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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/324,296	12/13/2011	Cecile Gibon	074008-1568-286358	3382

123223 7590 10/01/2020

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ART UNIT	PAPER NUMBER
1761	

NOTIFICATION DATE	DELIVERY MODE
10/01/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte CECILE GIBON, XIN YANG, CHRISTOF KUJAT, MARTIN WEBER, LASZLO SZARVAS, DANIEL KLEIN, PETRA POETSCHKE, and BEATE KRAUSE

_____

Appeal 2019-002789
Application 13/324,296
Technology Center 1700

_____

Before MICHAEL P. COLAIANNI, WESLEY B. DERRICK, and MERRELL C. CASHION, JR., *Administrative Patent Judges*.

DERRICK, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

The Appellant[1] filed an appeal under 35 U.S.C. § 134(a) from an Examiner's decision finally rejecting claims 18, 26, and 29–38. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies BASF SE as the real party in interest. Appeal Brief, filed October 10, 2018 ("Appeal Br."), 2.

CLAIMED SUBJECT MATTER

The subject matter of the claims on appeal generally relates to a thermoplastic molding composition including a polyamide, copolyamide, or polymer blend comprising polyamide; carbon black, graphite, or a mixture thereof, and ionic liquids. Specification, filed December 13, 2011 ("Spec."), Abstract.

Claims 26 and 35—reproduced below—are the sole independent claims on appeal.

> 26. A thermoplastic molding composition comprising, based on the thermoplastic molding composition,
>
> a) as component A, at least one polyamide or copolyamide selected from the group consisting of polyamide 66, polyamide 610, polyamide 6, nylon-6/66 copolyamides having from 5 to 95% by weight caprolactam units, and combinations thereof,
>
> b) as component B, from 4 to 8% by weight of carbon black or graphite, or a mixture thereof,
>
> c) as component C, from 0.3 to 1.2% by weight of ionic liquids;
>
> wherein the cation of the ionic liquid in component C isselected [sic] from the group consisting of quaternary ammonium cations, phosphonium cations, imidazolium cations, H-pyrazolium cations, pyridazinium ions, pyrimidinium ions, pyrazinium ions, pyrolidinium cations, guanidinium cations, 5- to at least 6-membered cations which comprise at least one phosphorus or sulfur atom, the 1,8-diazabicyclo[5.4.0]undec-7-enium cation and the l ,8-diazabicyclo[4.3.0]non-5-inium cation, and oligo- and polymers which comprise these cations; and
>
> wherein the anion in the ionic liquid in component C is selected from the group consisting of halide, optionally substituted C 1-4-carboxylate, phosphate, C 1-4-alkyl phosphate, Di-C 1-4-alkyl phosphate, C 1-4-alkyl sulfate, C 1-4-alkylsulfonate, hydrogensulfate, triflimide, tetrafluoroborate, triflate, and mixtures thereof.

> 35. A thermoplastic molding composition comprising, based on the thermoplastic molding composition,
>
> a) as component A, polyamide 6,
>
> b) as component B, 4 to 8% by weight of conductive carbon black,
>
> c) as component C, from 0.3 to 1.2% by weight of ionic liquids selected from the group consisting of 1-ethyl-3-methyl-imidazolium triflimide, 1-ethyl-3-methyl-imidazolium ethyl sulfate, 1-ethyl-3-methyl-imidazolium tetrafluoroborate, and 1-ethyl-3-methyl-imidazolium triflate.

Appeal Br. 20, 21–22.

