



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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/286,521	11/21/2005	Daniel Steiger	185192-1-US-NP	1223
43251	7590	03/04/2013	EXAMINER	
SABIC - 08CU - ULTEM			HEINCER, LIAM J	
SABIC Innovative Plastics - IP Legal			ART UNIT	
ONE PLASTICS AVENUE			PAPER NUMBER	
PITTSFIELD, MA 01201-3697			1767	
			NOTIFICATION DATE	DELIVERY MODE
			03/04/2013	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):

judith.rowe@sabic-ip.com
diderico.vaneyl@sabic-ip.com
usptopatentmail@cantorcolburn.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL
AND APPEAL BOARD

Ex parte DANIEL STEIGER, FARID FOUAD KHOURI,
DANIEL JOSEPH BRUNELLE, and AMY BETH KOREN

Appeal 2011-012602
Application 11/286,521
Technology Center 1700

Before HUBERT C. LORIN, DEBORAH KATZ, and
DONNA M. PRAISS, *Administrative Patent Judges*.

PRAISS, *Administrative Patent Judge*.

DECISION ON APPEAL

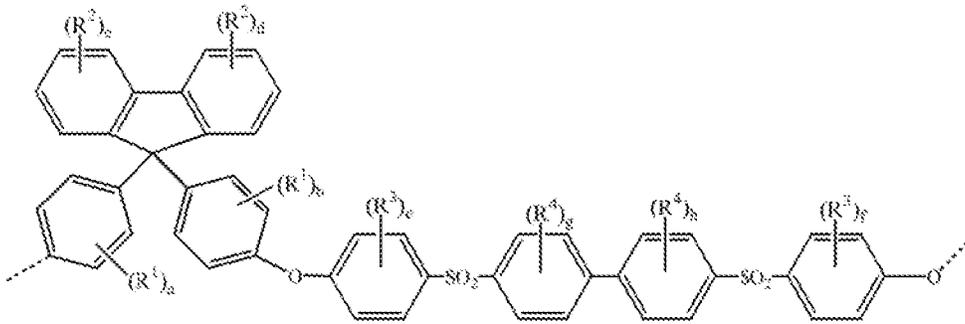
Appellants appeal under 35 U.S.C. § 134 the final rejection of claims 1-4, 6-20 and 22-24. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

We AFFIRM.

Appellants' invention is said to be directed to high heat polyethersulfone compositions (Spec. 1).

Claim 1 is illustrative:

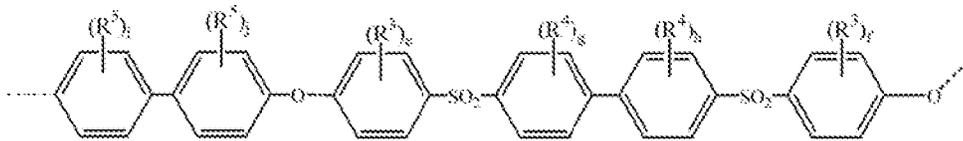
1. A polyethersulfone composition comprising structural units I



I

wherein R¹, R², R³, and R⁴ are independently at each occurrence halogen, nitro, a C₁-C₂₀ aliphatic radical, a C₃-C₂₀ cycloaliphatic radical, or a C₇-C₂₀ aromatic radical; and "a", "b", "c", "d", "e", "f", "g" and "h" are independently integers from 0 to 4 and

structural units III



III

wherein R³, R⁴, and R⁵ are independently at each occurrence halogen, nitro, a C₁-C₂₀ aliphatic radical, a C₃-C₂₀ cycloaliphatic radical, or a C₇-C₂₀ aromatic radical; and "e", "f", "g", "h", "i", and "j" are independently integers from 0 to 4.

The following rejections are on appeal:¹

1. Claims 1-3, 7, 9, 11-15, 19, and 22-24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Harris (US 4,957,978 issued Sept. 18, 1990) in view of Lee (US 2002/0115815 A1 published Aug. 22, 2002).
2. Claims 4 and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Harris in view of Lee, and further in view of Savariar (US 6,228,970 B1 issued May 8, 2001).
3. Claims 6, 10, 16-18, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Harris in view of Lee, and further in view of Hage (US 6,420,514 B1 issued Jul. 16, 2002).
4. Claim 23 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Harris in view of Lee, and further in view of Brunelle (US 5,132,423 issued Jul. 21, 1992).

ISSUE

The dispositive issue on appeal is whether the Examiner erred in determining that the claims are obvious in view of the disulfone-containing polyethersulfone of Harris with the fluorene-containing polyethersulfone of Lee.

