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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
2 February 2012 (02.02.2012)

PCT

(10) International Publication Number
WO 2012/015610 A2

(51) International Patent Classification:
H01L 21/316 (2006.01) *H01L 21/205* (2006.01)

(21) International Application Number:
PCT/US2011/044219

(22) International Filing Date:
15 July 2011 (15.07.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/369,352 30 July 2010 (30.07.2010) US
13/153,016 3 June 2011 (03.06.2011) US

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(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 (AL, 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, RS, 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: OXIDE-RICH LINER LAYER FOR FLOWABLE CVD GAPFILL

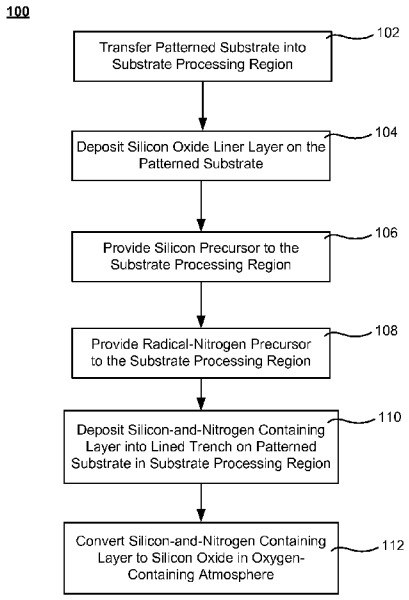


FIG 1

(57) Abstract: Formation of gap-filling silicon oxide layer with reduced volume fraction of voids is described. Deposition involves formation of an oxygen-rich less-flowable liner layer before an oxygen-poor more-flowable gapfill layer. However, the liner layer is deposited within same chamber as gapfill layer. Liner layer and gapfill layer may both be formed by combining a radical component with an unexcited silicon-containing precursor (i.e. not directly excited by application of plasma power). Liner layer has more oxygen content than gapfill layer and deposits more conformally. Deposition rate of the gapfill layer may be increased by the presence of the liner layer. Gapfill layer may contain silicon, oxygen and nitrogen and be converted at elevated temperature to contain more oxygen and less nitrogen. Presence of the gapfill liner provides a source of oxygen underneath the gapfill layer to augment the gas phase oxygen introduced during the conversion.

WO 2012/015610 A2

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