REJECTIONS ON APPEAL

The Examiner maintains the following rejections:

Claims 26, 29, 30–32, and 34–36 stand rejected as unpatentable for obviousness over Schmidt[2] in view of Vathauer[3];

Claims 18 and 33 stand rejected as unpatentable for obviousness over Schmidt in view of Vathauer and Hell[4];

Claims 37 and 38 stand rejected as unpatentable for obviousness over Schmidt in view of Vathauer and Malet[5]; and

Claims 26, 29, 30–32, and 34–36 stand rejected as unpatentable for obviousness over Schmidt in view of Weber[6];

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[2] Schmidt et al., US 7,601,771 B2, issued October 13, 2009.
[3] Vathauer et al., US 2004/0167264 A1, published August 26, 2004.
[4] Hell et al., US 2008/0114105 A1, published May 15, 2008.
[5] Malet et al., WO 2010/86574 A2, published August 5, 2010; the Office relies on the corresponding publication US 2012/0108694 A1, published May 3, 2012, which use is not contested. Final Office Action, issued May 11, 2018 ("Final Act."), 5.
[6] Weber et al., US 2010/0019210 A1, published January 28, 2010.

Claims 18 and 33 stand rejected as unpatentable for obviousness over Schmidt in view of Weber and Hell; and

Claims 37 and 38 stand rejected as unpatentable for obviousness over Schmidt in view of Weber and Malet.

DISCUSSION[7]

For any ground of rejection, "the examiner bears the initial burden . . . of presenting a *prima facie* case of unpatentability." *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). We consider the record to determine whether Appellant has identified reversible error in the Examiner's rejection. *See In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) ("[I]t has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections," *citing Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential)). An Appellant can also support the patentability of claims on the basis that the claimed invention imparts unexpected results and that the unexpected results are reasonably commensurate with the scope of protection sought by the claim on appeal. *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983); *In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972).

The Examiner set forth two parallel sets of grounds—Schmidt in combination with Vathauer (and further references) and Schmidt in combination with Weber (and further references). Final Act. 2–9. Each of the two sets of grounds encompass all of the claims on appeal. *Id.* In its appeal brief, Appellant addresses the first set of grounds, by way of arguments as to the combination of Schmidt with Vathauer, but does not

[7] We refer to the Specification, the Final Office Action, the Appeal Brief, the Examiner's Answer, dated December 17, 2018 ("Ans."), and the Reply Brief, filed February 19, 2019 ("Reply Br.").

address the combination of Schmidt with Weber. *See generally* Appeal Br.; Reply Br. 2 ("While the Schmidt/Weber combination was inadvertently omitted in the Appeal Brief, the remarks contained therein are equally applicable to those rejections.").

Schmidt in combination with Vathauer (and further references)

Schmidt teaches a polymer composition comprising a semicrystalline polymer having no ionic groups and an ionic liquid as plasticizer. Schmidt, Abstract. Schmidt teaches that including the ionic liquid improves thermoplastic processing properties. *Id.* at 10:19–27. Schmidt also teaches that including the ionic liquid *may* also provide antimicrobial properties (*id.* at 10:28–37), antistatic properties (*id.* at 10:38–45), and adhesive properties (*id.* at 12:55–59). Schmidt also teaches that "[t]he introduction of the ionic groups . . . by means of the ionic liquids . . . makes it possible to provide the polymer composition . . . with . . . in some cases a semiconductive property." *Id.* at 13:16–24. Other means for increasing conductivity in polymer materials are also disclosed in Schmidt, particularly, the "addition of conductive particles or fibers modified to be antistatic or conductive" (*id.* at 13:14–15), including, for example, carbon black or graphite (*id.* at 12:64–65), and that polymers including such conductive particles or fibers can be used as conductive binders or adhesives (*id.* at 12:61–13:15).

The Examiner relies on Schmidt teaching "a polymer composition comprising a crystalline polymer and 0.1 to 30 wt%, preferably 1–16 wt% of an ionic liquid" and that these encompassing or overlapping ranges with what is claimed establishes a *prima facie* case of obviousness. Ans. 3 (citing Schmidt, Abstract, 4:30); *see also* Final Act. 2–3. As to component A, the polymer component, the Examiner relies on Schmidt teaching "a preferred

