

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

Paper No. 11

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte LEIF C. OLSEN and LELAND S. SWANSON

Appeal No. 2001-2444
Application No. 09/419,176

ON BRIEF

Before GARRIS, WARREN, and OWENS, *Administrative Patent Judges*
OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal is from the final rejection of claims 1 and 2, which are all of the claims remaining in the application.

THE INVENTION

The appellants claim a method for inlaid interconnect fabrication wherein silicon carbide is used as a planarization stop. Claim 1 is illustrative:

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1. A method of inlaid interconnect fabrication, comprising the steps of:

- (a) provide a dielectric layer;
- (b) form a silicon carbide layer on said dielectric layer;
- (c) form vias and trenches in said silicon carbide and dielectric layers;
- (d) deposit conducting material on said silicon carbide and dielectric; and
- (e) planarize to remove said conducting material outside of said vias and trenches with said silicon carbide as a planarization stop.

THE REFERENCES

Fiordalice et al. (Fiordalice)	5,578,523	Nov. 26, 1996
Chiang et al. (Chiang)	5,817,572	Oct. 06, 1998

THE REJECTION

Claims 1 and 2 stand rejected under 35 U.S.C. § 103 as being unpatentable over Fiordalice in view of Chiang.

OPINION

We reverse the aforementioned rejection. We need to address only claim 1, which is the sole independent claim.

Fiordalice discloses a method of inlaid interconnect fabrication comprising providing, in order, a conductive

layer (26), a dielectric layer (27), an etch stop layer (28), a dielectric layer (30), and a polish assisting layer (31) (figure 3).¹ After a masking layer (33) having a pattern for forming an interconnect opening (32) has been applied to the polish assisting layer, the interconnect opening, which includes an interconnect portion (36) and a plug portion (34) and extends down to the conductive layer, is formed by etching (col. 5, lines 33-46; figure 5). The masking layer then is removed and the interconnect opening is filled with interconnect metal (42) (col. 6, lines 1-5; figure 6). Because deposition of the interconnect metal is not selective to deposition in the interconnect opening alone, the interconnect metal deposits on top of the polish assisting layer (col. 6, lines 5-8). The portion of the interconnect metal above the interconnect opening, and also the polish assisting layer, are removed in a planarization step, preferably by chemical mechanical polishing, to form an interconnect (44) inlaid into interlayer dielectrics 27 and 30 (col. 7, lines 3-40; figure 7). The

¹ "The polish assisting layer can include oxides or nitrides of titanium, tungsten, tantalum, or the like" (col. 8, lines 17-19).

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disclosed etch stop materials include silicon nitride (col. 4, lines 9-13).

The portion of Chiang relied upon by the examiner discloses both silicon nitride and silicon carbide as etch stop materials (col. 14, line 66 - col. 15, line 5).

The examiner argues (office action mailed September 1, 2000, paper no. 6, page 3):

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Fiordalice et al. by replacing SiN with SiC as taught by Chiang et al. because the SiN and SiC are seen as equivalent: they are dielectric, etch stop materials if they are used in an etching process and planarizing stop materials if they are used in a planarizing process, hence the substitution of one for the other would have been anticipated to produce an expected result.

Fiordalice, however, does not disclose silicon nitride as a planarization stop but, rather discloses it only as an etch stop. Since the planarizing takes place above dielectric layer 30 as shown in Fiordalice's figure 7, the etch stop, which is below dielectric layer 30, cannot serve as a planarization stop. Hence, even if Chiang's silicon carbide were substituted for Fiordalice's silicon nitride etch stop material as proposed by the examiner, the appellants' claimed invention would not be

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obtained. See *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1052, 5 USPQ2d 1434, 1439 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988).

Accordingly, we find that the examiner has not set forth a factual basis which is sufficient to support a conclusion of *prima facie* obviousness of the appellants' claimed invention. We therefore reverse the examiner's rejection.

DECISION

The rejection of claims 1 and 2 under 35 U.S.C. § 103 over *Fiordalice* in view of *Chiang* is reversed.

REVERSED

BRADLEY R. GARRIS)	
Administrative Patent Judge)	
)	
)	
)	BOARD OF PATENT
CHARLES F. WARREN)	APPEALS AND
Administrative Patent Judge)	INTERFERENCES
)	
)	
TERRY J. OWENS)	
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