argument. The portion of Kalnin relied upon by the Appellants in support of their position that Kalnin stresses increased flowability states, in relevant part: “For best results, it is recommended that an uncured epoxy resin be selected which is inherently liquid at about room temperature or which may be modified to possess flowable properties at about room temperature by the addition of conventional modifiers or diluents.” Kalnin at 5:2–7.

Largely for reasons stated by the Examiner, *see* Ans. 16, we are not persuaded that Kalnin’s preference for flowability would have dissuaded a person of ordinary skill in the art from substituting appropriate amounts of Weigel’s thixotropic agents, including fumed silica, for Kalnin’s modifiers, in certain embodiments. While we agree with the Appellants that Kalnin generally suggests addition of modifiers or diluents to increase flowability, we are not persuaded that Kalnin suggests that addition of a thixotropic agent such as fumed silica (a known viscosity modifiers) would cause Kalnin’s compositions to lose their desired “flowable properties.” *See* Kalnin at 5:2–7. For example, it appears that if the selected uncured epoxy resin were particularly non-viscous, some amount of a viscosity-increasing modifier such as fumed silica could be added to provide a composition having desired flowable properties. Absent evidence to the contrary, it would have been within the ordinary level of skill in the art to select known

modifiers, including fumed silica, to provide a composition having desired “flowable properties.” *See* Kalnin at 5:2–7. The Appellants provide no persuasive explanation as to why addition of fumed silica or other thixotropic agents to Kalnin’s composition necessarily would have decreased flowability to an undesirable level.

In view of the arguments presented, we are not persuaded of reversible error in the Examiner’s rejection of claims 4, 5, and 8.

### C. Claim 33

Claim 33 depends from claim 1 and recites “wherein the resin composition has relatively low tack.”

The Examiner notes that the “Appellant has not defined quantitatively the requirement for ‘relatively low tack.’”<sup>3</sup> Ans. 10. The Examiner nevertheless finds that, “because Weigel . . . teaches in Table 1 compositions having tackiness described as none or slightly, the Examiner considers said compositions as having relatively low tack. Therefore, Kalnin in view of Weigel renders obvious the additional limitation in the subject claim.” *Id.*

The Appellants do not dispute that at least some of Weigel’s compositions fall within the scope of the “relatively low tack” limitation of claim 33. Instead, the Appellants argue that, “[i]rrespective of whether certain compositions exemplified in Weigel are described as having no or slight tack, one of ordinary skill in the art would not be motivated to modify Kalnin in a way that is counterproductive to the principles set forth therein.” App. Br. 39. In particular, they argue that, “[o]ne of ordinary skill in the art

---

<sup>3</sup> Though noting vagueness in the definition of “relatively low tack,” the Examiner does not reject claim 33 under 35 U.S.C. § 112, ¶ 2. Our decision does not address the issue of whether or not claim 33 is indefinite.

would not understand Kalnin's stated requirement of partially curing the compositions therein 'to at least a tacky consistency' as teaching or suggesting the resin composition of claim 33, which has relatively low tack." *See App. Br. 39–40.*

The Appellants' argument appears to again be based on the assumption that Kalnin requires partial curing. *See App. Br. 39–40.* As explained above with respect to claim 1, we are not persuaded that Kalnin requires partial curing, given that Kalnin states "[i]t is possible . . . to partially cure . . . ." *See Kalnin at 7:7–11.*

Moreover, the Appellants' reliance on certain disclosures in Kalnin referring to tackiness does not identify error in the Examiner's rationale. The Appellants cite a portion of Kalnin that states: "Once the introduction of the flowable matrix-forming material is complete, it is solidified to at least a tacky consistency." Kalnin at 6:70–72; App. Br. 39–40. However, the fact that Kalnin's resin composition is solidified (for example, by heat) to a tacky consistency after it is introduced to Kalnin's mold, *see Kalnin at 1:19–24, 6:70–74*, says nothing about the level of tack of the resin composition pre-curing, which appears to be the state of the composition relevant to claim 33. To the extent that Kalnin describes its *partially cured* resin compositions as "soft and tacky," *id.* at 7:17–19, that description provides no evidence that Kalnin's uncured compositions would also have been considered tacky.

