UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte KEI-YU KO, LI LI,
and GUY T. BLALOCK

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Appeal No. 2006-0114
Application No. 09/585,682

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ON BRIEF

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Before WALTZ, KRATZ, and JEFFREY T. SMITH, ***Administrative Patent Judges***.

JEFFREY T. SMITH, ***Administrative Patent Judge.***

DECISION ON APPEAL

Applicants appeal the decision of the Primary Examiner finally rejecting claims 1 to 13, all of the pending claims in the application. We have jurisdiction under 35 U.S.C. § 134.

Comment [s1]: Indent five spaces only.

BACKGROUND

Appellants' invention relates to semiconductor devices that include passivation structures with one or more sidewalls that are oriented substantially perpendicular to a plane of a substrate and that terminate at undoped silicon oxide structures. (Brief, p. 5) Claims 1 and 6, as presented in the Brief, are reproduced below:

> 1. A semiconductor device, comprising:
> a semiconductor substrate including an active surface;
> at least one conductive line disposed upon the active surface, the at least one conductive line being flanked by sidewall spacers;
> an undoped silicon dioxide cap disposed over and in contact with the at least one conductive line;
> a passivation layer over the undoped silicon dioxide cap; and
> at least one contact aperture defined through the passivation layer and including at least one sidewall extending substantially perpendicularly relative to the semiconductor substrate, at least a portion of the at least one sidewall terminating at an interface between the passivation layer and the undoped silicon dioxide cap.

> 6. A semiconductor device, comprising:
> a semiconductor substrate;
> at least one undoped silicon oxide structure; and
> at least one doped silicon oxide structure over the at least one undoped silicon oxide structure and having at least one sidewall substantially perpendicular to a plane of the semiconductor substrate, at least a portion of the at least one sidewall terminating at an interface between the at least one doped silicon dioxide structure and the at least one undoped silicon oxide structure.

CITED PRIOR ART

As evidence of unpatentability, the Examiner relies on the following references:

Blalock et al. (Blalock)	5,286,344	Feb. 15, 1994
Lur	5,428,240	Jun. 27, 1995

Claims 1-13 stand rejected under 35 U.S.C. § 103(a) as obvious over Blalock in view of Lur. (Answer, pp. 4-10).

DISCUSSION

We have carefully reviewed the claims, specification and applied prior art, including all of the arguments advanced by both the Examiner and Appellants in support of their respective positions. This review leads us to conclude that the rejection of claims 1 to 13 is not well founded. Our reasons appear below.

Blalock discloses multi-layered semiconductor structures that may be composed of a doped silicon dioxide outer (passivation) layer on a silicon nitride stop layer. The Examiner recognizes that Blalock does not disclose that the material of the cap (stop) layer may be undoped silicon dioxide. The Examiner asserts that Lur teaches the equivalence of forming an etch cap (stop) layer from undoped silicon dioxide and silicon nitride. Thus, the Examiner concluded that it would have been obvious to one of ordinary skill in the art to modify the stop layer of Blalock by using the undoped silicon dioxide in place of silicon nitride. (Answer, pp. 3-6).

We recognize that based on the teaching of Lur persons of ordinary skill in the art would have recognized that various materials are suitable for use as etch stop layers. (Col. 5, ll. 29-35). This includes undoped silicon dioxide and silicon nitride as recognized by the Examiner. It is not disputed that Blalock discloses a process for producing semiconductor devices that comprise a cap (stop) layer composed of silicon nitride. Blalock's invention is a process that uses a fluorinated chemical etchant that has a high selectivity of SiO_2 etch rate with respect to Si_3N_4 etch rate. Thus, Blalock discloses it is essential that the stop layer of the formed semiconductor device be silicon nitride. (Cols. 3-4). If the stop layer were replaced with a non nitride containing stop layer, as suggested by the Examiner, the process of Blalock would not function to form a semiconductor device comprising a nitride containing layer. Consequently, we agree with Appellants, Brief, page 10, that,

> one of ordinary skill in the art would have had no reason to expect that the asserted combination of teachings from Blalock and Lur would have resulted in the structures recited in claims 1 - 13 . . . If the undoped silicon oxide etch stop were merely substituted for the silicon nitride layer of Blalock, due to lack of selectivity for the disclosed etchant between doped and undoped silicon oxides, etching of the overlying doped silicon dioxide layer would continue on into the undoped silicon dioxide film. Lur also fails to teach or suggest any specific etchants that could be used to form sidewalls having the characteristics that are recited in independent claims 1 and 6. Therefore, one of ordinary skill in the art would have no reason to expect the asserted combination of teachings from Blalock and Lur to be successful.

Comment [s2]: This new paragraph should be indented five spaces.

Comment [s3]: Quotations fifty words or more should be indented left and right without quotation marks *within* block. See page 43 of Blue Book 5.1.

Thus, the Examiner has failed to establish a *prima facie* case of obviousness to support the stated rejection. Accordingly, we reverse the Examiner's rejection under 35 U.S.C. § 103(a) of claims 1 to 13 over the combination of Blalock and Lur.

REVERSED

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THOMAS A. WALTZ	)	
Administrative Patent Judge	)	
	)	
	)	
	)	***BOARD OF PATENT***
PETER F. KRATZ	)	***APPEALS***
Administrative Patent Judge	)	***AND***
	)	***INTERFERENCES***
	)	
	)	
JEFFREY T. SMITH	)	
Administrative Patent Judge	)	

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