



# 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.
14/442,340	05/12/2015	Zai-Ming Qiu	70231US004	3707
32692	7590	10/01/2020	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			ROSENTHAL, ANDREW S	
			ART UNIT	PAPER NUMBER
			1613	
			NOTIFICATION DATE	DELIVERY MODE
			10/01/2020	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):

LegalUSDocketing@mmm.com

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

*Ex parte* ZAI-MING QIU, ALEXANDER J. KUGEL, and  
MICHAEL J. SVAROVSKY

---

Appeal 2020-000880  
Application 14/442,340  
Technology Center 1600

---

Before Richard M. LEBOVITZ, JASON V. MORGAN, and  
DEBORAH KATZ, *Administrative Patent Judges*.

KATZ, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant<sup>1</sup> seeks our review,<sup>2</sup> under 35 U.S.C. § 134(a), of the Examiner's decision to reject claims 19–26 and 31–37. We have jurisdiction under 35 U.S.C. § 6(b). We REVERSE.

---

<sup>1</sup> We use the word “Appellant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party-in-interest as the 3M Company. (Appeal Br. 3.)

<sup>2</sup> We consider the Final Office Action issued May 15, 2019 (“Final Act.”), the Appeal Brief filed October 11, 2019 (“Appeal Br.”), the Examiner's Answer issued on November 5, 2019 (“Ans.”), and the Reply Brief filed November 14, 2019 (“Reply Br.”).

The Examiner rejects claims 19–26 and 31–37 as being obvious under 35 U.S.C. § 103(a) over Qiu 2010<sup>3</sup> and Qiu 2011.<sup>4</sup> (*See* Ans. 3–6.)

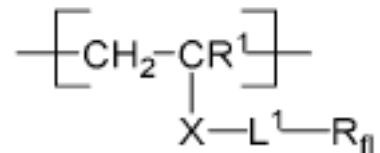
Appellant’s Specification is directed to compositions that inhibit the attachment of organisms to surfaces of objects, called “biofouling.” (Spec. 1:5–8.)

Appellant’s claim 19 recites:

A curable antifouling composition comprising components:

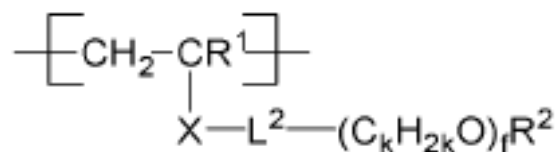
a) at least one fluorinated polymer, wherein each said at least one fluorinated polymer independently comprises:

at least one divalent group A represented by the formula



wherein R<sup>1</sup> independently represents H or methyl, X independently represents a covalent bond or a divalent organic linking group, L<sup>1</sup> independently represents a covalent bond or a divalent organic linking group, and R<sub>fl</sub> independently represents a monovalent perfluorinated organic group;

at least one divalent group B represented by the formula



---

<sup>3</sup> International Patent Application Publication WO 2010/080288 A2, published July 15, 2010.

<sup>4</sup> U.S. Patent Application Publication 2011/0027702 A1, published February 3, 2011.

wherein  $L^2$  independently represents a covalent bond or divalent organic linking group,  $k$  represents an integer in the range of from 1 to 4,  $R^2$  independently represents H or an alkyl group having from 1 to 18 carbon atoms, and  $f$  independently represents an integer in the range of from 3 to 200, inclusive;

at least one divalent group C represented by the formula



wherein  $L^3$  independently represents a covalent bond or a divalent organic linking group, and each  $Y^1$ ,  $Y^2$ , and  $Y^3$  independently represents a hydrolyzable group or a hydrocarbyl group having from 1 to 10 carbon atoms, with the proviso that at least one of  $Y^1$ ,  $Y^2$ , and  $Y^3$  is a hydrolyzable group; and

b) cationic curative.

(Appeal Br. 8–9.) Thus, claim 19 recites a composition comprising a fluorinated polymer including at least three different divalent cation groups, A, B, and C, and a cationic curative.

