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. 24

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex Parte WILEY P. KIRK, JOE X. ZHOU,
BRUCE E. GNADE and CHIH-CHEN CHO

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Appeal No. 1998-1727
Application 08/340,097

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ON BRIEF

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Before GARRIS, ***Administrative Patent Judge*** and McKELVEY, ***Senior Administrative Patent Judge*** and JEFFREY T. SMITH, ***Administrative Patent Judge.***

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

Decision on appeal under 35 U.S.C. § 134

Applicants appeal the decision of the Primary Examiner finally rejecting claims 1, 2 and 4 to 24, which are all of the claims pending in this application. We have jurisdiction under 35 U.S.C. § 134.

BACKGROUND

The invention generally relates to semiconductor technology and more particularly is directed to a method of forming a layer over a surface of a silicon substrate. (Specification, p. 1). Claim 1 which is representative of the invention is reproduced below:

> 1. A method of forming a layer over a surface of a silicon substrate, the layer being lattice matched to the silicon substrate, comprising the steps of:
>
> cleaning the surface of the silicon substrate;
>
> forming a passivation layer having a thickness in excess of one monolayer on the silicon substrate; and
>
> forming the lattice matched layer on the passivation layer.

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

Kasai, et al. (Kasai)	5,262,633	Nov. 16, 1993
de Lyon	5,399,206	Mar. 21, 1995

THE REJECTIONS

The Examiner rejected claims 1, 2, 6, 8, 9, 12, 13, and 15 to 23 under 35 U.S.C. § 102(e) as anticipated by de Lyon; claims 1, 2, and 6 to 23 under 35 U.S.C. § 103(a) over de Lyon; and claims 4, 5 and 24 under 35 U.S.C. § 103(a) over the combination of de Lyon and Kasai. (Answer, pp. 3 and 4).

OPINION

We reverse the aforementioned rejections. We need to address only claims 1 and 24, which are the independent claims.

The de Lyon reference describes a process for forming ternary II-VI semiconductor films (16) on a silicon substrate (12) by first depositing a monolayer of arsenic (14) or other group V metal on a cleaned surface of the substrate. The ternary II-VI semiconductor film is then formed over the arsenic monolayer, either directly thereon or on top of an intermediate buffering layer (18). (Cols. 3 and 4; Fig. 2). The de Lyon reference describes the importance of using a single monolayer of arsenic on the cleaned silicon surface in order to avoid disruption of the epitaxial process. (Col. 3, l. 67 to col. 4, l. 9).

Thus, the de Lyon reference discloses forming a passivation layer having a thickness of one monolayer on a cleaned silicon substrate and forming a lattice matched layer on the passivation layer. The de Lyon reference does not anticipate the subject matter of claim 1 because the reference discloses the use of a passivation layer having more than one monolayer will disruption of the epitaxial process. In order for a claimed invention to be anticipated under 35 U.S.C. § 102, all of the elements of the claim must be found in one reference. ***See Scripps Clinic & Research Found. v. Genentech Inc.,***

927 F.2d 1565, 1576, 18 USPQ2d 1001, 1010 (Fed. Cir. 1991). The rejection under 35 U.S.C. § 102(e) is reversed.

Regarding the rejection under § 103 over the de Lyon reference, the Examiner argues that it would have been obvious to one of ordinary skill in the art to determine through routine experimentation the optimum operable number of monolayers in order to prevent diffusion of impurities. (Answer, p. 4). The de Lyon reference describes the use of a passivation layer containing one monolayer. As stated above, de Lyon discloses a passivation layer having more than one monolayer will cause a disruption to the epitaxial process. In essence, de Lyon is indicating that a suitable epitaxial film cannot be formed when the passivation layer has more than one monolayer. Thus, according to de Lyon, a passivation layer having one monolayer is the optimum. The Examiner does not specifically address de Lyon's concern with the disruption to the epitaxial process. In order for a ***prima facie*** case of obviousness to be established, the teachings from the prior art itself must appear to have suggested the claimed subject matter to one of ordinary skill in the art. See ***In re Rinehart,*** 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976). The rejection of the claims under 35 U.S.C. § 103 over de Lyon is reversed.

Regarding the rejection of claim 24 under § 103, the Examiner relies on the combination of de Lyon and Kasai. The Examiner relies on Kasai to disclose germanium

can be used as a passivation layer. The Examiner directs us to column 2 lines 40 to 50 of Kasai. The Examiner concludes "[i]t would have been obvious to one of ordinary skill in the art to modify the de Lyon process by the teachings of the Kasai et al. reference to use germanium passivation layer in order to decrease the lattice mismatch between the passivation layer and the substrate." (Answer, p. 4).

Kasai is directed to a method of forming a wideband anti-reflection coating on a light receiving surface of an indium antimonide photodetector. Kasai discloses the passivation layer, formed of germanium, inhibits the flash effect after exposure to light. (Col. 1, ll. 39-41 and 61-65). Kasai does not discuss lattice match between the passivation layer and the substrate. The de Lyon reference is concerned with lattice match however, there is no disclosure that germanium is suitable alternative to arsenic. (Col. 4, l. 61 to col. 5, l. 10). The record indicates that the motivation relied upon by the Examiner for using a germanium passivation layer comes from the Appellants' description of their invention in the specification rather than coming from the applied prior art and that, therefore, the Examiner used impermissible hindsight in rejecting the claims. ***See W.L. Gore & Associates v. Garlock, Inc.,*** 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983), ***cert. denied***, 469 U.S. 851 (1984); ***In re Rothermel,*** 276 F.2d 393, 396, 125 USPQ 328, 331 (CCPA 1960). Accordingly, we reverse the Examiner's rejection under 35 U.S.C. § 103 over the combination of de Lyon and Kasai.

CONCLUSION

The rejection of claims 1, 2, 6, 8, 9, 12, 13, and 15 to 23 under 35 U.S.C. § 102(e) as anticipated by de Lyon is reversed.

The rejection of claims 1, 2, and 6 to 23 under 35 U.S.C. § 103(a) over de Lyon is reversed.

The rejection of claims 4, 5 and 24 under 35 U.S.C. § 103(a) over the combination of de Lyon and Kasai is reversed.

REVERSED

BRADLEY R. GARRIS Administrative Patent Judge	)
FRED E. McKELVEY, Senior Administrative Patent Judge	) BOARD OF PATENT) APPEALS AND) INTERFERENCES
JEFFREY T. SMITH Administrative Patent Judge	)

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