

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. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GAYLE W. MILLER
and GAIL D. SHELTON

Appeal No. 2001-1064
Application No. 09/164,069

ON BRIEF

Before FLEMING, RUGGIERO, and GROSS, Administrative Patent Judges.
RUGGIERO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal from the final rejection of claims 6-17, which are all of the claims pending in the present application. Claims 1-5 have been canceled.

The disclosed invention relates to a dielectric layer formed within a semiconductor structure in which a layer of silica precursor material is initially deposited on a silicon substrate. The layer of silica precursor material is then dried and becomes a porous silica film. A protective layer, such as parylene, is formed on top of the dried porous silica film resulting in a

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composite porous silica layer formed between the parylene layer and the original porous silica composition. According to Appellants (specification, page 5), the composite porous silica layer has a relatively low dielectric constant and is able to withstand damage from a standard chemical-mechanical polishing (CMP) procedure.

Claim 6 is illustrative of the invention and reads as follows:

6. A dielectric layer within a damascene structure of a semiconductor device, comprising:

a porous silica layer;

a parylene layer; and

a composite layer formed between said parylene layer and said porous silica layer, wherein said composite layer is formed by a combination of said parylene layer and said porous silica layer.

The Examiner relies on the following prior art:

Sivaramakrishnam et al. (Sivaramakrishnam)	5,958,510	Sep. 28, 1999 (filed Jan. 08, 1996)
Lu et al. (Lu)	6,008,540	Dec. 28, 1999 (filed May 28, 1998)

Claims 6-17 stand finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Lu in view of Sivaramakrishnam.

Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the Brief (Paper No. 10) and Answer (Paper No. 11) for the respective details.

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OPINION

We have carefully considered the subject matter on appeal, the rejection advanced by the Examiner, the arguments in support of the rejection and the evidence of obviousness relied upon by the Examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, Appellants' arguments set forth in the Brief along with the Examiner's rationale in support of the rejection and arguments in rebuttal set forth in the Examiner's Answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 6-17. Accordingly, we reverse.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to

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modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the Examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

With respect to the Examiner's 35 U.S.C. § 103(a) rejection of independent claims 6 and 9 based on the proposed combination of Lu and Sivaramakrishnam, Appellants assert that the Examiner has failed to establish a prima facie case of obviousness since all of the limitations of claims 6 and 9 are not taught or suggested by the applied prior art references, either separately or in combination. In particular, Appellants contend (Brief, page 7) that the applied Lu and Sivaramakrishnam references do not teach or

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suggest a dielectric layer structure including a composite layer, formed by a combination of a parylene layer and a porous silica layer, disposed between the parylene layer and the porous silica layer as presently claimed.

After careful review of the applied Lu and Sivaramakrishnam references, in light of the arguments of record, we are in general agreement with Appellants' position as stated in the Brief. Although the Examiner points to portions of Lu (column 7, lines 59-67 through column 8, lines 1-5) which, in the Examiner's view, suggest the use of parylene as an alternative to the HSQ layer 144, our review of this portion of Lu reveals a clear difference in application procedures between the HSQ and parylene embodiments. In Lu, the HSQ material is used as a pore filling material which fills the pores 512 of the xerogel or porous silica layer 510 creating a composite layer of HSQ and xerogel. An entirely different approach is taken by Lu, however, when using parylene. As indicated by Lu (column 7, lines 59-67), "[r]ather than apply a pore filling material such as HSQ 144" an alternative surface activation/adhesion approach is used which treats the surface of the xerogel layer with a plasma of hydrogen and argon. The resultant hydrided surface of the xerogel layer acts to provide good adhesion for dielectric materials such as parylene. A further

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indication that the above-discussed approaches are part of different and alternative embodiments is provided at column 2, lines 39-45 in Lu.

From the above disclosure in Lu, it is apparent to us that the only instance in which parylene is used is in a non-pore filling embodiment. In our view, the adhesion enhancing surface treatment of the parylene embodiment in Lu would prevent a composite layer of parylene and porous silica from being formed as required by Appellants' claims.

We have also reviewed the Sivaramakrishnam reference, applied by the Examiner in combination with Lu, and find nothing which would overcome the deficiencies of Lu discussed above. Although Sivaramakrishnam provides a general discussion (column 6, lines 18-49) of the use of parylene in integrated circuit fabrication, there is no indication from the Examiner as to how and in what manner the Lu reference might be modified to result in Appellants' claimed structure, in particular the claimed composite layer of parylene and porous silica.

In view of the above discussion, it is our view that, since all of the limitations of the appealed claims are not taught or suggested by the applied prior art Lu and Sivaramakrishnam references, the Examiner has not established a prima facie case of

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obviousness. Accordingly, the 35 U.S.C. § 103(a) rejection of independent claims 6 and 9, as well as claims 7, 8, and 10-17 dependent thereon, is not sustained.¹

¹ The copy of the appealed claims attached as an appendix to Appellants' Brief is incorrect. Claims 10 and 11 are indicated as dependent on claim 9 while these claims as amended in the amendment filed February 14, 2000 (paper No. 7) indicate a dependence on claim 6. A review of pending claims 6-17 reveals that claims 10 and 11 should properly be dependent on claim 9, not claim 6. We leave this matter for Appellants and the Examiner to address accordingly.

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In conclusion, we have not sustained the Examiner's 35 U.S.C. § 103(a) rejection of any of the claims on appeal. Therefore, the decision of the Examiner rejecting claims 6-17 is reversed.

REVERSED

MICHAEL R. FLEMING)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
JOSEPH F. RUGGIERO)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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