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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
19 May 2005 (19.05.2005)

PCT

(10) International Publication Number
WO 2005/045890 A3

(51) International Patent Classification[7]: G01N 21/00, G01J 3/30

(21) International Application Number: PCT/US2004/034840

(22) International Filing Date: 20 October 2004 (20.10.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/696,628 28 October 2003 (28.10.2003) US

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

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **MCMILLIN, Brian, K.** [US/US]; 5408 Quebec Common, Fremont, CA 94555 (US). **DASSAPA, Francois, Chandrasekar** [FR/US]; 42055 Camino Santa Barbara, Fremont, CA 94539 (US).

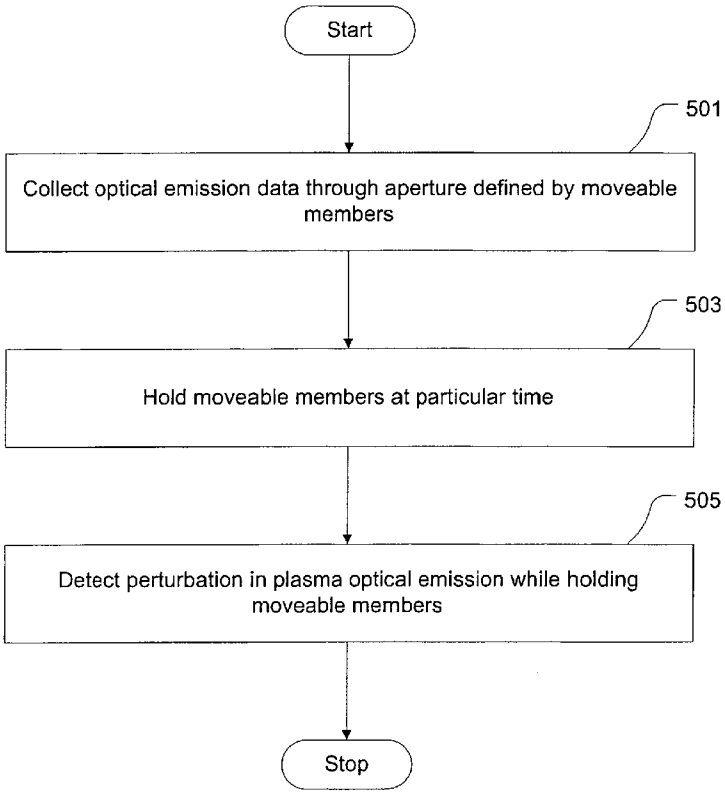
(74) Agent: **WRIGHT, Kenneth, D.**; Martine & Penilla, LLP, 710 Lakeway Drive, Suite 170, Sunnyvale, CA 94085 (US).

(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,

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR ETCH ENDPOINT DETECTION



(57) Abstract: Broadly speaking, an invention is provided for monitoring a plasma optical emission. More specifically, the present invention provides a method for monitoring the plasma optical emission through a variable aperture to detect an endpoint of a plasma etching process without interferences that could lead to false endpoint calls. The method includes collecting optical emission data from a plasma through an aperture defined by moveable members. The moveable members are capable of varying a configuration of the aperture. The method also includes holding the moveable members at a particular time to cause the aperture to maintain a fixed configuration. The method further includes detecting a specific perturbation in the plasma optical emission while holding the moveable members.

WO 2005/045890 A3

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, 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*

(88) Date of publication of the international search report:
24 November 2005

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.