

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

IN RE: KWANGJIN SONG,
Appellant

2025-1653

Appeal from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in No. 15/707,151.

Decided: February 18, 2026

KWANGJIN SONG, Rockwell, NC, pro se.

MARY L. KELLY, Office of the Solicitor, United States
Patent and Trademark Office, Alexandria, VA, for appellee
John A. Squires. Also represented by KAKOLI CAPRIHAN,
NICHOLAS THEODORE MATICH, IV, ROBERT J. MCMANUS.

Before DYK, HUGHES, and STOLL, *Circuit Judges*.

PER CURIAM.

Kwangjin Song appeals pro se from a decision of the
Patent Trial and Appeal Board (“Board”) affirming an ex-
aminer’s final rejection of several claims of U.S. Patent Ap-
plication No. 15/707,151 (“patent application”) as
anticipated or obvious over prior art. We *affirm*.

BACKGROUND

Appellant Song is one of three listed inventors of the patent application, filed on September 18, 2017, which appellant prosecuted pro se. The application is directed to an “oriented multilayer porous film,” which is used as a separator dividing the positive and negative electrodes of certain battery types. J.A. 1249.¹ Independent claim 48 recites:

A multilayer porous film comprising at least one oriented layer, the at least one oriented layer comprising:

- a) a matrix polymer selected from the group of a first polymer having a crystalline melting temperature (“T_m”) or a glass transition temperature (“T_g”) of 180°C, or higher, a second polymer other than the first polymer, and combinations thereof;
- b) a plurality of interconnecting pores yielding a Gurley air permeability of 1 sec/100 cc or greater and a porosity of 90% or less; and
- c) an ionic conductivity characterized by a MacMullin number of 1 to 15.

J.A. 1063.

The examiner rejected claims 48, 49, 55, and 57 under 35 U.S.C. § 102(a)(1) as anticipated by U.S. Patent Publication No. 2012/0145468 to Pekala et al. (published June 14, 2012) (“Pekala”). Pekala is directed to a “microporous polymer film . . . constructed for use in an energy storage device.” J.A. 1174. The examiner rejected

¹ Citations to “J.A.” refer to the corrected joint appendix filed by the parties. Dkt. No. 24.

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claims 60, 62, 69–73, 75–79, 83–86, 107, and 112 under 35 U.S.C. § 103 as obvious over Pekala. Appellant appealed to the Board, and the Board affirmed.

Appellant timely appeals to our court. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

DISCUSSION

“To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either expressly or inherently.” *Rapoport v. Dement*, 254 F.3d 1053, 1057 (Fed. Cir. 2001). A prior art reference need not use the same language as the invention to be anticipating. *Adasa Inc. v. Avery Dennison Corp.*, 55 F.4th 900, 913 (Fed. Cir. 2022). Rather, the question is whether the reference enables a person of ordinary skill in the art (“POSA”) to practice an embodiment of the invention as claimed without undue experimentation. *Am. Calcar, Inc. v. Am. Honda Motor Co.*, 651 F.3d 1318, 1341 (Fed. Cir. 2011). A claim is unpatentable as obvious “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious” to a person of ordinary skill in the art (“POSA”) at the effective filing date. 35 U.S.C. § 103. A single prior-art reference may render a claim obvious if a POSA would have been motivated to modify the prior art to arrive at what is claimed. *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361 (Fed. Cir. 2016).

I

Appellant’s arguments are primarily directed to the rejection of independent claim 48 as anticipated. Pekala discloses a “microporous polymer film . . . constructed for use in an energy storage device” having “three-dimensional interconnecting and interpenetrating pore and polymer networks” and comprising a “polymer matrix” including ultrahigh molecular weight polyolefin (“UHMWPE”). J.A. 1192 ¶¶ 15–17.

First, appellant argues that claim 48 is not anticipated because Pekala does not disclose an “oriented layer.” As the Board recognized, the examiner considered that the application specification defines “oriented” as “an alignment of polymer chains within the film in a specific direction.” J.A. 4 (citing J.A. 1076, 1256 ¶ 51). Claim 48 does not recite, and the specification does not suggest, a quantitative orientation threshold for “oriented.” The Board concluded that because Pekala teaches biaxial stretching, “some orientation of the polymer chains within the film must occur.” J.A. 4–5. The examiner found that Pekala inherently discloses the claimed “oriented layer” because Pekala teaches a biaxial stretching method that appellant’s application discloses would cause a film to become oriented. Appellant disagrees, arguing that the composition and procedures disclosed in Pekala would either fail to produce orientation or would undo any existing orientation. The Board concluded that Pekala teaches biaxially stretching a film, which would inherently orient the polymer chains in a manner similar to appellant’s film.