embodiment comprising polyamides, homopolyamides and copolyamides . . . such as nylon-6,6 [and] nylon 6." *Id.* (citing Schmidt, 7:54–56, 7:1–8:21); *see also* Final Act. 3.[8] As to component C, the included ionic liquid, and its composition, the Examiner relies on Schmidt teaching the use of "quat ammonium, phosphonium, imidazolium, pyrazolium, pyridazinium cations, 5-6 membered cations comprising sulfur" (Ans. 3 (citing Schmidt, 4:35–6:17)), including "1-ethyl-3-methylimidazoliunium cations" (*id.* (citing Schmidt, 5:6, 5:52–54, Examples)), and various anions, including tetrafluoroborate (*id.* (citing Schmidt 6:7–10)), such that the claimed 1-ethyl-3-methyl imidazolium tetrafluoroborate is met (*id.*). As to component B, the included carbon black or graphite, the Examiner relies on Schmidt teaching "the addition of conductive particles" to raise the conductivity of the polymer blend (*id.* at 3–4 (citing Schmidt, 13:10–15)), and particularly the use of "carbon black or graphite as conductivity improving fillers" (*id.* at 4 (citing Schmidt, 12:64–65)).

Vathauer teaches thermoplastic molding compositions comprising electrically conductive carbon. Vathauer, Abstract. Determining that Schmidt fails to specifically disclose the amount of carbon black or graphite in its composition, the Examiner relies on Vathauer as teaching the use of "an electrically conductive carbon in particular [sic, particulate] form" (Ans. 4 (citing Vathauer, Abstract)) "for establishing conductivity" (*id.* (citing Vathauer ¶ 77)), "in the amount of 5–70 wt%" (*id.* (citing Vathauer ¶ 82),

[8] The Examiner inadvertently refers to "Spec" instead of "Schmidt," but this, and other similar mis-citation, including of "Spec" for "Vathauer," is deemed harmless because it is manifest that Schmidt, or Vathauer later, is being referenced and Appellant raises no argument it is not. *See generally* Appeal Brief.

and that this overlapping range with what is claimed establishes a *prima facie* case of obviousness (*id.*). The Examiner concludes, specifically, that it would have been obvious to one or ordinary skill in the art, informed by the teachings of Schmidt and Vathauer, to have provided carbon black or graphite in the amounts claimed, in a polymer composition according to the claims, to establish conductivity in the composition. Ans. 4 (citing Schmidt, 12:64–65, 13:10–15; Vathauer ¶¶ 77, 82).

Appellant argues against this rejection of independent claims 26 and 35 separately (*see, e.g.*, Pet. 6–16), and further argues the patentability of dependent claims 29, 30, 32, and 36–38 (*see, e.g.*, *id.* at 9–10, 17–18). Appellant raises three general arguments, applicable, to varying degrees, to all of the claims: (1) that the prior art does not suggest the specific molding composition in a manner sufficient to establish *prima facie* obviousness, emphasizing the particular combination of ionic liquids and carbon black or graphite; (2) that there is no teaching or suggestion for use of carbon black or graphite in combination with an ionic liquid, contending that Schmidt teaches ionic liquid as a preferable alternative and that Vathauer lacks any suggestion to include an ionic liquid; and (3) that there is an unexpected synergistic effect, particularly significantly improved conductivity with inclusion of low amounts of the ionic liquid with relatively low amounts of carbon black.

Independent Claim 26

Appellant highlights the recited limitations, particularly those added since the Board's prior decision affirming the rejection of previously pending claim 26, and contends "that this specific molding composition is not suggested by the art in a manner sufficient to form *prima facie*

obviousness." Appeal Br. 2, 6–7; *see generally* Decision in Appeal No. 2017-000576, dated October 27, 2017 ("Dec."). Appellant highlights that the recited components are selected from a smaller group of potential polyamides, that the recited component B is present in an amount of 4–8%, rather than 3–20%, and that component C is selected from a specific group of potential ionic liquids. *Id.*

Appellant contends that the Examiner erred in determining that Schmidt and Vathauer disclose the use of carbon black or graphite in combination with an ionic liquid. *Id.* at 7–8. Appellant also contends that Schmidt's teaching of the use of carbon black or graphite as a conductive filler is in relation to the prior art and that it teaches, in the next column, "that conductivity was found through the use of the ionic liquids disclosed therein." *Id.* at 8 (citing Schmidt, 12:64–65, 13:16–24); *see also* Reply Br. 3 (citing Schmidt, 12:61, 13:8, 13:16–28) (contending "Schmidt does not invite any researcher to employ additional conductive fillers"). Appellant contends that this amounts to Schmidt teaching ionic liquids as a preferable *alternative* to including "'conductivity improving fillers' of the prior art, such as carbon black or graphite." Pet. 7–8; *see* Reply Br. 3.

