



(51) International Patent Classification:

H01L 21/3065 (2006.01) *H05H 1/34* (2006.01)
H01L 21/205 (2006.01)

(21) International Application Number:

PCT/US2009/003186

(22) International Filing Date:

22 May 2009 (22.05.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/155,739 9 June 2008 (09.06.2008) US

(71) Applicant (for all designated States except US): **LAM RESEARCH CORPORATION** [US/US]; 4650 Cushing Parkway, Fremont, CA 94538-6470 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **STEVENSON, Tom** [GB/US]; 16755 Oak View Circle, Morgan Hill, CA 95937 (US). **DHINDSA, Rajinder** [US/US]; 3670 Rollingside Drive, San Jose, CA 95148 (US).

(74) Agent: **SKIFF, Peter, K.**; Buchanan Ingersoll & Rooney P.C., P. O. Box 1404, Alexandria, VA 22313-1404 (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, 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, 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, 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))
- 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))

(54) Title: SHOWERHEAD ELECTRODE ASSEMBLIES FOR PLASMA PROCESSING APPARATUSES

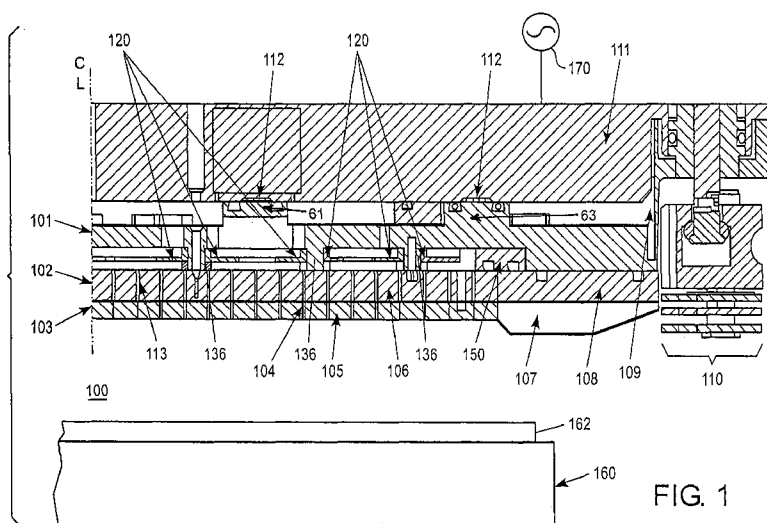


FIG. 1

(57) Abstract: Showerhead electrode assemblies are disclosed, which include a showerhead electrode adapted to be mounted in an interior of a vacuum chamber; an optional backing plate attached to the showerhead electrode; a thermal control plate attached to the backing plate or to the showerhead electrode at multiple contact regions across the backing plate; and at least one interface member separating the backing plate and the thermal control plate, or the thermal control plate and showerhead electrode, at the contact regions, the interface member having a thermally and electrically conductive gasket portion and a particle mitigating seal portion. Methods of processing semiconductor substrates using the showerhead electrode assemblies are also disclosed.

