

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
14 October 2004 (14.10.2004)

PCT

(10) International Publication Number
WO 2004/088746 A3

(51) International Patent Classification⁷: H01L 21/768,
21/288

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(21) International Application Number:
PCT/US2004/008945

(22) International Filing Date: 23 March 2004 (23.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/402,600 27 March 2003 (27.03.2003) US

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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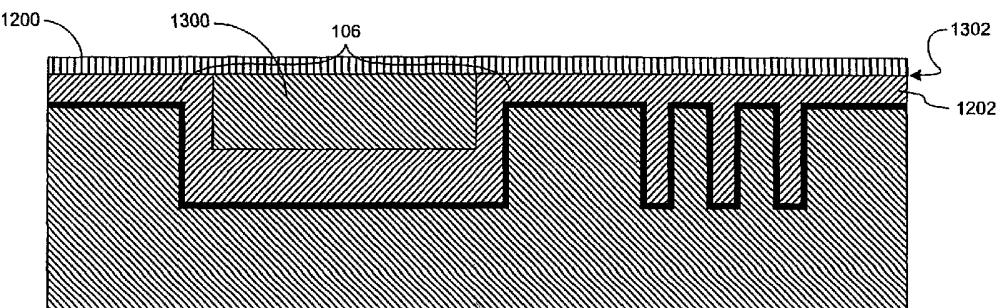
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

(88) Date of publication of the international search report: 17 February 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND APPARATUS TO FORM A PLANARIZED CU INTERCONNECT LAYER USING ELECTROLESS MEMBRANE DEPOSITION



WO 2004/088746 A3

(57) Abstract: A planarized conductive material is formed over a substrate including narrow (108) and wide (106) features. The conductive material is formed through a succession of deposition processes. A first deposition process forms a first layer (600) of the conductive material that fills the narrow features and at least partially fills the wide features. A second deposition process forms a second layer (700) of the conductive material within recesses in the first layer. Polishing with a flexible material (1200) can reduce a thickness of the first layer above the substrate while delivering a solution to the recesses to form the second layer therein. The flexible material can be a porous membrane attached to a pressurizable reservoir filled with the solution. The flexible material can also be a poromeric material wetted with the solution.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/008945A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01L21/768 H01L21/288

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/78135 A (NUTOOL INC) 18 October 2001 (2001-10-18)	1-7, 9-13, 20
Y	the whole document -----	8, 14-16
Y	US 6 341 998 B1 (ZHANG LIMING) 29 January 2002 (2002-01-29) abstract -----	8, 14-19
A	US 6 176 992 B1 (TALIEH HOMAYOUN) 23 January 2001 (2001-01-23) column 3, line 51 - column 5, line 60; figure 2 -----	14-16
Y	US 4 753 838 A (WATANABE SHINICHI ET AL) 28 June 1988 (1988-06-28) the whole document ----- -/-	17-19

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
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Date of the actual completion of the international search

24 November 2004

Date of mailing of the International search report

13/12/2004

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/008945

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 692 947 A (TALIEH HOMAYOUN ET AL) 2 December 1997 (1997-12-02) abstract; figures 1,5-7 -----	18
Y	US 5 516 400 A (PASCH NICHOLAS F ET AL) 14 May 1996 (1996-05-14) column 9, lines 34-67; figure 7 -----	19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/008945

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16,20

Simultaneously polishing filled narrow features and filling by electroless deposition cavities in wide features by a porous flexible material supplying electroless plating solution to the cavities from a reservoir.

2. claims: 17-19

Poromeric flexible material is wetted with electroless plating solution for deposition.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/008945

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