Appellant also argues that the particular combination required by the claims, including claim 26, "lead[s] to a combined effect which brings about high conductivity even at low concentrations of carbon black or graphite." Appeal Br. 8–9 (citing Spec. 1:38–2:2, 11:38–12:4). Appellant relies on "there [being] a significant increase in conductivity (decrease in volume resistivity), despite the use of only 1% of ionic liquid." *Id.* at 9; *see also id.* at 15–16 (contending that the results are "unexpected" as to claim 35

because the contended "synergistic effect between the carbon black and the ionic liquid is in no way suggested by any of the cited art").

Appellant's arguments, detailed above, are not persuasive of reversible error. First, there is no particular, cogent argument explaining why the narrower range of options set forth in the claim for components A and C (and difference in the recited range of component B) would not have been obvious, or why the Examiner's rejection should not be affirmed for the same reasons as set forth in the Board's earlier decision affirming the rejection of prior pending claim 26. Rather, Appellant simply asserts the claim differs from what was rejected earlier. This is not sufficient to address the Examiner's position. *Cf. In re Lovin*, 652 F.3d 1349, 1357 (Fed. Cir. 2011) (("[W]e hold that the Board reasonably interpreted Rule 41.37 to require more substantive arguments in an appeal brief than a mere recitation of the claim elements and a naked assertion that the corresponding elements were not found in the prior art. Because Lovin did not provide such arguments, the Board did not err in refusing to separately address claims 2-15, 17-24, and 31-34."). As explained in the prior decision, "disclos[ing] a multitude of effective combinations does not render any particular combination less obvious." Dec. 6 (quoting *Merck & Co. Inc. v. Biocraft Laboratories*, 874 F.2d 804, 807 (Fed. Cir. 1989)).

Second, Appellant's arguments grounded on Schmidt failing to teach a polymeric composition that includes both carbon black (and/or graphite) and an ionic fluid fall short. As set forth by the Examiner, Schmidt reasonably teaches options for increasing (or adjusting) conductivity of polymers that include both solid particles, such as carbon black or graphite, and ionic liquids, such as those recited in the claim. Ans. 10–12. Further, as

highlighted in the Board's prior decision, use of both carbon black (and/or graphite) and an ionic fluid would have been *prima facie* obvious because both are taught to be useful for the same purpose and what is recited in the claim is merely the combination of those to form a composition for that same purpose. Dec. 8 (citing *In re Kerkhoven*, 626 F.2d 846, 850 (CCPA 1980)). Also, in accord with the Examiner's reasoning, we discern no teaching away from a composition that includes both a component B and a component C. *Cf. DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1364 (Fed. Cir. 2006) ("We will not read into a reference a teaching away from a process where no such language exists.").

Third, Appellant's arguments grounded on contended synergistic effects of combining component carbon black or graphite with an ionic liquid fall short because there is no objective evidence of record that such an effect was, in fact, unexpected at the time of invention. Here, as in the earlier appeal, Appellant fails to direct us to any statement in the Specification or elsewhere attesting to the unexpected nature of the results or to any persuasive evidence that the results would have been unexpected at the time of the invention. *See generally* Appeal Br.; Reply Br.; Dec. As set forth by our reviewing court, arguments by counsel are not sufficient. *See Geisler*, 116 F.3d 1465, 1471 (Fed. Cir. 1997) ("Geisler made no such assertion [that results were unexpected] in his application. Nor did Geisler submit any such statement through other evidentiary submissions, such as an affidavit or declaration under Rule 132 . . . Instead, the only reference to unexpected results was a statement by Geisler's counsel ... that Geisler's results were 'surprising.'"). Further, Appellant's reliance on the cited prior

art as evidencing that the results would have been unexpected, as set forth for claim 35, is not well-founded. Appeal Br. 15–16. The issue is whether the results would have been unexpected by the skilled artisan at the time of invention, not whether the cited prior art suggests the results or does so at a point in time other than at the time of invention.