The Board’s determination that Pekala’s film discloses an oriented layer is supported by substantial evidence. Appellant discloses that “orientation can be obtained by stretching or compressing a precursor film.” J.A. 1256 ¶ 51. The examiner found, and the Board agreed, that Pekala teaches a stretching step. J.A. 1076 (citing J.A. 1195 ¶ 56); J.A. 1079 (citing J.A. 1196 ¶ 68); *see* J.A. 4–5. Notably, Pekala describes a film embodiment that is “biaxially oriented.” J.A. 1195 ¶ 56. The examiner further noted that another reference disclosed molecular orientation that resulted from the same UHMWPE composition and stretch ratios. J.A. 1079. This is substantial evidence that supports the Board’s determination that Pekala discloses a film that is inherently “oriented” as broadly defined in the application.

Second, appellant contends that claim 48 is not anticipated because Pekala does not disclose “a plurality of

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interconnecting pores yielding a Gurley air permeability of 1 sec/100 cc or greater and a porosity of 90% or less.” J.A. 1063. The examiner reasonably found that Pekala discloses interconnecting pores yielding permeability, porosity, and ionic conductivity properties within the ranges recited in claim 48. J.A. 1076-77 (citing J.A. 1196, 1199) (identifying example films disclosed in Pekala with permeability measured by Gurley numbers greater than 1, porosity of 90% or less, and ionic conductivity measured by MacMullin numbers between 1 and 15). Appellant’s contention that Pekala teaches a two-layer film formed by overlaying rather than by the coextrusion, lamination, or coating methods disclosed in the specification is also unpersuasive because the scope of claim 48 is defined by its structure, not by any particular manufacturing process. *See AFG Indus., Inc. v. Cardinal IG Co.*, 375 F.3d 1367, 1372–73 (Fed. Cir. 2004) (holding that the term “layer” in a structural claim is not limited to any particular method of manufacture).

Third, appellant argues that claim 48 is not anticipated because Pekala does not disclose other beneficial properties of the inventive film. These properties are not recited in claim 48. For example, appellant argues that Pekala fails to disclose the claimed pore structure because Pekala’s annealing would result in irregular or closed pores, making it difficult to measure average pore size. But claim 48 recites no pore-size limitation. Consequently, appellant’s attempts to distinguish Pekala as being “extremely annealed” and lacking “substantial uniformity” in pore size are unavailing because they have no bearing on any limitations in claim 48. Appellant’s Br. 38. Appellant also argues that Pekala’s film contains inorganic fillers, lacks a shutdown temperature (“Tsd”), and lacks a melt-down temperature (“Tmd”). But the claim does not recite limitations related to these properties, so any differences in those properties do not exclude Pekala.

Appellant also contends that some of the beneficial properties not recited in the claim are nevertheless inherent in a film produced in accordance with the disclosed process and should be treated as claim limitations. But unrecited inherent properties are not claim limitations.

Finally, appellant argues that the claimed invention here is “broader” than the prior art. Appellant’s Br. 16. But appellant misapprehends the significance of a broader claim scope. A claim is anticipated if it reads on even a single embodiment in the prior art. *Atlas Powder Co. v. Ireco, Inc.*, 190 F.3d 1342, 1346 (Fed. Cir. 1999). This is so “regardless of whether it also covers subject matter not in the prior art.” *Id.* In other words, an inventor cannot overcome an anticipation rejection by showing that the applied-for claim is broader than the prior art.

The Board did not err in concluding that claim 48 is unpatentable as anticipated by Pekala.

II

Appellant also disputes the Board’s finding that dependent claim 49 is anticipated by Pekala. Claim 49 recites “[t]he film of claim 48, wherein the matrix polymer is made from a method that comprises incorporating at least one of a biobased material, a biodegradable material, or combinations thereof.” J.A. 1063. Importantly, claim 49 does not require the matrix polymer to comprise a biobased or biodegradable material, but only requires that the matrix polymer be made from a *method* that incorporates such a material. The claim therefore recites a product by process, as recognized by the Board. The patentability of a product-by-process claim is determined by the structure of the resulting product, not by the performance of the process steps. *Greenliant Sys., Inc. v. Xicor LLC*, 692 F.3d 1261, 1267–68 (Fed. Cir. 2012). As claim 49 adds no structural limitations to claim 48, the Board’s conclusion that claim 49 is anticipated by Pekala is supported by the same reasoning as claim 48.

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Appellant provides no independent arguments concerning the rejections of claims 55 and 57, which also depend from claim 48. Since we agree that the Board's decision concerning claim 48 was supported by substantial evidence, we affirm the rejections of claims 55 and 57.