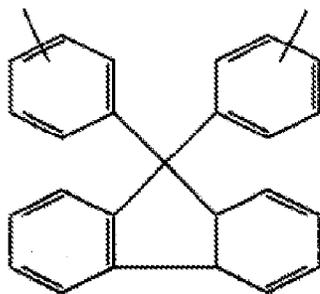
¹ See Final Office Action (“Final”) dated June 10, 2010; Advisory Action dated June 28, 2011. Claims 5 and 21 were cancelled in an Amendment dated April 8, 2010 and are not pending in this application as reflected on the first page of the Final Office Action.

FINDINGS OF FACT

We find that the following enumerated findings are supported by at least a preponderance of the evidence. *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

The scope and content of the prior art

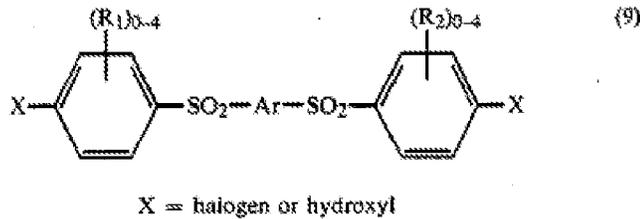
1. Harris is directed to poly(aryl ether sulfone) compositions. Harris blends “a poly(aryl ether sulfone) having a second order glass transition temperature (T_g) higher than about 240°C” and “a second poly(aryl ether sulfone) having a T_g lower than about 225°C” to achieve “improved melt-flow properties” while “the heat distortion temperature of the high T_g material remains practically unaffected by the addition of the lower T_g polymer.” Harris, col. 3, ll. 31-53. Harris teaches “poly(aryl ether sulfones) displaying high glass transition temperatures are, for example, those containing . . . fluorine-9,9-bis(phenylene) units (8):



(8)

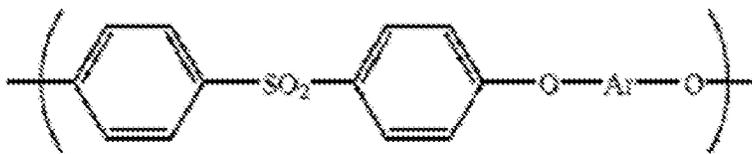
Id. at col. 3, ll. 3-18. Harris teaches preparation of high T_g poly(aryl ether sulfones) based on monomers of formula (9) where X is a halogen, or a hydroxyl group; Ar is a divalent aromatic radical such as the above formula (8) prepared by nucleophilic polycondensation of (9) with a

dihydric phenol, dihydroxy variant of (9) or any other dihydric phenol or mixture of those materials:



Id. at col. 3, l. 54-col. 4, l. 46. The “low Tg poly(aryl ether sulfones) are prepared using methods that are similar to those used for the preparation of their high Tg counterparts.” *Id.* at col. 10, ll. 44-46.

2. Lee is directed to poly(aryl ether sulfones) using 9,9'-bis(4-hydroxyphenyl)fluorine as the dihydroxy compound in the preparation. Lee ¶¶[0040], [0047].
3. Hage is directed to polyethersulfones comprising bis(4-chlorophenyl)sulfone. Hage, col. 3, ll. 25-29.
4. Savariar is directed to polyethersulfones having units of the formula:



wherein Ar is biphenyl. Savariar, col. 2, ll. 37-55.

Any differences between the claimed subject matter and the prior art

5. The claimed subject matter combines structural units derived from at least one fluorenone bisphenol, such as Lee's 9,9'-bis(4-hydroxyphenyl)fluorine, with at least one biphenyl-bissulfone, such as

Harris's poly(aryl ether sulfones), to make a polyethersulfone composition.

The level of skill in the art

6. Neither the Examiner nor Appellants have addressed the level of ordinary skill in the pertinent arts of polyethersulfone compositions. We will therefore consider the cited prior art as representative of the level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“[T]he absence of specific findings on the level of skill in the art does not give rise to reversible error ‘where the prior art itself reflects an appropriate level and a need for testimony is not shown’”) (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985).

Secondary considerations

7. There is no evidence of record of secondary considerations of non-obviousness for our consideration.

ANALYSIS

Appellants do not separately argue the patentability of claims 1-3, 7, 9, 11-20, 22 and 24 in this appeal (App. Br. 8-16). Accordingly, claims 2-3, 7, 9, 11-15, 19, 22 and 24 stand or fall with claim 1. Appellants do not provide substantively separate arguments with respect to claims 4 and 8 (App. Br. 14-15) and claims 6, 10, 16-18, and 20 (App. Br. 15-16). Accordingly, claim 8 stands or falls with claim 4, and claims 10, 16-18, and 20 stand or fall with claim 6. See 37 C.F.R. § 41.37(c)(vii).

