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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 October 2010 (28.10.2010)

PCT

(10) International Publication Number
WO 2010/122459 A3

(51) International Patent Classification:
H01L 21/3065 (2006.01) *H05H 1/36* (2006.01)
H05H 1/34 (2006.01)

(21) International Application Number:
PCT/IB2010/051649

(22) International Filing Date:
15 April 2010 (15.04.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/429,940 24 April 2009 (24.04.2009) US

(71) Applicant *(for all designated States except US)*: **LAM RESEARCH CORPORATION** [US/US]; 4650 Cushing Parkway, Fremont, California 94538 (US).

(71) Applicant *(for BZ only)*: **LAM RESEARCH AG** [AT/AT]; SEZ-Strasse 1, A-9500 Villach (AT).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **EDELBERG, Erik A.** [US/US]; 3152 Enfield Street, San Ramon, California CA 94582 (US).

(74) Agent: **KONTRUS, Gerhard**; SEZ-Strasse 1, A-9500 Villach (AT).

(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).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

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

(88) Date of publication of the international search report:
24 March 2011

(54) Title: METHOD AND APPARATUS FOR HIGH ASPECT RATIO DIELECTRIC ETCH

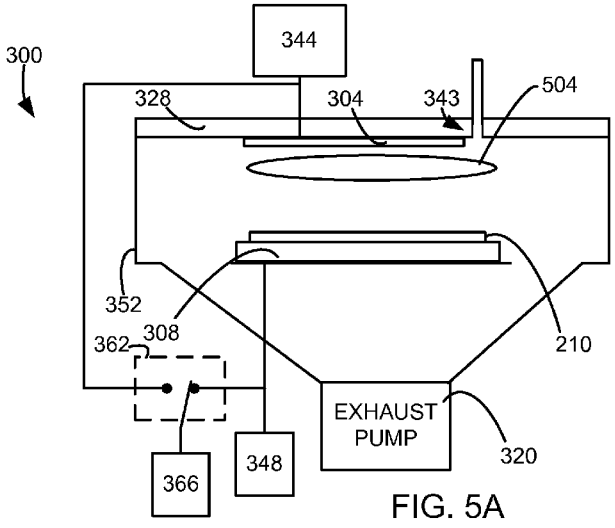


FIG. 5A

(57) Abstract: An apparatus for etching high aspect ratio features is provided. A plasma processing chamber is provided, comprising a chamber wall forming a plasma processing chamber enclosure, a lower electrode, an upper electrode, a gas inlet, and a gas outlet. A high frequency radio frequency (RF) power source is electrically connected to at least one of the upper electrode or lower electrode. A bias power system is electrically connected to both the upper electrode and the lower electrode, wherein the bias power system is able to provide a bias to the upper and lower electrodes with a magnitude of at least 500 volts, and wherein the bias to the lower electrode is pulsed to intermittently. A gas source is in fluid connection with the gas inlet. A controller is controllably connected to the gas source, the high frequency RF power source, and the bias power system.

WO 2010/122459 A3