

07 MAY 2002

2002029742

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

(19) World Intellectual Property Organization
International Bureau

162162

(43) International Publication Date
25 May 2001 (25.05.2001)

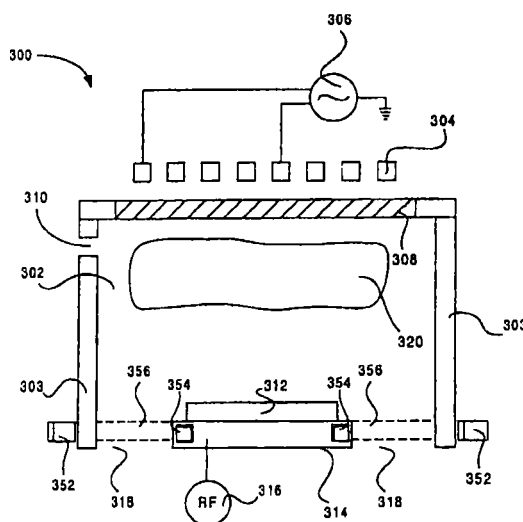
PCT

(10) International Publication Number
WO 01/37311 A3

- (51) International Patent Classification⁷: **H01J 37/32** [US/US]: 5950 Country Club Parkway, San Jose, CA 95138 (US).
- (21) International Application Number: PCT/US00/42158
- (22) International Filing Date:
14 November 2000 (14.11.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
09/439,759 15 November 1999 (15.11.1999) US
- (71) Applicant (for all designated States except US): **LAM RESEARCH CORPORATION** [US/US]; P0593.PCT, 4650 Cushing Parkway, Fremont, CA 94538-6516 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **BAILEY, Andrew, D., III** [US/US]; 5167 Northway Road, Pleasanton, CA 94566 (US). **SCHOEPP, Alan, M.** [US/US]; 10010 Highway 9, Ben Lomond, CA 95005 (US). **BRIGHT, Nicolas**
- (74) Agent: **LEE, Michael**; Beyer Weaver & Thomas, LLP, P.O. Box 778, Berkeley, CA 94704 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR CONTROLLING THE VOLUME OF A PLASMA



(57) Abstract: A plasma confinement arrangement for controlling the volume of a plasma while processing a substrate inside a process chamber using a plasma enhanced process is disclosed. The arrangement includes a first magnetic bucket having a plurality of first magnetic elements. The first magnetic elements being configured for producing a first magnetic field inside the process chamber. The arrangement further includes a second magnetic bucket having a plurality of second magnetic elements. The second magnetic elements being configured for producing a second magnetic field inside the process chamber. The second magnetic field being configured to combine with the first magnetic field to produce a resultant magnetic field between the first magnetic bucket and the second magnetic bucket. The resultant magnetic field being configured to permit by-product gas from the processing to pass through while substantially confining the plasma within a volume defined at least by the process chamber and the resultant magnetic field.

WO 01/37311 A3



ACTION

(88) Date of publication of the international search report:
11 October 2001

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.