

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JIN-O CHOI

Appeal No. 95-2579
Application 08/134,707¹

ON BRIEF

Before CAROFF, METZ and WEIFFENBACH, *Administrative Patent Judges*.

WEIFFENBACH, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-20 which are all of the claims in the application. We reverse.

¹Application for patent filed October 12, 1993.

The Claimed Subject Matter

The claims on appeal are directed to method of forming a pattern on a substrate using a solution of a partially imidized polyamic acid. Claim 1 is representative of the claimed subject matter and reads as follows:

1. A method of forming a pattern on a substrate comprising
 - (A) forming a first solution which comprises
 - (1) organic solvent, and
 - (2) monomers of
 - (a) diamine, and
 - (b) dianhydride, tetracarboxylic acid or ester of tetracarboxylic acid;
 - (B) polymerizing said monomers to form a polyamic acid soluble in said organic solvent;
 - (C) imidizing 10 to 95% of the amic acid groups in said polyamic acid to form a partially imidized polyamic acid;
 - (D) forming a second solution of said partially imidized polyamic acid, which is more concentrated than said first solution;
 - (E) applying said second solution to a substrate;
 - (F) evaporating the solvent from said second solution to form a coating of said partially imidized polyamic acid on said substrate;
 - (G) using a process requiring exposure to light, removing a portion of said coating to form a pattern on said substrate; and
 - (H) fully imidizing said partially imidized polyamic acid in said coating on said substrate.

References of Record

The examiner relies on the following references as evidence of obviousness:

Peterson	4,073,788	Feb. 14, 1978
Lee	4,829,131	May 9, 1989
Chion et al. (Chion)	0 224 680 (Published European Patent Application)	Jun. 10, 1987
Yamada et al (Yamada)	0 349 010 (Published European Patent Application)	Jan. 3, 1990

Rhee et al. (Rhee), "Synthesis of Alternating Aromatic Copolyimides," *Macromolecules*, Vol. 26, Number 2, Pages 404-406 (1993).

The Rejections²

Claims 1-6 and 8-12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Chion in view of Peterson or Rhee.

Claims 7, 13-15 stand rejected under 35 U.S.C. § 103 as being unpatentable over Chion in view of Peterson or Rhee and further in view of Yamada or Lee.

Claims 13-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Chion in view of Yamada or Lee.

²In the answer and in the brief, the examiner and appellant enter into a dialog regarding a Japanese reference (an abstract to a Japanese patent, JP 03197530), cited by appellant in an information disclosure statement (paper no. ½) submitted before the first action on the merits. First, while appellant did attach a copy of the reference to his reply brief, we note that we were unable to find the original reference submitted with the information disclosure statement in the application file wrapper. Second, we have not considered the reference in reviewing the rejection for obviousness since the reference is not included in listing of prior art of record relied upon for the rejection. *Ex parte Raske*, 28 USPQ2d 1304, 1304-05 (Bd. App. & Int. 1993); *In re Hoch*, 428 F.2d 1341, 1342 n.3, 166 USPQ 406, 407 n. 3 (CCPA 1970).

Opinion

We have carefully considered the respective positions advanced by appellant and the examiner. For the reasons set forth below, we will not sustain any of the examiner's rejections.

According to appellant, "in the method of this invention the solutions of polyamic acids are partially imidized before they are applied to the substrate" (p. 3, lines 14-16). Independent claims 1 and 13 require partially imidizing the polyamic acid [step (C) of the claimed method] and forming a second solution of partially imidized polyamic acid which is more concentrated than the first solution [step (D) of the claimed method] before applying the second solution to a substrate. On page 11, lines 18-27 of the specification, appellant discloses the concentration step as follows:

Concentration can be accomplished by gently heating under vacuum at about 80 to about 130E C. Concentration is preferably achieved by precipitating the partially imidized polyamic acid from the first solution, preferably by the addition of water. The precipitated partially imidized polyamic acid is collected, usually by filtration, and can be washed (e.g., in methanol), and dried, if desired. It is then dissolved in a second organic solvent ... to form the second solution of about 20 to about 50 wt% solids.

Chion, the examiner's principle reference, teaches on page 5, lines 20-24 that

[p]artial imidization preferably to a level of about 10 to about 30 percent of the polyamic acid may be accomplished during the coating process wherein the polyamic acid based photoresist solution is deposited on the semiconductor substrate. Thus after the polyamic acid based photoresist solution is coated on the semiconductor substrate, the substrate is heated at a temperature of about 85-95EC for about 15 to about 30 minutes to effect about 10 to about 20% imidization of the polyamic acid.

From this teaching the examiner concludes that Chion teaches appellant's step (C) of the claimed method. The examiner further concludes that the following disclosure on page 5, lines 32-34 of Chion teaches step (D), i.e., forming a more concentrated solution:

Partial neutralization of the free carboxylic acid groups of the polyamic acid may be accomplished by reacting one equivalent of a basic organic compound such as an amine compound such as triethylamine to one equivalent of the polyamic acid before incorporation of the polyamic acid in the photoresist solution.

We do not share the examiner's view of the teachings of Chion as it relates to steps (C) and (D) of appellant's claimed method.

We find that Chion does not teach partially imidizing the polyamic acid before it is applied to the substrate. While Chion does disclose that the partial imidization may be accomplished during the coating process, Chion does not suggest or teach explicitly or implicitly that the partial imidization may be accomplished before the coating process. As for step (D) of appellant's method, the examiner has failed to explain how the teachings of Chion on page 5, lines 32-34 would have led a person having ordinary skill in the art to form a more "concentrated solution" as interpreted in light of appellant's disclosure.

The teachings of Peterson, Rhee, Yamada and Lee do not make up for the deficiencies of Chion. Accordingly, we find that the examiner has not established a *prima facie* case of obviousness to sustain the rejection of the claims 1-6 and 8-12 under 35 U.S.C. § 103 over Chion in view of Peterson or Rhee, the rejection of claims 7, 13-15 under 35 U.S.C. § 103 over Chion in view of Peterson or Rhee and further

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in view of Yamada or Lee, and the rejection of claims 13-20 under 35 U.S.C. § 103 over Chion in view of Yamada or Lee. *In re Piasecki*, 745 F.2d 1468, 223 USPQ 785 (Fed. Cir. 1984). For the foregoing reasons, the decision of the examiner is reversed.

REVERSED

MARC L. CAROFF)	
Administrative Patent Judge)	
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ANDREW H. METZ)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
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