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14/896,854	12/08/2015	Roman GOUK	020921USAP/ ATG/ATG/ESONG	5923
44257	7590	09/18/2020	EXAMINER	
PATTERSON & SHERIDAN, LLP - - APPLIED MATERIALS 24 GREENWAY PLAZA SUITE 1600 HOUSTON, TX 77046			ISAAC, STANETTA D	
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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ROMAN GOUK and STEVEN VERHAVERBEKE

Appeal 2019-006906
Application 14/896,854
Technology Center 2800

Before ROMULO H. DELMENDO, MICHAEL P. COLAIANNI, and
N. WHITNEY WILSON, *Administrative Patent Judges*.

WILSON, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the
Examiner’s March 22, 2018 decision to finally reject claims 1–6 and 8–15
 (“Final Act.”). We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

¹ We use the word Appellant to refer to “applicant” as defined in
37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as Applied
Materials, Inc. (Appeal Br. 3).

CLAIMED SUBJECT MATTER

Appellant's disclosure is directed to a method for processing a substrate (Abstract). The method comprises providing a silicon substrate having an aperture containing an exposed silicon contact surface at a bottom of the aperture, depositing a metal seed layer on the exposed silicon contact surface and exposing the substrate to an electroplating process by flowing a current through a backside of the substrate to form a metal layer on the metal seed layer (*id.*). Details of the claimed method are set forth in representative claim 1, which is reproduced below from the Claim Appendix to the Appeal Brief:

1. A method for depositing a material on a substrate, comprising:
 - depositing a metal seed layer on an exposed silicon contact surface at a bottom of an aperture on a silicon substrate;
 - exposing a backside of the substrate to a potassium hydroxide solution while exposing the metal seed layer to a copper containing solution, wherein the substrate separates the potassium hydroxide solution from the copper containing solution; and
 - flowing a current through the substrate to form a metal layer on the metal seed layer.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Shih et al.	US 2005/0189233 A1	September 1, 2005
Sun et al.	US 2007/0125657 A1	June 7, 2007
Halahan et al.	US 2007/0128868 A1	June 7, 2007
Baskaran et al.	US 2012/0152751 A1	June 21, 2012

REJECTIONS

1. Claims 1–6 and 8 are rejected under 35 U.S.C. § 103 as unpatentable over Shih in view of Baskaran and Halahan.
2. Claims 9–12, 14, and 15 are rejected under 35 U.S.C. § 103 as unpatentable over Shih in view of Halahan and Baskaran.
3. Claim 13 is rejected under 35 U.S.C. § 103 as unpatentable over Shih in view of Halahan and Baskaran, and further in view of Sun.

DISCUSSION

The Examiner finds that “Shih discloses the semiconductor method substantially as claimed” (Final Act. 3). The Examiner also finds that Shih does not explicitly disclose that the substrate separates the potassium hydroxide solution from the copper containing solution (*id.*). However, the Examiner further finds, without a specific citation to the record, that Shih teaches “performing a deposition process using electroplating where the substrate separates the metal salts from any other component[s] in the electroplating solution” (*id.*). The Examiner also finds that Baskaran discloses using potassium hydroxide as a pH adjustment agent in an electrolytic copper process. The Examiner determines that it would have been obvious “to incorporate[] exposing a backside of the substrate to a potassium hydroxide solution while exposing the metal seed layer to a copper containing solution, in the method of Shih, according to the teachings of Baskaran” (*id.*). The motivation to do so, as set forth in the Final Action, would have been to maintain specific pH levels within the desired ranges (*id.*). Moreover, according to the Examiner, “it would [have been] obvious

that the substrate separates the metal salts from any other component in the electroplating solution” (*id.*, not citing the record).

Appellant contends, *inter alia*, that the Examiner’s findings of what is disclosed by the references are inaccurate (Appeal Br. 7). In particular, Appellant argues that Baskaran does not disclose separating the potassium hydroxide containing solution from the copper containing solution, as required by claim 1 (“wherein the substrate separates the potassium hydroxide solution from the copper containing solution”). Appellant points to Baskaran’s disclosure that its first processing solution contains both potassium hydroxide and copper ions which are not, therefore, separated by a substrate (Appeal Br, 7–8, citing Baskaran ¶¶ 31–34).

In response, the Examiner points to Shih’s disclosure that its process, as was conventionally known in the art, separates copper metal from the salts to be deposited to the semi-conductor wafer (Ans. 6, citing Shih ¶¶ 7–11).

However, as explained by Appellant (Reply Br. 3), none of the Examiner’s findings demonstrate that, as recited in the claims, Shih or Baskaran teach that the copper ions and potassium hydroxide are separated by the substrate.

The Examiner has the initial burden of establishing a *prima facie* case of obviousness based on an inherent or explicit disclosure of the claimed subject matter under 35 U.S.C. § 103. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992) (“[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability.”). To establish a *prima facie* case of obviousness, the Examiner must show that each and every limitation of the claim is described

or suggested by the prior art or would have been obvious based on the knowledge of those of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988). In this instance, the evidence of record does not establish that it would have been obvious to have a substrate separating the potassium hydroxide solution from the copper containing solution, as recited in each of the independent claims.

Accordingly, we reverse the rejections.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-6, 8	103	Shih, Baskaran, Halahan		1-6, 8
9-12, 14, 15	103	Shih, Halahan, Baskaran		9-12, 14, 15
13	103	Shih, Halahan, Baskaran, Sun		13
Overall Outcome				1-6, 8-15

REVERSED