

(51) International Patent Classification:
H01L 21/66 (2006.01)(21) International Application Number:
PCT/US2012/026715(22) International Filing Date:
27 February 2012 (27.02.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/451,897 11 March 2011 (11.03.2011) US(71) Applicant (for all designated States except US): **APPLIED MATERIALS, INC.** [US/US]; 3050 Bowers Avenue, Santa Clara, CA 95054 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **OZGUN, Omer** [TR/US]; 4484 Piper Drive, San Jose, California 95129 (US). **FLORIN, Didier P.** [FR/US]; 406 Charles Avenue, Sunnyvale, California 94086 (US). **OLGADO, Donald J.K.** [US/US]; 831 Melville Avenue, Palo Alto, California 94301 (US).(74) Agents: **PATTERSON, B. Todd** et al.; Patterson & Sheridan, L.L.P., 3040 Post Oak Blvd., Suite 1500, Houston, Texas 77056-6582 (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, QA, RO, RS, RU, RW, 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, RW, 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, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

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

(88) Date of publication of the international search report:
21 March 2013

(54) Title: APPARATUS FOR MONITORING AND CONTROLLING SUBSTRATE TEMPERATURE

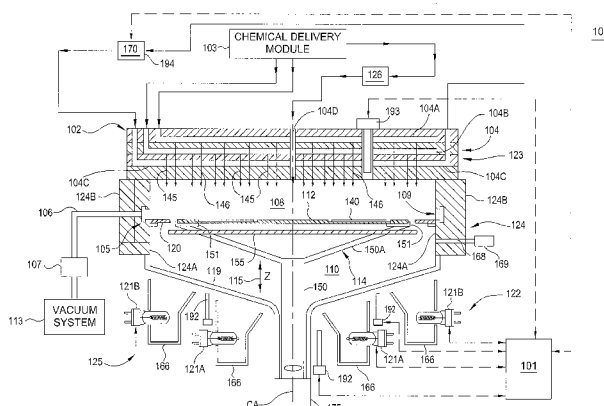


FIG. 1

(57) Abstract: A system and methods for heating substrates during high temperature processing is provided. The system uses multiple temperature inputs of the backside of a substrate carrier and known parameters within the processing chamber to estimate the temperature of substrates being processed on the substrate carrier. Temperature readings of the substrate carrier taken from above the processing volume may be used to correct any drift that may occur with respect to temperature readings taken from below the substrate carrier. Temperature readings of heat exchanging fluid flowing through a showerhead assembly may be used to estimate the temperature of the surface of the showerhead, which may be used in the estimation of the temperature of the substrates being processed. The system then uses the estimated temperature to control the amount of power supplied to a plurality of heat sources configured to heat the substrates from below the substrate carrier.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/026715**A. CLASSIFICATION OF SUBJECT MATTER****H01L 21/66(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H01L 21/66; C23C 16/52; C23C 16/46; C30B 23/00; C30B 28/14; H01L 21/465; C23C 16/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: substrate,temperature,monitor,control,cooling,fluid,sensor,pyrometer,thermocouple,heat,lamp

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2009-0194024 A1 (BURROWS BRIAN H. et al.) 06 August 2009 See abstract; figure 1; paragraphs [0024]-[0031]	1-15
Y	US 2007-0062439 A1 (NAOYUKI WADA et al.) 22 March 2007 See abstract; figures 1-2; paragraphs [0029]-[0031]	1-15
Y	US 6453992 B1 (KIM; CHANG-JAE) 24 September 2002 See abstract; figure 5; column 5 line 1 - column 7 line 3, column 8 line 1 - column 9 line 39	6-11, 14, 15
A	US 2010-0151687 A1 (DHINDSA RAJINDER et al.) 17 June 2010 See abstract; figure 1; paragraphs [0018]-[0021]	1-15

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

24 DECEMBER 2012 (24.12.2012)

Date of mailing of the international search report

26 DECEMBER 2012 (26.12.2012)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Kim, Young Jin

Telephone No. 042 481 5771



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/026715

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