



(51) International Patent Classification:

H05H 1/34 (2006.01) *H01L 21/3065* (2006.01)
H05H 1/38 (2006.01)

(21) International Application Number:

PCT/US2009/003952

(22) International Filing Date:

6 July 2009 (06.07.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/216,524 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 94538-6470 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **PATRICK, Roger** [GB/US]; 102 Whit's Road, Mountain View, CA 94040 (US). **BETTENCOURT, Gregory, R.** [US/US]; 3775 Howe Court, Fremont, CA 94538 (US). **KELLOGG, Michael, C.** [US/US]; 10890 Dublin Canyon Road, Pleasanton, CA 94588 (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, 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).

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))
- with amended claims (Art. 19(1))

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

22 April 2010

Date of publication of the amended claims:

24 June 2010

(54) Title: CLAMPED MONOLITHIC SHOWERHEAD ELECTRODE

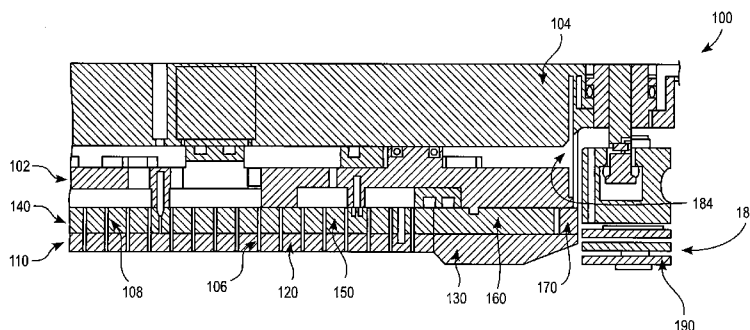


FIG. 1

(57) Abstract: An electrode assembly for a plasma reaction chamber used in semiconductor substrate processing. The assembly includes an upper showerhead electrode which is mechanically attached to a backing plate by a series of spaced apart cam locks. A guard ring surrounds the backing plate and is movable to positions at which openings in the guard ring align with openings in the backing plate so that the cam locks can be rotated with a tool to release locking pins extending from the upper face of the electrode.