Appellant elected a species of curable antifouling composition with “AM1 (HFPO-Mar)” as the divalent cation group A, “PEG-Mar” as the divalent cation group B, “AM4 (Si-Mar)” as the divalent group C, and triarylsulfonium hexafluoroantimonate as the cationic curative. (*See* Final Act. 2–3.)

Qiu 2010 teaches a coating composition that is useful as a hardcoat for plastic, metal, and ceramic articles for, among other uses, water resistance. (*See* Qiu 2010 abstract, 1:28–32, 18:22–23, 21:1–8; *see* Ans. 4.) A

composition taught in Qiu 2010 comprises a copolymer prepared from a mixture comprising (1) an ethyleneically unsaturated hydrolysable silane, (2) an ethyleneically unsaturated polyoxyalkylene, and (3) an ethyleneically unsaturated fluorinated polyether, as well as an initiator. (Qiu 2010 1:18–22; *see* Ans. 4). Qiu 2010 provides an example with a polymer comprising HFPO-Mar/PEG-Mar/Si-Mar/CTA in a ratio of 40:20:40:5 prepared along with an initiator. (*See* Qiu 2010 28:15-22; *see* Ans. 4.) The Examiner finds, and Appellant does not dispute, that Qiu 2010 teaches a composition with monomers of the elected species of divalent cation groups A, B, and C. (*See* Ans. 4.)

The Examiner acknowledges that Qiu 2010 does not teach a composition that includes the claimed cationic curative agent. (*See* Ans. 4.) Rather, Qiu 2010 teaches using a different type of curative – a free-radical initiator. (*See* Qiu 2010 12:24–25.)

Qiu 2011 teaches a hardcoat composition that can be applied to stone, ceramic, vinyl, or wood for water resistance. (*See* Qiu 2011 ¶ 113; *see* Ans. 4–5.) The composition of Qiu 2011 includes an epoxysilane compound, an epoxy-functionalized perfluoropolyether acrylate oligomer, and a photoacid initiator. (*See* Qiu 2011 abstract; *see* Ans. 5.) Qiu 2011 teaches that the initiator can be CYRACURE UVI-6976, which is a triarylsulfonium hexafluoroantimonate salt corresponding to the elected cationic curative agent. (*See* Qiu 2011, ¶¶ 95–96; *see* Ans. 5.) Thus, Qiu 2011 teaches Appellant’s elected species of cationic curative agent, although it does not teach compounds from divalent groups A, B, or C.

The Examiner reasons that it is *prima facie* obvious to combine two compositions, each taught to be useful for the same purpose, to achieve a

third composition, also useful for the same purpose, citing *In re Kerkhoven*, 626 F.2d 846, 850 (CCPA 1980). (*See* Ans. 5.) Under this principle, the Examiner reasons that it would have been obvious to one of ordinary skill to combine the compositions of Qiu 2010 and Qiu 2011 to achieve a composition suitable as a curable hardcoating agent for application to metal, plastic, or ceramic substances for water protection and that the resulting composition would comprise a polymer of the divalent monomers recited in claim 19 and a photoinitiator, such as triarylsulfonium hexafluoroantimonate, as a cationic curative agent. (*See* Ans. 5–6.)

We are not persuaded by the Examiner’s reasoning. First, as Appellant argues, the chemistries used by Qiu 2010 and Qiu 2011 for curing are different. (*See* Appeal Br. 5.) The Examiner fails to explain why one of ordinary skill in the art would have considered the cationic curative of Qiu 2011 to be useful in curing the polymers of Qiu 2010, which uses a free-radical initiator. The Examiner does not explain why one of ordinary skill would have had a reasonable expectation of success in making this change.

