



(51) International Patent Classification:

H01L 21/66 (2006.01) *H01L 21/3065* (2006.01)
H01L 21/205 (2006.01) *H01L 21/302* (2006.01)

(21) International Application Number:

PCT/US2009/049762

(22) International Filing Date:

7 July 2009 (07.07.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/078,748 7 July 2008 (07.07.2008) US

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

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BOOTH, Jean-paul** [FR/US]; 4650 Cushing Parkway, -, Fremont, CA 94538 (US). **ALBAREDE, Luc** [US/US]; 4650 Cushing Parkway, -, Fremont, CA 94538 (US). **KIM, Jung** [KR/US]; 4650 Cushing Parkway, -, Fremont, CA 94538 (US). **KEIL, Douglas, L.** [US/US]; 4650 Cushing Parkway, -, Fremont, CA 94538 (US).

(74) Agent: **NGUYEN, Joseph, A.**; P.O. Box 700640, -, San Jose, CA 95170 (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, 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, 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).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

[Continued on next page]

(54) Title: RF-BIASED CAPACITIVELY-COUPLED ELECTROSTATIC (RFB-CCE) PROBE ARRANGEMENT FOR CHARACTERIZING A FILM IN A PLASMA PROCESSING CHAMBER

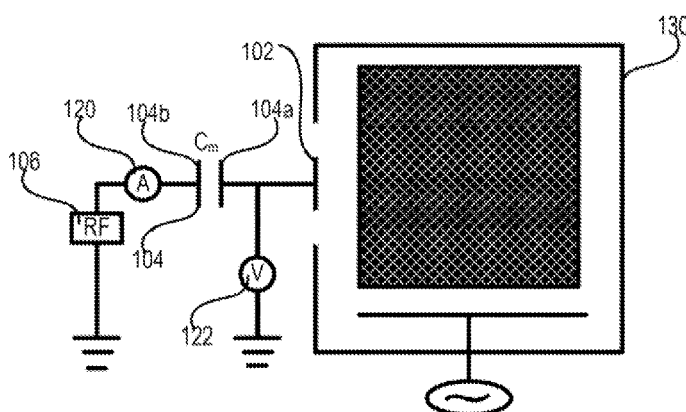


FIG. 1

(57) Abstract: A method for characterizing deposited film on a substrate within a processing chamber during processing is provided. The method includes determining voltage-current characteristic for a probe head when measuring capacitor is set at a first capacitance value. The method also includes applying RF train to the probe head when measuring capacitor is set at a capacitance value greater than first capacitance value. The method further includes providing an initial resistance value and an initial capacitance value for the deposited film. The method yet also includes employing initial resistance value, initial capacitance value, and voltage-current characteristic to generate simulated voltage-time curve. The method yet further includes determining measured voltage-time curve, which represents potential drop across the deposited film for one RF train. The method more over includes comparing the two curves. If the difference is less than predefined threshold, employ initial resistance value and initial capacitance for characterizing the deposited film.



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

6 May 2010