III

We next turn to the claims rejected on obviousness grounds. Appellant contests the rejection of claims 60, 62, 69–73, 75–79, 83–86, 107, and 112.² Each of these claims was rejected as obvious over Pekala. Claim 60 recites the film of claim 48 wherein, in relevant part, “one or more layers of the film further comprise a porogen material of 95% wt. % to 0.001 wt. %.” J.A. 1064. The examiner found that appellant's application expressly disclosed that silica acts as a porogen and that Pekala teaches a film incorporating silica as a filler material in a range overlapping the claimed range, establishing a prima facie case of obviousness. *See In re Geisler*, 116 F.3d 1465, 1469 (Fed. Cir. 1997).

Appellant argues that claim 60 embraces only films made by a wet process and that Pekala's inorganic fillers, including silica, act as porogens only for dry-process films, not wet-process films. But claim 60 does not recite dry- or wet-process limitations. Even if it did, patentability would depend only on the resulting structures. *See Greenliant*, 692 F.3d at 1267–68. Because appellant does not dispute that silica acts as a porogen for dry-process films, and dry-

² Appellant submitted amendments to claims 69 and 70 after final rejection that would have changed their dependency from claim 60 to claim 48, which the examiner declined to enter. The Board considered the claims without appellant's proposed after-final amendments, as do we. *See* 37 C.F.R. § 1.116.

process films are within the scope of claim 60, appellant's argument fails.

Appellant argues that Pekala does not render obvious the pore-size limitation of claim 62. Claim 62 recites “[t]he film of claim 60, wherein at least a portion of at least one of the outer surfaces of the film comprises interconnecting pores having an average pore size characterized by a size ratio of 0.001 to 1,000 relative to the average pore size of an inner layer of the film.” J.A. 1065. The examiner found, and the Board agreed, that Figures 5A and 5B in Pekala depict a wide range of pore sizes. In light of the large range of size ratios in the claim spanning six orders of magnitude, the Board's conclusion that Pekala teaches a film meeting the pore-size limitation in claim 62 was supported by substantial evidence.

With respect to claims 69 through 73, appellant contends that performing the process steps in these claims involves a different process than Pekala discloses and results in structures different from those disclosed in Pekala. As with claim 49, these are product-by-process claims for which patentability turns on the final product. *See Greenliant*, 692 F.3d at 1267–68. Claim 69 recites the film of claim 48 wherein a film layer is “made by a dry method comprising . . . orienting the sheet in at least one direction,” and claim 70 recites the film of claim 48 wherein a film layer is “made by a wet method comprising . . . orienting the sheeting in at least one direction, and extracting the diluent from the oriented film.” J.A. 1065. Claims 71, 72, and 73 depend from claim 70 and recite limitations relating to the diluent recited in claim 70. Appellant has the burden of producing evidence to establish a nonobvious structural difference between the resulting product and the prior art. *Greenliant*, 692 F.3d at 1268; *see In re Marosi*, 710 F.2d 799, 803 (Fed. Cir. 1983). But appellant provides no evidence that performing the process steps in claims 69 through 73 alters the structural limitations recited in

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independent claim 48. The Board did not err in upholding the examiner's rejection of claims 69 through 73.

With respect to dependent claims 75, 77–79, and 83–85, which all depend from dependent claim 60, appellant argues in a single sentence that “[t]he claimed wet UHMWPE films all neither comprise a porogen of p-SiO₂, nor extremely annealed morphologies, nor a merely overlapped 2-layer structure.” Appellant’s Br. 47. Appellant makes the same arguments for dependent claims 86, 107, and 112. Appellant appears to argue here, as to the Board, that Pekala’s two-layer structure is assembled by stacking instead of coextrusion, but this is another attempt to distinguish the manufacturing process, not the claimed structure. Appellant’s other arguments, as we understand them, were not made to the Board and are forfeited. *See In re Google Tech. Holdings LLC*, 980 F.3d 858, 863 (Fed. Cir. 2020).

Appellant argues that Pekala does not satisfy the limitations of claim 76. Claim 76 depends from claim 75, further reciting that “one or more layers of the film comprise the compatibilizer.” J.A. 1068. The Board agreed with the examiner’s finding that Pekala discloses a coating on the surface of the inorganic particles that promotes compatibility between the particles and electrolytes. Appellant argues that the claimed compatibilizer must enhance “compatibility between components *within* an immiscible blend.” Appellant’s Br. 47. But the specification does not support such a narrow meaning for a compatibilizer, instead disclosing that “compatibilizing polymers . . . bear functional groups . . . to interact with other polymers, components, surfaces, fillers, ions, solvents, and the like.” J.A. 1268 ¶ 147. The Board’s conclusion was supported by substantial evidence.

The Board did not err in concluding that claims 60, 62, 69–73, 75–79, 83–86, 107, and 112 are unpatentable as obvious over Pekala.

IV

We have considered appellant's other arguments and find them unpersuasive. We *affirm* the Board's decision.

AFFIRMED