



(43) International Publication Date
27 September 2012 (27.09.2012)

- (51) **International Patent Classification:**
H01L 21/02 (2006.01) *H01L 33/00* (2010.01)
H01L 21/66 (2006.01)
- (21) **International Application Number:**
PCT/US2012/029246
- (22) **International Filing Date:**
15 March 2012 (15.03.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/454,440 18 March 2011 (18.03.2011) US
13/419,121 13 March 2012 (13.03.2012) US
- (71) **Applicant (for all designated States except US):** APPLIED MATERIALS, INC. [US/US]; 3050 Bowers Avenue, Santa Clara, California 95054 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** HSU, Wei-Yung [US/US]; 5915 Friar Way, San Jose, California 95129 (US). CHUNG, Hua [US/US]; 4645 Piper Avenue, San Jose, California 95129 (US). SHIU, Ting-Ruei [—/US];

1147 Sladky Avenue, Mountain View, California 94040 (US). CUI, Jie [US/US]; 820 Evelyn Avenue, Albany, California 94706 (US).

(74) **Agents:** VINCENT, Lester J. et al.; Blakely Sokoloff Taylor & Zafman, 1279 Oakmead Parkway, Sunnyvale, California 94085 (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,

[Continued on next page]

(54) **Title:** INTEGRATED METROLOGY FOR WAFER SCREENING

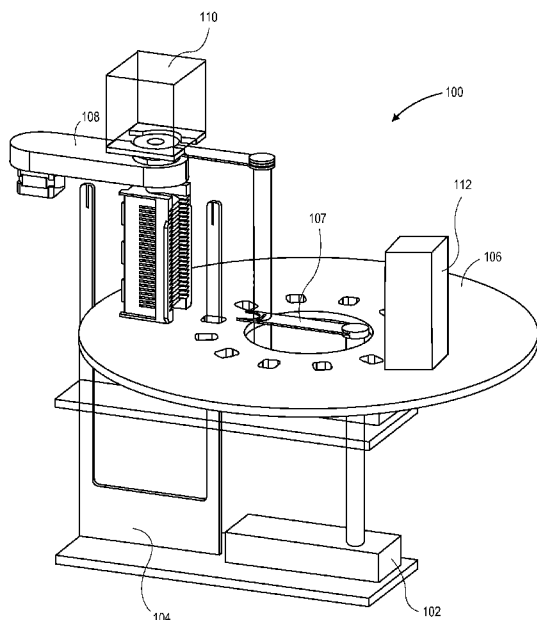


FIG. 1A

(57) **Abstract:** Integrated wafer or substrate bow measurement modules are described. For example, a multi-chamber system includes a chamber housing a bow measurement module. In another example, a method of pre-screening a wafer includes inserting a wafer or a substrate into a multi-chamber system. A bow parameter of the wafer or the substrate is measured in a bow measurement module housed in a chamber of the multi-chamber system.



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).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))*

Published:

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

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

3 January 2013

A. CLASSIFICATION OF SUBJECT MATTER***H01L 21/02(2006.01)i, H01L 21/66(2006.01)i, H01L 33/00(2010.01)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 21/02; G06F 15/00; G01B 21/16; H01L 21/66; C23C 16/00; G01L 21/30

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: multi-chamber, bow, measurement, load, align, transfer

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009-0084169 A1 (ANDREW D. BAILEY, III) 02 April 2009 See abstract; figures 2-9; and paragraphs [0030]-[0074].	1-15
A	US 2006-0241891 A1 (SANJEEV KAUSHAL et al.) 26 October 2006 See abstract; figure 21; and paragraphs [0144]-[0154].	1-15
A	US 2008-0124817 A1 (DAVID BOUR et al.) 29 May 2008 See abstract; figures 4-7; and paragraphs [0039]-[0055].	1-15
A	US 2007-0231934 A1 (TOSHIYA SATO et al.) 04 October 2007 See abstract; figures 3-5; and paragraphs [0032]-[0045].	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"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

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

26 OCTOBER 2012 (26.10.2012)

Date of mailing of the international search report

29 OCTOBER 2012 (29.10.2012)

Name and mailing address of the ISA/KR

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

Facsimile No. 82-42-472-7140

Authorized officer

CHOI, SANGWON

Telephone No. 82-42-481-5695



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/029246

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009-0084169 A1	02.04.2009	CN 101919038 A JP 2011-504290 A JP 2011-504290 T KR 10-2010-0063786 A TW 200942769 A WO 2009-042997 A2 WO 2009-042997 A3 WO 2009-042997 A4	15.12.2010 03.02.2011 03.02.2011 11.06.2010 16.10.2009 02.04.2009 16.07.2009 03.09.2009
US 2006-0241891 A1	26.10.2006	TW 1334983A TW 1334983B US 7452793 B2 WO 2006-107523 A1	21.12.2010 21.12.2010 18.11.2008 12.10.2006
US 2008-0124817 A1	29.05.2008	US 7374960 B1	20.05.2008
US 2007-0231934 A1	04.10.2007	JP 04992266 B2 JP 2007-266305 A US 7648887 B2	18.05.2012 11.10.2007 19.01.2010