Claim 1

The Examiner finds that Harris does not teach the claimed fluorene and relies on Lee for teaching 9,9'-bis(4-hydroxyphenyl)fluorene as the dihydroxy structural unit in polyethersulfone. Ans. 4. Further, the Examiner appears to provide “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int’l v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Namely, according to the Examiner, one would have been led to include the fluorene of Lee in the composition of Harris for the reason that Harris suggests; that is, polyethersulfones with fluorene units have high glass transition temperatures. Ans. 4. Accordingly, the Examiner appears to have set forth a prima facie case of obviousness.

Appellants challenge the prima facie case of obviousness by disputing the Examiner’s characterization of the scope and content of the prior art; that is, Appellants argue that Harris does not teach dihydric phenols of the size of 9,9'-bis(4-hydroxyphenyl)fluorene. App. Br. 8. However, the Examiner relied on Lee as teaching 9,9'-bis(4-hydroxyphenyl)fluorene, not Harris.

Appellants also challenge the reasoning underlying the prima facie case of obviousness, arguing that Lee does not teach the two sulfone groups the Examiner identified in Harris and that one skilled in the art would not have a reasonable expectation of successfully incorporating a moiety derived from 9,9'-bis(4-hydroxyphenyl)fluorine into a poly(ether sulfone) having two sulfone groups to produce a desired effect such as increased glass transition temperature. *Id.* at 9. Appellants contend that Table 2 of Lee supports the argument that a change in physical properties of a polyethersulfone based on a change in the chemical structure of a

polyethersulfone is difficult to predict. *Id.* at 10. Appellants further contend that the increase in glass transition temperature of the claimed poly(ether sulfone) is greater than expected or predicted by the Fox equation. *Id.* at 11-12.

The difficulty with Appellants' argument is that all of the elements of the claimed composition are disclosed in the references. "[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." *KSR Int'l Co.*, 550 U.S. at 416 (citing *United States v. Adams*, 383 U.S. 39, 40 (1966)). The operative question is "whether the improvement is more than the predictable use of prior art elements according to their established functions." *Id.* In our view, the evidence showing that combining Lee's particular dihydric phenol for the fluorene unit in the backbone of Harris' disulfone polymer yields, unpredictably, the polyethersulfone composition with increased glass transition temperature is insufficient. Appellants argue that a difference of 5°C or 10°C in performance capability is unexpected and significant. Reply Br. 2-3. However, this is merely attorney argument, which cannot be a substitute for factually supported objective evidence. *See, e.g., In re Huang*, 100 F.3d 135, 139-40 (Fed. Cir. 1996); *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984). In that regard, there is no factually supported objective evidence of unexpected results. (FF 5). Absent such evidence of a significant difference between experimental and predictable results, we are not persuaded as to error in the prima facie case of obviousness. *Cf. KSR*, 550 U.S. at 418.

Claim 4

Appellants argue that the addition of the polyether sulfone structural unit of Savariar to the combination of Harris and Lee increases the overall unpredictability of the polymer. App. Br. 14-15. As with claim 1, Appellants' unpredictability argument is not persuasive because it is not supported by objective factual evidence.

Claim 6

Appellants contend that no motivation exists to combine Hage for the same reason asserted with regard to Lee since the structural units in both Hage and Lee have a single sulfone group. App. Br. 15. Appellants' argument is not persuasive because the Examiner's finding that the motivation for combining the monomer of Hage is to provide internal stability is undisputed. *See* Ans. 16.

Claim 23

Appellants assert that the phase transfer catalyst taught by Brunelle is in the context of a polyimidization reaction and, therefore, it is difficult to predict success of the catalyst in a polymerization reaction. App. Br. 16. We do not find Appellants' argument persuasive. Appellants do not dispute that Brunelle teaches polyimides as a preferred embodiment and that the broader teaching of Brunelle is that the phase transfer catalyst can be used in the reaction of any aromatic halide and aromatic hydroxyl. *See* Ans. 13, 16-17.

For the foregoing reasons, we sustain the rejections of claims 1-4, 6-20 and 22-24 under 35 U.S.C. §103(a).

DECISION

The Examiner's decision is affirmed.

Appeal 2011-012602
Application 11/286,521

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

ORDER
AFFIRMED

kmm