The Appellants provide no explanation as to why pre-cured compositions described by Kalnin would not fall within the scope of the term "relatively low tack" under the broadest reasonable interpretation of that term consistent with the Specification. As the Examiner notes, *see Ans.*

10, the Specification provides very little guidance as to the meaning of the term “relatively low tack.” The plain meaning of the term, however, permits at least some tack. The Appellants make no effort to quantify or describe the amount of tack permitted by claim 33, or the amount of tack possessed by Kalnin’s uncured compositions.

Kalnin’s compositions are similar to those of Weigel. Both references teach compositions comprising epoxy resins, *compare* Kalnin at 5:43–48 (e.g., DER 332 epoxy resin) *with* Weigel at 14:47 (e.g., DER 332 epoxy resin), curatives, *compare* Kalnin at 5:50–70 *with* Weigel at Abstract, and viscosity modifiers, *compare* Kalnin at 5:6–7 *with* Weigel at 8:59–62. The Examiner finds, and the Appellants do not dispute, that Weigel teaches that at least some such compositions have little to no tack. Ans. 10. Given the similarity of Kalnin’s compositions to Weigel’s, and the fact that Kalnin teaches the importance of flowable properties in its compositions, it appears reasonable to conclude that Kalnin renders obvious compositions that would have been expected to fall within the broadest reasonable scope of claim 33’s “relatively low tack” limitation. *Cf.* Ans. 7 (“Kalnin in view of Weigel meets the compositional and/or chemical limitations set forth and there is nothing on record to evidence that the prior art product could not function in the desired capacity.”); *cf. also* *Schreiber*, 128 F.3d at 1477–79; *In re Best*, 562 F.2d 1252, 1255 (CCPA 1977) (“Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product.”).

The Appellants' argument, which focuses on cured or partially cured compositions in Kalnin that are described as tacky, does not provide any evidence to the contrary. *Cf. Jung*, 637 F.3d at 1365 (explaining that, even if the examiner had failed to make a prima facie case, the Board would not have erred in framing the issue as one of reversible error because "it has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections"). In view of the arguments presented, we are not persuaded of reversible error in the Examiner's rejection of claim 33.

#### D. Claim 43

Claim 43 depends from claim 1 and recites "wherein the at least one curative for the thermosetting resin effectuates cure of the resin composition when heated to 100°C."

As noted above, the Examiner finds that Kalnin teaches the use of aliphatic amine curing agents, which are likewise disclosed as useful curing agents by the Appellants' Specification. *See* Ans. 5; Spec. ¶¶ 37, 38. The Examiner also finds that Kalnin teaches curing at temperatures in the range of about 80 to 200°C. Ans. 5 (citing Kalnin at 7:28–31). It appears that, in the statement of the rejection, the Examiner does not expressly discuss claim 43. *See generally* Final Act. 4–10; Ans. 5–11. The Appellants identify that alleged deficiency in the Appeal Brief and argue that "a prima facie case of obviousness has not been properly established in rejecting claim 43." *See* App. Br. 48.

The Examiner responds in the Answer, noting again that Kalnin teaches aliphatic amine curing agents, and that Kalnin teaches a curing temperature range that encompasses the curing temperature of claim 43,

concluding that claim 43 would have been obvious in view of Kalnin's teachings. *See* Ans. 18.

The Appellants do not file a Reply Brief to contest the Examiner's findings set forth in the Answer. On this record, given that Kalnin teaches curing agents that are the same as or similar to those of disclosed by the Specification, and given that Kalnin teaches curing temperatures that encompass the temperature recited by claim 43, we are not persuaded of reversible error in the Examiner's determination that claim 43 would have been obvious in view of the prior art.

#### E. Claim 44

Claim 44 depends from claim 1 and recites "wherein the resin composition exhibits Bingham plastic fluid behavior."

