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BROOKS KUSHMAN P.C. 1000 TOWN CENTER TWENTY-SECOND FLOOR SOUTHFIELD, MI 48075			BRATLAND JR, KENNETH A	
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL
AND APPEAL BOARD

Ex parte CHRISTIAN HAGER, THOMAS LOCH, and
NORBERT WERNER

Appeal 2014-000978
Application 13/014,796
Technology Center 1700

Before PETER F. KRATZ, BEVERLY A. FRANKLIN, and WESLEY B.
DERRICK *Administrative Patent Judges*.

FRANKLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants seek our review under 35 U.S.C. § 134(a) of the Examiner's decision rejecting claims 1, 2 and 5–14. We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

STATEMENT OF THE CASE

Claim 1 is illustrative of Appellants' subject matter on appeal and is set forth below:

1. A method for producing a silicon semiconductor wafer with an epitaxially deposited layer, comprising
 - placing a dummy wafer on a susceptor of an epitaxy reactor, wherein the dummy wafer consists of silicon or comprises silicon or silicon carbide, and is covered with an oxide layer on at least the rear side;
 - conducting an etching gas containing hydrogen chloride through the epitaxy reactor in order to remove residues on surfaces in the epitaxy reactor through the action of the etching gas;
 - conducting a first deposition gas through the epitaxy reactor to deposit silicon on surfaces in the epitaxy reactor;
 - replacing the dummy wafer by a silicon substrate wafer; and
 - conducting a second deposition gas through the epitaxy reactor to deposit an epitaxial layer on the substrate wafer.

The Examiner relies on the following prior art references as evidence of unpatentability:

Kuroyanagi et al. (hereafter "Kuroyanagi")	US 5,993,770	Nov. 30, 1999
Otsuka	US 2005/0160971 A1	July 28, 2005
Jin-Xing Li	US 2007/0065671	March 22, 2007
Kobayashi et al. (hereafter "Kobayashi")	US 2007/0077737 A1	April 2007
Ito et al. (hereafter "Ito")	US 2008/0308036 A1	Dec. 18, 2008
Hirata et al., (hereafter "Hirata")	US 2009/0139448 A1	June 04, 2009

THE REJECTIONS

1. Claims 1, 2, 5–7, and 12 stand rejected under 35 U.S.C. § 103(a) as obvious over Otsuka in view of Kobayashi, and further in view of Li.
2. Claims 8 and 9 stand rejected under 35 U.S.C. § 103(a) over Otsuka in view of Kobayashi, further in view of Li, and still further in view of Hirata.
3. Claim 10 stands rejected under 35 U.S.C. § 103(a) over Otsuka, Kobayashi, Li, Hirata further in view of Ito.
4. Claim 11 stands rejected under 35 U.S.C. § 103(a) over Otsuka in view of Kobayashi further in view of Li and still further in view of Ito.
5. Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) over Otsuka in view of Kobayashi, further in view of Li, and still further in view of Kuroyanagi.

ANALYSIS

The Examiner's basic position is as follows. Otsuka teaches the aspects of the claimed subject matter as identified on pages 5–6 of the Answer. The Examiner recognizes that Otsuka does not teach to place a dummy wafer on a susceptor, and thus relies upon Kobayashi for teaching use of a dummy wafer during cleaning and pre-coating processes. Ans. 6. The Examiner recognizes that Otsuka in view of Kobayashi does not teach

the dummy wafer used is coated with an oxide layer on at least its rear side.

Ans. 7. The Examiner relies upon Li for teaching that the use of a LTO (oxide deposition) layer on the backside of a wafer suppresses the out diffusion of contaminants such as dopant atoms from the backside of the silicon wafer, thereby preventing contamination of the chamber and the front side of the wafer. Ans. 7.

Appellants argue, *inter alia*, that the combination of Otsuka in view of Kobayashi, and in view of Li lacks sufficient motivation. More specifically, Appellants argue that Otsuka requires conducting the chamber etch step and coating step without a wafer, so that all parts of the chamber, including the susceptor, are etched and then coated. Appeal Br. 4, 11–12. Otsuka, para. [0011] and [0012]. Appellants therefore submit that Otsuka teaches away from use of a wafer during etching and coating. Appeal Br. 11–14.

In response, beginning on page 16 of the Answer, the Examiner states that the arguments regarding Otsuka are not persuasive because the Examiner relies upon Kobayashi for teaching a technique of using a dummy wafer. The Examiner states that the mere fact that Otsuka teaches that the cleaning and pre-coating are performed without a wafer present does not amount to a teaching away. Ans. 16–17.

In reply, Appellants emphasize that Otsuka requires absence of a wafer because Otsuka requires all parts of the epitaxy reactor to be both etched and coated. Reply Br. 3-4.

We agree with Appellants that Otsuka purposefully conducts etching and pre-coating with no wafer upon the susceptor. Otsuka, paras. [0011], [0012], [0042], [0043], [0044], [0055]. The Examiner states “that there does not appear to be a single instance where Otsuka states that the reactor

chamber must be empty or that the cleaning or pre-coating step will not function according to the intended purpose if a wafer is present.” Ans. 17. However, such disclosure is not necessary to support Appellants’ position. Also, such a statement ignores the teachings of Otsuka (as Appellants point out on pages 3–4 of the Reply Brief), that require absence of a wafer because Otsuka requires all parts of the epitaxy reactor to be both etched and coated. For example, paragraph [0042] of Otsuka states that HCL cleaning is conducted so that silicon deposit is removed from the susceptor, inside wall of the reaction chamber and the like. Paragraphs [0043] and [0044] of Otsuka teach that after the HCL cleaning, coating is conducted to each portion inside of the reactor chamber to reduce impurities. Furthermore, the Examiner has not demonstrated that if a wafer is present during the etching and pre-coating step according to Otsuka, that the objective of obtaining an environment within the chamber having reduction of impurities achieved by the process according to Otsuka would be met. On page 17 of the Answer, the Examiner argues that if a dummy wafer were used in Otsuka, portions of the susceptor are still etched and pre-coated as “required” by the teachings of Otsuka. However, Otsuka teaches to etch and pre-coat the susceptor in its entirety, and not only portions of it. We note that “[i]f the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)” (emphasis added). As such, we are persuaded by Appellants’ points raised in the record on this issue.

In addition, we also agree with Appellants’ stated position regarding the reference of Li made on pages 16–18 of the Appeal Brief. As stated,

supra, the Examiner relies upon Li for teaching that the use of a LTO (oxide deposition) layer on the backside of a wafer suppresses the out diffusion of contaminants such as dopant atoms from the backside of the silicon wafer, thereby preventing contamination of the chamber and the front side of the wafer. Ans. 7. The Examiner's stated response made on page 19 of the Answer that any contamination of the front of the wafer may be later released into the chamber (hence a need for a coating) is not supported as the Examiner does not direct us to evidence in the record indicating that a dummy wafer would release contaminants (as Appellants point out on page 2 of the Reply Brief).

In view of the above, we reverse Rejection 1. Because the other applied references applied in the other rejections were not used by the Examiner to cure the stated deficiencies of the combination of Otsuka in view of Kobayashi, and further in view of Li, we also reverse Rejections 2–5.

DECISION

Each rejection is reversed.

ORDER
REVERSED