Independent Claim 35

As to claim 35, Appellant again highlights the limitations as to recited components A, B, and C—"PA 6 as component A, . . . conductive carbon black as component B, and . . . component C" selected from a listing of four specific compounds. Appeal Br. 10. Appellant highlights the more limited groups from which components must be selected, and argues that there is no *prima facie* case because there is insufficient rationale for making the particular selections required from what Schmidt discloses to arrive at the claimed invention, such that the Examiner's rejection is, accordingly, no more than impermissible hindsight. *Id.* at 11 (citing Final Act. 3). Appellant further argues that it is necessary for the prior art to suggest the desirability of the modification required to reflect the features of the claimed invention, and that the listing of components in Schmidt does not suffice due to the number of different options it reflects. *Id.* at 11–12. Appellant also references its earlier argument that Schmidt teaches use of its ionic liquids as an alternative to prior art conductive filters, such as carbon black. *Id.* at 10.

Appellant argues in particular that a specific motivation to arrive at the particular combination set forth in the claim is required. *Id.* at 13–15 (citing *Unigene Labs, Inc. v. Apotex, Inc.*, 655 F.3d 1352 (2011)). Appellant relies on *Unigene Labs* as requiring a person of ordinary skill in the art to have both a reason to modify a reference composition taught by a reference

and a reason to select particular components from the prior art in making the modifications. *Id.* at 13. Appellant highlights that the court in *Unigene Labs* found disclosure in one reference (the '116 patent) of a formulation that "included citric acid as a chelating agent and/or absorption agent" and disclosure in a second reference (Day) "that citric acid is a pH adjuster and a buffer" as insufficient "reason to choose citric acid from among 50 examples of chelating agent in the [first reference] to enhance the bioavailability of the formulation." *Id.* Appellant also highlights six particular "adjustments" that it contends must be made from the Schmidt reference. *Id.* at 14.

Appellant also relies on a contended "surprising synergistic effect," arguing that the specification shows "significant reduction of resistivity" and that this "is in no way suggested by any of the cited prior art." *Id.* at 15. Appellant relies on both cited prior art references suggesting higher amounts of ionic liquid and conductivity filler as supporting its contention that the synergistic effect was unexpected. *Id.* at 16.

Appellant's arguments are not persuasive of reversible error. In *Unigene Labs*, our reviewing court determined that a reference (the '315 patent) that discusses the '116 patent teaches away from using the recited amount of citric acid such that one of ordinary skill in the art reading the '315 and '116 patent would have considered it "undesirable" in the claimed composition (*Unigene Labs*, 655 F.3d at 1363) and that despite the Day reference's teachings, there was no genuine dispute that one of ordinary skill in the art would not have considered using the claimed amount of citric acid in the claimed formulation "because the formulation would not be expected to perform properly to meet the specificity of a pharmaceutical use." *Id.* at 1363–64. In contrast, here, there is no persuasive argument that the prior art

teaches away from the selected components in the recited amounts, nor that the resulting synergistic effect would have been unexpected. *See generally* Appeal Br.; Reply Br.

