



(51) International Patent Classification:

H01L 21/66 (2006.01) *H01L 21/00* (2006.01)
H01L 21/3065 (2006.01)

(21) International Application Number:

PCT/US2010/040477

(22) International Filing Date:

29 June 2010 (29.06.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/222,102	30 June 2009 (30.06.2009)	US
61/222,024	30 June 2009 (30.06.2009)	US
12/555,674	8 September 2009 (08.09.2009)	US

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

(72) Inventors; and

(75) Inventors/Applicants (for US only): **WANG, Jiangxin** [US/US]; c/o Lam Research Corporation, Legal Department, 4650 Cushing Parkway, Fremont, California 94538 (US). **PERRY, Andrew James** [AU/US]; c/o Lam Research Corporation, Legal Department, 4650 Cushing Parkway, Fremont, California 94538 (US).

search Corporation, Legal Department, 4650 Cushing Parkway, Fremont, California 94538 (US). **VENUGOPAL, Vijayakumar C.** [IN/US]; c/o Lam Research Corporation, Legal Department, 4650 Cushing Parkway, Fremont, California 94538 (US).

(74) Agent: **NGUYEN, Joseph A.**; PO Box 700640, San Jose, California 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, TH, 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, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

[Continued on next page]

(54) Title: METHODS FOR CONSTRUCTING AN OPTIMAL ENDPOINT ALGORITHM

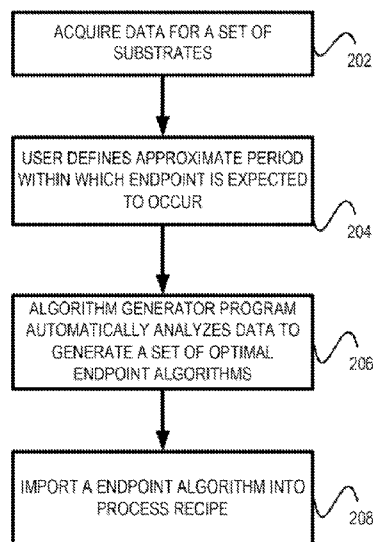


FIG. 2

(57) Abstract: A method for automatically identifying an optimal endpoint algorithm for qualifying a process endpoint during substrate processing within a plasma processing system is provided. The method includes receiving sensor data from a plurality of sensors during substrate processing of at least one substrate within the plasma processing system, wherein the sensor data includes a plurality of signal streams from a plurality of sensor channels. The method also includes identifying an endpoint domain, wherein the endpoint domain is an approximate period within which the process endpoint is expected to occur. The method further includes analyzing the sensor data to generate a set of potential endpoint signatures. The method yet also includes converting the set of potential endpoint signatures into a set of optimal endpoint algorithms. The method yet further includes importing one optimal endpoint algorithm of the set of optimal endpoint algorithms into production environment.



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).

— *with amended claims and statement (Art. 19(1))*

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

14 April 2011

Published:

— *with international search report (Art. 21(3))*

Date of publication of the amended claims and statement: 3

June 2011