Furthermore, we are not persuaded that *Kerkhoven* is pertinent and dispositive given the facts before us. In *Kerkhoven*, a process of preparing a spray-dried mixture of at least two slurries of different detergent ingredients, which are independently dried and then mixed before being sprayed together, was found to be obvious because the slurries were known to be mixed together in one slurry and then spray-dried as one. *See Kerkhoven*, 626 F.2d at 847–48. The composition claimed by Appellant, though, is not merely a collection of four separate ingredients acting independently of each other. Instead, the divalent groups A, B, and C make up a fluorinated polymer cured by a cationic curative. As described in the Specification,

“[c]oating solutions having the compositions reported in Table 2 were prepared by mixing 3 percent 12 photoacid generator [described as photoactivated cationic curative] (prepared as a 10% solids solution in S2) with the polymer solutions P 1 - P7.” (Spec. 22:15–16.) Thus, the ingredients of the claimed composition do not have the same relationship—mere coexistence with each other—as the ingredients at issue in *Kerkhoven*. Instead, the ingredients of the claimed composition react with each other.

Appellant claims a particular genus of curable antifouling compositions comprising certain recited ingredients. It is the Examiner’s burden to show why those of ordinary skill in the art would have had a reason to combine these particular ingredients.

The Examiner finds further that the compositions of both Qui 2010 and Qui 2011 can comprise a chain transfer agent and both teach 3-mercaptopropyltrimethoxysilane as a possible chain transfer agent. (Ans. 4–5, 7; *see* Qiu 2010 13:24–31; *see* Qiu 2011 ¶¶ 79, 85.) The Examiner finds that Qiu 2011 also teaches triarylsulfonium hexafluoroantimonate as an alternative to the chain transfer agent. (*See* Ans. 7, citing Qiu 2011 ¶¶ 95–96.) The Examiner appears to be equating a chain transfer agent with a cationic curative, stating:

Qiu 2011 and Qiu 2010 both require a chain transfer agent (i.e. cationic curative) to initiate the curing process. Qiu 2010 teaches said agent as being a silane such as 3-mercaptopropyltrimethoxysilane (pg 13, Ins 24-31 ). Qiu 2011 also teaches using a chain transfer agent in the curable coating and also includes 3-mercaptopropyltrimethoxysilane (pg 13, Ins 24-31). Qiu 2011 also teaches using a chain transfer agent in the curable coating and also includes 3-mercaptopropyltrimethoxysilane [0085] but also includes triarylsulfonium hexafluoroantimonate as a suitable alternative [0095]-[0096].

(Ans. 7.) Thus, the Examiner appears to be reasoning that Qiu 2011 provides a reason to use triarylsulfonium hexafluoroantimonate as an alternative to 3-mercaptopropyltrimethoxysilane as a chain transfer agent.

We are not persuaded that Qiu 2011 equates chain transfer agents and cationic curatives or provides a reason why triarylsulfonium hexafluoroantimonate would be considered an alternative to 3-mercaptopropyltrimethoxysilane. Paragraphs 95 and 96 of Qiu 2011, which the Examiner cites, refer only to photoacid generators and cationic initiators. The Examiner does not direct us to a discussion of the use of chain transfer agents as cationic initiators in either paragraph 95 or paragraph 96 of Qiu 2011 and we note that chain transfer agents are discussed in a separate section of the disclosure (*see* Qiu 2011 ¶¶ 77–85).

Furthermore, Appellant's Specification indicates that chain transfer agents and curative initiators are used in different reactions to form a curable composition as claimed. Specifically, chain transfer agents are used in the preparation of the polymers (*see* Spec. 21:7–8), whereas cationic curatives are used in the final preparation of the coating solutions (*see id.* at 21:15–16). We are not persuaded without further explanation that a chain transfer agent can be substituted by a cationic curative agent as the Examiner asserts.

Because the Examiner has not provided a reason why those of ordinary skill in the art would have combined the ingredients of Qiu 2010 and Qiu 2011 or would have substituted the chain transfer agent of Qiu 2011 with triarylsulfonium hexafluoroantimonate, we are not persuaded that the claimed curable antifouling composition would have been obvious. Accordingly, we reverse the Examiner's rejection under 35 U.S.C. § 103.



*Conclusion*

Upon consideration of the record and for the reasons given, we reverse the Examiner's rejection.

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>References</b>	<b>Affirmed</b>	<b>Reversed</b>
19-26, 31-37	103	Qiu 2010, Qiu 2011		19-26, 31-37

REVERSED