As to the more general argument that selecting the particular components from the multitude of those disclosed is impermissible hindsight, we are not persuaded the Examiner erred reversibly. Appellant relies on there being insufficient guidance to render the claimed composition obvious where there are numerous potential thermoplastic polymers, hundreds of potential cations, and hundreds of potential anions disclosed in Schmidt. Appeal Br. 14. Appellant fails, however, to sufficiently account for the guidance provided in Schmidt and, thus, argues, in effect, against a rejection that was not made, the obviousness of the composition where the prior art did not indicate any preference for polyamide polymers nylon 6 and nylon 6,6, for 1-ethyl-3-methylimidazolium as the cation, or for any particular anion. As relied on by the Examiner, however, Schmidt reasonably identifies polyamide polymers nylon 6 and nylon 6,6 as exemplary thermoplastic polymers for use in its composition. Ans. 3; Schmidt, 6:47–7:11. Similarly, as to the Examiner's reliance on Schmidt for the ionic liquid (component C), Schmidt reasonably identifies 1-ethyl-3-methylimidazolium as an exemplary cation, including in its disclosure of this cation as one of only three used in the examples (Schmidt, 13:65–14:14; Ans. 3 (citing Schmidt, Examples, as support)), and tetrafluoroborate as a preferred anion in indicating that the anion can be an arylsulfonate, and "preferably . . . tetrafluoroborate" (Schmidt, 6:17–24; Ans. 3).

Further, as discussed in the Board's prior decision, it is well-settled that the prior art is good for all that it discloses, including, as here, each of

the various combinations manifest in the teaching of various polymers and compositions of those in combination with ionic liquids and carbon black and/or graphite. *See, e.g.*, *Biocraft Laboratories Inc.,* 874 F.2d at 807.

Again, as to Appellant's arguments grounded on contended synergistic effects being unexpected, the arguments fail because there is no sufficient showing that the results were unexpected.

Claims 29 and 36

Appellant further argues patentability of claims 29 and 36 separately. Appeal Br. 17. The arguments raised are grounded solely on unexpected results, which are not persuasive for the reasons discussed above, namely, that it is not sufficiently established that the results are, in fact, unexpected.

Claims 37 and 38

Claims 37 and 38 stand rejected over the combination including Malet. Ans. 5–6. This rejection is identified as grounded on Schmidt in view of Vathauer, in further view of Malet, but also discusses what is, and is not, taught by the combination that further includes Hell before addressing what is added by Malet. *Id.* at 6. In any case, the Examiner relies on Malet, identified as being in a similar field of endeavor, teaching a composition comprising a polymer and an organic salt/ionic liquid including 1-ethyl-3-methylimidazolium cation with tetrafluoroborate and ethyl sulfate. *Id.* (citing Malet, Abstract, ¶¶ 15, 16, 99). The Examiner determines that it would have been obvious to substitute 1-ethyl-3-methylimidazolium ethyl sulfate as the ionic liquid as Schmidt discloses the 1-ethyl-3-methyl-imidazolium cation and alkyl sulfate anion, and doing so is merely the "simple substitution of one known ionic liquid for another ionic liquid [that]

would achieve the predictable result of enhancing the antistatic properties of the composition." *Id.*

Appellant's limited further arguments as to claims 37 and 38 include the same arguments grounded on unexpected results, but also on the narrowly recited composition as including PA 6 as component A, 4 to 6% of conductive carbon black as component B, and 0.3–1.2% 1-ethyl-3-methylimidazolium ethyl sulfate as component C as "requir[ing] election of one specific cation and one specific anion of the hundreds of possibilities given in the reference." *Id.* at 17–18. As with the corresponding argument for independent claim 35, Appellant both fails to establish that the results are unexpected and to address the ground as set forth by the Examiner in which the references provide guidance as to what particular components to include that significantly narrows the breadth of choices and possibilities.

Accordingly, on this record, we are unpersuaded of reversible error in the Examiner's rejection of these claims.

Schmidt in combination with Weber (and further references)

The Examiner relies on Schmidt in like manner to the combination with Vathauer discussed above. *Compare* Ans. 6–10, *with id.* at 3–6. Weber, in like manner as Vathauer, is relied on for its teaching of a thermoplastic molding comprising polyamide and 0.5–15 % electrically conductive additive, and that suitable examples are graphite or conductive carbon black. Ans. 7–8 (citing Weber, Abstract, ¶¶ 130, 138). The Examiner concludes that it would have been obvious to one of ordinary skill in the art to have provided carbon black or graphite in amounts according to the claims in order to establish conductivity in a polymer as taught by Schmidt. *Id.* at 8.

