Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte ROBERT R. OBERLE

Appeal No. 1998-0780
Application No. 08/573,370

ON BRIEF

Before PAK, WALTZ, and LIEBERMAN, Administrative Patent Judges.

LIEBERMAN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner refusing to allow claims 1 through 12, as amended subsequent to the final rejection, which are all the claims pending in this application.

THE INVENTION

The invention is directed to a process for the selective electroless plating of specific metals by activating the metal layer of a wafer with either an acid or an alkaline solution and in the presence of a complexing agent. Thereafter the activated metal is sensitized with

a metal non-ammonia nitrogen complex in alkaline solution followed by electroless plating of the sensitized metal layer with no substantial plating on other areas of the wafer.

THE CLAIM

Claim 1 is illustrative of appellant's invention and is reproduced below.

1. A process for the selective electroless metal plating of Ti, W, Ti/W alloy, aluminum or aluminum alloy metal layer used in the fabrication of a silicon integrated circuit wafer coated with a layer of a dielectric material comprising:

forming a desired circuit pattern in the dielectric layer on the wafer in the form of vias or other openings which extend through the dielectric layer to the silicon layer;

depositing the metal layer on the silicon layer in the via or in the other opening;

activating the metal layer of the wafer by contacting the wafer with an activation solution which solution removes metal layer oxides and/or etches the metal layer surface which activation solution is either acid or alkaline and comprises a complexing agent to form a complex with metal which may be removed during the activating step;

sensitizing the activated metal layer of the wafer by contacting the wafer with an alkaline sensitizing solution composition comprising a sensitizing metal non-ammonia nitrogen complex to sensitize the metal layer; and

electrolessly metal plating the sensitized metal layer of the wafer by contacting the wafer with an electroless metal plating solution wherein the metal is plated on the sensitized metal layer with no substantial plating on other areas of the wafer.

THE REFERENCES OF RECORD

As evidence of obviousness, the examiner relies upon the following references:

Vratny	4,122,215	Oct. 24, 1978
Takeda et al. (Takeda)	5,041,356	Aug. 20, 1991
Bengston	5,147,692	Sep. 15, 1992

THE REJECTIONS

Claims 1 and 10 through 12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Vratny in view of Takeda.

Claims 2 through 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Vratny in view of Takeda further in view of Bengston.

OPINION

We have carefully considered all of the arguments advanced by appellant and the examiner and agree with the appellant that the aforementioned rejections of claims 1 through 12 under 35 U.S.C. § 103 are not well founded. Accordingly, we do not sustain these rejections.

The Rejections under § 103

"[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," whether on the grounds of anticipation or obviousness. ***In re Oetiker***, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). On the record before u examiner relies upon a combination of at least two references. Vratny is relied upon as disclosing the claimed method other than the step of sensitizing the activated metal layer. It is the examiner's position that Vratny "fails to teach activating, i.e. [sic: ,] sensitizing, the aluminum surface with a non-ammonia nitrogen complex." See Answer, page 3. Takeda is relied upon as disclosing the metal complex compounds used by the appellant in the sensitizing step of the claimed subject matter, which metal complexes are reduced to form metal development nuclei. See Answer, page 4. It is the examiner's position that one skilled in the art reasonable expectation of success of catalyzing the surface to promote subsequent electroless metalization. Id. We disagree.

We find that Vratny discloses a method for the electroless deposition of nickel on aluminum or its alloys. See column 1, lines 51-52. The method is further directed to the selective deposition of nickel in predetermined areas defined by apertures in a photoresist. See column 1, lines 55-57. A pretreatr method is directed to immersion of a substrate in a stop etchant which comprises buffered hydrofluoric acid. See column 1, lines 62-64. As stated by the examiner, ***supra***, there is no disclosure of sensitizing the aluminum surface with a non-ammonia nitrogen complex. The examiner however relies upon Take teaching of the preferred sensitizing agent.

We find that Takeda is directed to an optical recording material wherein a first recording layer is obtained by imagewise exposing a photosensitive material. See column 1, lines 14-15. The photosensitive material comprises a photo decomposable development restrainer having a diazo or azido group present and a m compound which is reduced to form metal development nuclei. See column 5, lines 41-49 and column 6, lines 66-68. At the exposed portions of the photosensitive material the diazo or azido group decomposes upon exposure to light to form a latent image. See column 8, lines 59-63. The metal complex compounds incl sensitizing metal non-ammonia complex, dichloroethylenediaminepalladium (II) salt, of the claimed subject matter. See column 7, line 8. The method of Takeda requires the presence of a reducing agent to generate metallic developing nuclei. See column 9, lines 1-11. The metallic developing nuclei are subsequently bro contact with a developing solution to reduce the metal in the physical developing solution. See column 9, lines 23-28. Thereafter metal deposits around the metallic developing nucleus to form light screening portions. See column 9, lines 26-27 and Examples 1 and 2 and claim 1. Upon development, these metallic nuclei activators for plating. Physical development may be carried out using a nickel plating bath and a reducing agent. See column 10, lines 30-32. Based upon the above analysis, it is reasonable to conclude that there is no preformed metal layer treated by the complexing agent of Takeda. The function of the complexing agen reduced and decompose to form the initial metallic nuclei which can thereafter be electrolessly plated. There is no suggestion or disclosure of using the nitrogen amine complex to treat an already existing metal layer and sensitize that layer for electroless deposition. Based upon the above analysis, we conclude that there is suggestion or teaching for selecting the non-ammonia nitrogen complex of palladium of Takeda for use in the process of Vratny.

The examiner must show reasons that the skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. We determine that there is no reason, sugg motivation to combine the references in the manner proposed by the examiner. Accordingly, the examiner has not established a ***prima facie*** case of obviousness and the examiner's rejection of claims 1 through 12 under 35 U.S.C. § 103 is not sustained. ***In re Rouffet***, 149 F.3d 1350, 1355, 47 USPQ2d 1453, 1455 (Fed.

Bengston fails to remedy the above deficiency.

DECISION

The rejection of claims 1 and 10 through 12 under 35 U.S.C. § 103 as being unpatentable over Vratny in view of Takeda is reversed.

The rejection of claims 2 through 9 under 35 U.S.C. § 103 as being unpatentable over Vratny in view of Takeda further in view of Bengston is reversed.

The decision of the examiner is reversed.

REVERSED

CHUNG K. PAK)
Administrative Patent Judge)
)
)
)
)
)
) BOARD OF PATENT
THOMAS A. WALTZ) APPEALS
Administrative Patent Judge) AND
) INTERFERENCES
)
)
)
PAUL LIEBERMAN)
Administrative Patent Judge)

PL:hh

Appeal No. 1998-0780
Application No. 08/573,370

DELIO & PETERSON
121 Whitney Ave.
New Haven, CT 06510