

(51) International Patent Classification:
H01L 21/205 (2006.01) *C23C 16/455* (2006.01)(21) International Application Number:
PCT/US2010/031491(22) International Filing Date:
16 April 2010 (16.04.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/465,471 13 May 2009 (13.05.2009) US(71) Applicant (for all designated States except US): **APPLIED MATERIALS, INC.** [US/US]; 3050 Bowers Avenue, Santa Clara, California 95054 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MA, Paul, F.** [NZ/US]; 2181 Rancho McCormick Blvd., Santa Clara, California 95050 (US). **AUBUCHON, Joseph, F.** [US/US]; 280 El Bosque Drive, San Jose, California 95134 (US). **LU, Jiang** [CN/US]; 400 River Side Court, # 108, Santa Clara, California 95054 (US). **CHANG, Mei** [US/US]; 12881 Corte de Arguello, Saratoga, California 95070 (US).(74) Agents: **PATTERSON, Todd, B.** et al.; Patterson & Sheridan, L.L.P., 3040 Post Oak Blvd., Suite 1500, Houston, TX 77056-6582 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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(54) Title: METHOD FOR TUNING A DEPOSITION RATE DURING AN ATOMIC LAYER DEPOSITION PROCESS

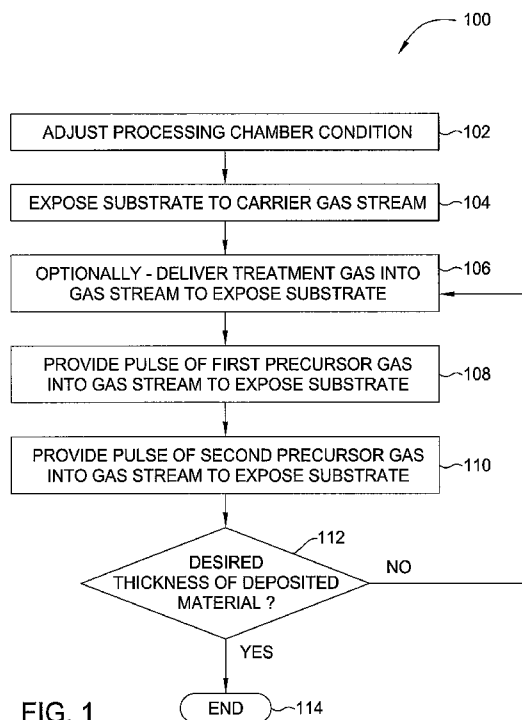


FIG. 1

(57) Abstract: Embodiments of the invention provide methods for depositing a material on a substrate within a processing chamber during a vapor deposition process, such as an atomic layer deposition (ALD) process. In one embodiment, a method is provided which includes sequentially exposing the substrate to a first precursor gas and at least a second precursor gas while depositing a material on the substrate during the ALD process, and continuously or periodically exposing the substrate to a treatment gas prior to and/or during the ALD process. The deposition rate of the material being deposited may be controlled by varying the amount of treatment gas exposed to the substrate. In one example, tantalum nitride is deposited on the substrate and the alkylamino metal precursor gas contains a tantalum precursor, such as pentakis(dimethylamino) tantalum (PDMAT), the second precursor gas contains a nitrogen precursor, such as ammonia, and the treatment gas contains dimethylamine (DMA).

WO 2010/132172 A3



Published:

(88) Date of publication of the international search report:

— *with international search report (Art. 21(3))*

31 March 2011

A. CLASSIFICATION OF SUBJECT MATTER***H01L 21/205(2006.01)i, C23C 16/455(2006.01)i***

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)

H01L 21/205; H01L 23/532; H01L 21/44; C23C 16/00

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: ALD, precursor, alkyl and amine

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008-0064210 A1 (BRIAN A. VAARTSTRA) 13 March 2008 See abstract; paragraphs [0033]-[0067]; claims 56-72 and figures 1-3.	1-15
A	US 2009-0032952 A1 (CHEN TIANNIU et al.) 05 February 2009 See abstract; paragraphs [0046]-[0091]; claims 1-2, 10-20 and figures 3-5.	1-15
A	US 2006-0040054 A1 (RONALD PEARLSTEIN et al.) 23 February 2006 See abstract; paragraphs [0016]-[0038]; claims 1-9 and figure 2.	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

29 NOVEMBER 2010 (29.11.2010)

Date of mailing of the international search report

30 NOVEMBER 2010 (30.11.2010)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-
gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

CHOI, SANGWON

Telephone No. 82-42-481-5695



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/031491

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US 2006-0040054 A1	23.02.2006	None	