Appellant raises no argument as to this combination in the Appeal Brief. *See generally* Appeal Br.; Reply Br. 2. Further, what argument might apply that is raised as to Schmidt in arguing against the rejections over Schmidt in view of Vathauer (and further references) is, as discussed above, unpersuasive of reversible error.

Appellant's Reply Brief

In addition to addressing its failure to explicitly address the combination of Schmidt with Weber, Appellant also raises a number of other arguments in the Reply Brief that were not raised earlier. *Compare* Reply Br., *with* Appeal Br. Couching it as a response to the Examiner asserting that Schmidt uses an overlapping generic range for ionic liquid, Appellant raises an argument as to Schmidt's "use of ionic liquid as plasticizer [that] lowers the melting point in glass transition temperature, and thus improves the thermoplastic processability" and contends that this "strongly encourages to employ significantly higher amounts." Reply Br. 2–3 (citing Ans. 10). Appellant likewise couches a contention that "the main aim of Schmidt is to improve the adhesion performance of the polymer composition on polar surfaces or surfaces solvated by ionic liquids" as a response to the Examiner's determination that Schmidt teaches including conductivity-improving fillers to produce conductive systems. *Id.* at 3 (citing Ans. 11). Appellant also notes that "the Examiner reiterates that it would have been obvious to combine Schmidt and Vathauer" and raises an argument grounded on Vathauer addressing "mechanical properties" and not "the problem of electrical conductivity." *Id.* at 3–4 (citing Ans. 12). In each case, Appellant fails to show good cause why these arguments could not have been raised in the Appeal Brief as each addresses a position taken by

the Examiner in the Final Office Action, namely, that Schmidt's disclosed range of the ionic liquid overlaps that claimed, that Schmidt teaches including conductivity-improving fillers to produce conductive materials, and that it would have been obvious to combine Schmidt and Vathauer because Vathauer teaches including electrically conductive carbon for establishing conductivity. Final Act. 2–3. We therefore deem these arguments waived for purposes of the present appeal. 37 C.F.R. § 41.41(b)(2). "[A]n issue not raised by an [A]ppellant in its opening brief is waived." *Optivus Tech., Inc. v. Ion Beam Appl'ns S.A.*, 469 F.3d 978, 989 (Fed. Cir. 2006) (citations omitted) (internal quotations omitted).

As to further arguments addressing claims 29 and 35–38, these reiterate the arguments raised earlier in the Appeal Brief, as to the combination of Schmidt and Vathauer and are unpersuasive of reversible error for the same reasons discussed above for that ground. Further, as to the grounds relying on the combination of Schmidt and Weber (and further references), these arguments are properly considered to be waived. 37 C.F.R. § 41.41(b)(2). Further, to the extent the arguments raised as to the combination of Schmidt and Vathauer constitute any argument as to that of Schmidt and Weber, the arguments would not be found persuasive for the same reasons that they fall short as to Schmidt and Vathauer.

On this record, Appellant has failed to identify reversible error in the rejection of claims 18, 26, and 29–38.

CONCLUSION

The Examiner's decision is affirmed.

Claims Rejected	35 U.S.C. §	Rejection(s)	Affirmed	Reversed
26, 29, 30–32, 34–36	103	Schmidt, Vathauer	26, 29–32, 34–36	
18, 33	103	Schmidt, Vathauer, Hell	18, 33	
37, 38	103	Schmidt, Vathauer, Malet	37, 38	
26, 29, 30–32, 34–36	103	Schmidt, Weber	26, 29–32, 34–36	
18, 33	103	Schmidt, Weber, Hell	18, 33	
37, 38	103	Schmidt, Weber, Malet	37, 38	
Overall Outcome	103		18, 26, 29–38	

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)(iv).

AFFIRMED