

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
9 June 2005 (09.06.2005)

PCT

(10) International Publication Number
WO 2005/052995 A3

(51) International Patent Classification⁷: **G01J 5/00**

(21) International Application Number:
PCT/US2004/038287

(22) International Filing Date:
15 November 2004 (15.11.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/720,839 24 November 2003 (24.11.2003) US

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

(72) Inventor; and

(75) Inventor/Applicant (for US only): **STEGER, Robert, J.** [US/US]; Apt. 307, 2240 Homestead Court, Los Altos, CA 94024 (US).

(74) Agent: **NGUYEN, Joseph, A.**; Suite 201, 10121 Miller Avenue, Cupertino, CA 95014-3469 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, 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, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

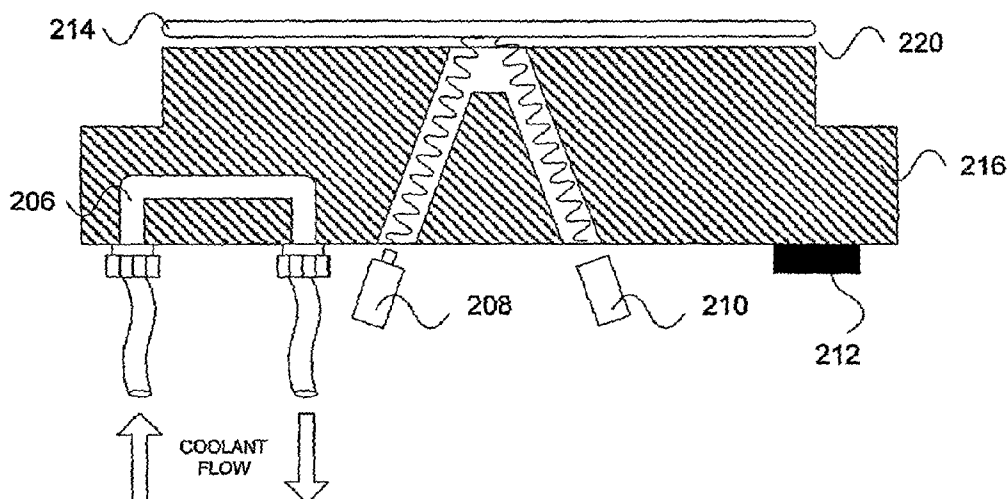
Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
28 July 2005

[Continued on next page]

(54) Title: METHODS AND APPARATUS FOR IN SITU SUBSTRATE TEMPERATURE MONITORING



(57) Abstract: In a plasma processing system, a method of determining the temperature of a substrate is disclosed. The method includes positioning the substrate on a substrate support structure, wherein the substrate support includes a chuck. The method further includes creating a temperature calibration curve for the substrate, the temperature calibration curve being created by measuring at least a first substrate temperature with an electromagnetic measuring device, and measuring a first chuck temperature with a physical measuring device during a first isothermal state. The method also includes employing a measurement from the electromagnetic measurement device and the temperature calibration curve to determine a temperature of the substrate during plasma processing.

WO 2005/052995 A3



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.