The Examiner finds that Kalnin and Weigel do not "specifically recite that the resin composition exhibits such behavior." Ans. 7–8. However, the Examiner determines that, because Kalnin in view of Weigel renders obvious a composition including an initial resin (e.g., epoxy resins such as DER 332), a curing agent (e.g., aliphatic amines), and a viscosity modifier (e.g., fumed silica) that falls within the scope of claim 1 and possesses ingredients described by the Appellants as preferred, "it is reasonable to expect that the resin composition suggested by Kalnin in view of Weigel would exhibit Bingham plastic fluid behavior. The Burden is upon Appellant to prove otherwise." Ans. 8.

The Appellants argue that "not all compositions having an amount of fumed silica" necessarily exhibit Bingham plastic fluid behavior. App. Br. 56. In particular, they point to Table 1 of their Specification, which shows a

resin composition that includes fumed silica but does not exhibit Bingham plastic fluid behavior. *See* Spec. ¶ 99 (Table 1).

We are persuaded by the Appellants' argument. The Examiner's conclusion of obviousness appears to rest solely on the fact that Kalnin in view of Weigel renders obvious compositions having an epoxy resin, a curative, and a fumed silica modifier. *See* Ans. 19. The Appellants have adequately established that such compositions do not necessarily exhibit Bingham plastic fluid behavior. *See* App. Br. 56; Spec. ¶ 99. The Specification suggests that some minimum amount of fumed silica is necessary to achieve Bingham plastic fluid behavior. *See* Spec. ¶ 99. Although the record supports the Examiner's determination that it would have been obvious to add some amount of fumed silica to certain of Kalnin's compositions, the Examiner does not establish whether a person of ordinary skill in the art would have been motivated to add a sufficient amount of fumed silica to achieve Bingham plastic fluid behavior, particularly in light of Kalnin's apparent desire to maintain the "flowable properties" of its compositions. Accordingly, we reverse the Examiner's rejection of claim 44.

#### F. Claim 45

Claim 45 depends from claim 1 and recites "wherein about 2% to about 7% by weight of the resin composition comprises one or more viscosity modifiers." Claim 45, notably, is not limited to fumed silica.

The Examiner finds that Weigel "teaches that amounts of up to about 200 parts of adjuvant per 100 parts of epoxy resin compositions can be used," and that Weigel "recognizes that the viscosity of the curable epoxy resin composition is a variable in achieving proper processing." Ans. 8–9.

The Examiner concludes that “it would have been obvious . . . to optimize the % weight of viscosity modifier since it has been held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *Id.* at 9.

The Appellants first argue that, “given Kalnin’s requirement that flowability of the compositions therein be increased, inclusion of a viscosity modifier in the amount recited in claim 45 would be counterproductive therein.” App. Br. 65.

We are not persuaded by that argument. Claim 45 does not require that the viscosity modifier be fumed silica, or even that it be used to increase viscosity. Kalnin teaches the suitability of an uncured epoxy resin that “may be modified to possess flowable properties at about room temperature by the addition of conventional modifiers or diluents.” Kalnin at 5:2–7. Kalnin thus suggests the addition of viscosity modifiers to achieve desired flowable properties. The Appellants’ arguments do not persuade us that inclusion of a viscosity modifier in the amounts recited by claim 45 would be contrary to the goals of Kalnin. The Appellants do not persuasively dispute the Examiner’s finding that viscosity modifier concentration is a result effective variable.

The Appellants also argue that “unique properties obtainable when using higher levels of viscosity modifiers” support the nonobviousness of the claimed range. App. Br. 66. Even if we were to agree that the claimed range produces “unique properties,” that would be insufficient to support nonobvious because the Appellants have not attempted to show that the alleged unique properties would have been unexpected. *See, e.g., In re*

*Applied Materials, Inc.*, 692 F.3d 1289, 1297 (Fed. Cir. 2012) (“The outcome of optimizing a result-effective variable may still be patentable if the claimed ranges are critical and produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art.” (internal quotation marks omitted)).

On this record, we are not persuaded that the range recited by claim 45 imparts patentability to the composition. *Cf. In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990) (“The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims . . . [and] in such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.” (citations omitted)).

