

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board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

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte JONG CHEN,  
SHYUE SHENG LU and  
JYU HORNG SHIEH

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Appeal No. 2006-0563  
Application 09/941,537

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ON BRIEF

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Before KIMLIN, KRATZ, and TIMM, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-3, 7, 8, 10, 11, 13-15 and 17-24. Claim 1 is illustrative:

1. A method for reducing light reflectance from via sidewalls in a photolithographic trench patterning dual damascene process comprising the steps of:

providing an inter-metal dielectric (IMD) layer comprising at least one via opening extending through a thickness thereof;

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forming an antireflectance coating (ARC) layer over the IMD layer such that the ARC layer is formed over sidewalls of the at least one via opening without filling the at least one via openings; and

depositing a photoresist layer over the IMD layer and photolithographically patterning a trench opening over the at least one via opening.

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

Filipiak et al. (Pilipiak)	5,918,147	Jun. 29, 1999
Yu et al. (Yu)	6,027,861	Feb. 22, 2000
Lin et al. (Lin)	6,042,999	Mar. 28, 2000

Appellants' claimed invention is directed to a method for reducing light reflectance from the sidewalls of a via in a photolithographic trench patterning dual damascene process. The method entails, inter alia, forming an antireflectance coating (ARC) layer over the inter-metal dielectric (IMD) layer in a manner such that the ARC layer is formed over the sidewalls of the via opening but without filling the via opening.

Appealed claims 1-3, 7, 8, 10, 11, 13-15 and 17-24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lin in view of Yu and Filipiak.

The claims of the groups set forth at pages 8 and 9 of appellants' brief stand or fall together.

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We have thoroughly reviewed each of appellants' arguments for patentability. However, we find ourselves in complete agreement with the examiner's reasoned analysis and application of the prior art, as well as his cogent and thorough deposition of the arguments raised by appellants. Accordingly, we will adopt the examiner's reasoning as our own in sustaining the rejection of record, and we add the following for emphasis only.

Appellants do not dispute the examiner's factual determination that Lin, like appellants, discloses a method for reducing light reflectance from via sidewalls in a photolithographic trench patterning dual damascene process by forming an ARC layer over the sidewalls of the via openings. As recognized by the examiner, the method of Lin not only forms the ARC layer over the sidewalls of the via, but also fills the via opening with the ARC. However, based on the prior art discussed by Lin, as depicted in Figures 1a-1i, and the teachings of Yu and Filipiak, we fully concur with the examiner that it would have been obvious to one of ordinary skill in the art "that adequate protection could also be obtained by using one or more ARC layers of sufficient thickness without necessarily requiring that the ARC material fill one or more via openings or holes" (page 5 of answer, last sentence). Also, as set forth by the examiner, Yu shows the suitability of utilizing a TiN barrier layer

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also as a thin conformal ARC layer of about 200-1500 Angstroms thick (see column 4, lines 33-62 and column 5, lines 27-41). In addition, Filipiak evidences that it was known in the art to design an ARC layer only as thick as needed when patterning an overlying photoresist layer (see column 3, lines 48-55).

Hence, as explained by the examiner, Lin establishes that it was conventional in the art to use a thin conformal edge barrier layer 50 of about 1000 Angstrom thickness to cover the sidewalls of a via without filling it, and Yu and Filipiak teach that the same materials of similar thickness also serve as an ARC. Accordingly, we find that it would have been obvious for one of ordinary skill in the art to employ either option of coating only the sidewalls of a via with an ARC or to fill the via with an ARC. Moreover, in keeping with Filipiak's teaching of keeping the ARC layer only as thick as needed, we agree with the examiner that one of ordinary skill in the art would have been properly motivated to form ARC layer 150 of Lin such that it conformally deposits over the IMD layer and the via openings without filling the openings (see page 21 of answer). As noted by the examiner, this would save ARC material and the subsequent removal of Lin's ARC material.

Appellants, in referring to the examiner's statement that the etch stop materials of Lin's Figures 1(c) through 1(f) would be expected to inherently function as an ARC layer, contends that the "Examiner provides no support for this statement of inherency" (page 15 of brief, last paragraph). However, the examiner clearly explains that Lin identifies two materials, TiN and SiON, as being suitable for either etch stop layers or an ARC (see page 14 of answer). Also, further factual support is provided by the examiner in pointing out that Yu teaches that TiN can function as both a barrier layer and an ARC.

As a final point, we note that appellants base no argument upon objective evidence of non-obviousness, such as unexpected results, which would serve to rebut the inference of obviousness established by the applied prior art.

Accordingly, based on the foregoing and the reasons well-stated by the examiner, the examiner's decision rejecting the appealed claims is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.36(a)(iv) (effective Sept. 13, 2004; 69 Fed. Reg. 49960 (Aug. 12, 2004); 1286 Off. Gaz. Pat. Office 21 (Sept, 7, 2004)).

AFFIRMED

Edward C. Kimlin	)	
Administrative Patent Judge	)	
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Peter F. Kratz	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND
	)	INTERFERENCES
	)	
	)	
Catherine Timm	)	
Administrative Patent Judge	)	

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