

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHINGFU LIN

Appeal 2007-0479
Application 10/356,960
Technology Center 2814

Decided: February 26, 2007

Before EDWARD C. KIMLIN, CHARLES F. WARREN, and JEFFREY T. SMITH, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-12. Claim 1 is illustrative:

1. A method for cleaning exposed copper surfaces in a process for making electronic components consisting essentially of the following sequence the steps of:

providing an integrated circuit structure which is in the process of being fabricated into a finished electronic component by etching a dielectric

layer of the component with an etchant to form an opening having an exposed copper surface with copper oxide on the surface thereof;

contacting the exposed copper surface of the opening of the etched component with a cleaning composition different from the etchant consisting essentially of a nitrogen containing material and an oxygen containing material to clean the copper surface with a lower dielectric constant shift of the dielectric compared to a conventional argon cleaning method;

forming a barrier layer on sidewalls and the exposed copper surface in the cleaned opening;

filling the opening with copper; and

continuing the process for making the integrated circuit device.

The Examiner relies upon the following reference in the rejection of the appealed claims:

Chen US 6,352,938 B2 Mar. 5, 2002

Appellant's claimed invention is directed to a method for cleaning exposed copper surfaces in integrated circuit structures. The method comprises, inter alia, contacting the exposed copper surface with a cleaning composition that consists essentially of a nitrogen containing material and an oxygen containing material (claim 1), or with a nitrogen containing material, an oxygen containing material, and a hydrogen containing material (claim 7). It can be seen that both independent claims 1 and 7 require that the cleaning composition comprises an oxygen containing material.

Appealed claims 1-12 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Chen.

We have thoroughly reviewed the respective positions advanced by Appellant and the Examiner. In so doing, we find that the Examiner has

failed to establish a prima facie case of anticipation for the claimed subject matter. Accordingly, we will not sustain the Examiner's rejection.

Chen expressly discloses that undesirable copper oxide is removed from the copper layer by using a gaseous composition of N₂H₂ (*see Abstract* and col. 4, ll. 33 et. seq.). Hence, Chen does not describe a cleaning composition comprising an oxygen containing material within the meaning of § 102. Consequently, the Examiner has committed reversible error in stating that the method of Chen includes contacting the copper surface "with a cleaning composition different from the etchant consisting essentially of a nitrogen containing material (N₂H₂) and an oxygen containing material (O₂) to clean the copper surface... (sentence bridging pages 3 and 4 of Answer). We find no such disclosure in Chen and the Examiner, significantly, has not cited any particular disclosure in the reference to support this statement. Accordingly, the Examiner has failed to establish a prima facie case of anticipation.

Also, although we do not find the claim language "consisting essentially of" to be at issue on this appeal, we must point out to the Examiner that, contrary to the statement made at page 7 of the Answer, the language "comprising" and "consistently essentially of" are not equivalent in patent parlance. The term "comprising" is open-ended and includes other materials not specifically recited in the claims. On the other hand, "consisting essentially of" excludes components that materially affect the basic nature of the claimed composition. *See In re DeLajarte*, 337 F.2d 870, 873-74, 143 USPQ 256, 258 (CCPA 1964), and MPEP § 2111.03.

Appeal 2007-0479
Application 10/356,960

Upon return of this application to the Examiner, the Examiner should consider a rejection of the appealed claims under 35 U.S.C. § 103 over Chen. In particular, the Examiner should consider the obviousness of including the oxygen in Chen's gaseous mixture for removing photoresist in the gaseous composition for removing copper oxygen.

In conclusion, based on the foregoing, we are constrained to reverse the Examiner's rejection.

REVERSED

cam

Law Office of Delio & Peterson, LLC
121 Whitney Avenue
3rd Floor
New Haven, CT 06510