### *III. Rejection 3*

Claims 9 and 10, which depend from claim 1, are subject to Rejection 3. Because the Appellants do not raise separate arguments for the patentability of claims 9 and 10, we affirm the Examiner’s rejection of those claims for reasons stated above with respect to claim 1.

### *IV. Rejection 4*

Claim 30 depends from claim 1 and recites “further comprising at least one detackifying resin selected from waxes, fatty acids, and other release agents.”

The Examiner finds that Kalnin and Weigel both teach that various adjuvants can be added to the resin compositions to alter the characteristics of the composition, including adjuvants that influence viscosity and tack.

*See* Ans. 12–13. The Examiner finds that neither Kalnin nor Weigel “specifically recognize the use of detackifying or release agents.” *Id.* at 13. The Examiner finds that Kamae teaches production of fiber-reinforced composite materials “by impregnating a reinforcing fiber substrate placed in a mold with a liquid thermosetting resin composition, and heating to cure.” *Id.* The Examiner further finds that Kamae teaches the addition of “an internal release agent” to its epoxy resin compositions. *Id.* The Examiner concludes that “[i]t would have been obvious . . . to have added release agents as taught by Kamae to Kalnin in view of Weigel’s resin composition when it is desired to further modify the tackiness of the impregnating resin composition.” *Id.*

The Appellants argue that addition of a detackifying resin to Kalnin’s composition would be contrary to “Kalnin’s stated requirement of partially curing the compositions therein ‘to at least a tacky consistency.’” App. Br. 90–91.

We are not persuaded by that argument. Partial curing in Kalnin is optional. *See* Kalnin at 7:7–8. As noted above, both Kalnin and Weigel teach the addition of various ingredients to an epoxy resin composition to achieve desired viscosity and tack characteristics. Kalnin, like Kamae, involves the use of a mold. *See* Kalnin at 1:10–30. Both Kalnin and Kamae teach that, if necessary, steps should be taken to prevent the molded composite from sticking to the mold. *See* Kalnin at 3:23–28 (“It is recommended that the mold be of a composite that will readily release from the resulting reinforced composite body in those instances where the mold is to be discarded following the formation of the composite body. Alternatively, conventional mold release agents may be selected.”); Kamae

¶ 71 (describing addition of “an internal release agent” to the epoxy resin composition), ¶ 111 (describing addition of “release agents to the surface of the mold to demold the resulting fiber-reinforced composite materials easily”). Kalnin does not expressly state whether its “mold release agents” are added to the mold or to the resin composition, but Kamae teaches that mold release agents may be added to either the resin composite or to the surface of the mold. Kamae ¶¶ 71, 111. In view of those teachings and Kalnin’s express recognition of the potential problem of adherence of the mold to the composite, we agree with the Examiner that it would have been obvious to a person of ordinary skill in the art, through the use of only ordinary creativity, to include a release agent in the resin composition to the extent necessary to minimize adherence of the composite to the mold.

The fact that Kalnin describes some of its cured or partially cured resin compositions as “tacky” does not persuade us otherwise. *See* App. Br. 90–91. The Appellants provide no evidence or persuasive argument that addition of an appropriate amount of release agent would necessarily cause a resin composition to lose all tackiness. On the contrary, Kalnin suggests that the desired level of tackiness (if any) of the resin composition relative to the mold is low enough that adherence to the mold would not be problematic. *See* Kalnin at 3:23–28. Because addition of a release agent to a resin composition is a known way of preventing or reducing adherence of a composite to a mold, *see* Kamae ¶ 71, we are not persuaded of reversible error in the Examiner’s rejection of claim 30.

CONCLUSION

We AFFIRM the Examiner's § 112, ¶ 1 rejection of claim 48.

We AFFIRM the Examiner's § 103 rejections of claims 1–5, 8–10, 23, 27–34, 43, 45, 47, and 49.

We REVERSE the Examiner's § 103 rejection of claim 44.

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

AFFIRMED-IN-PART