

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
17 June 2004 (17.06.2004)

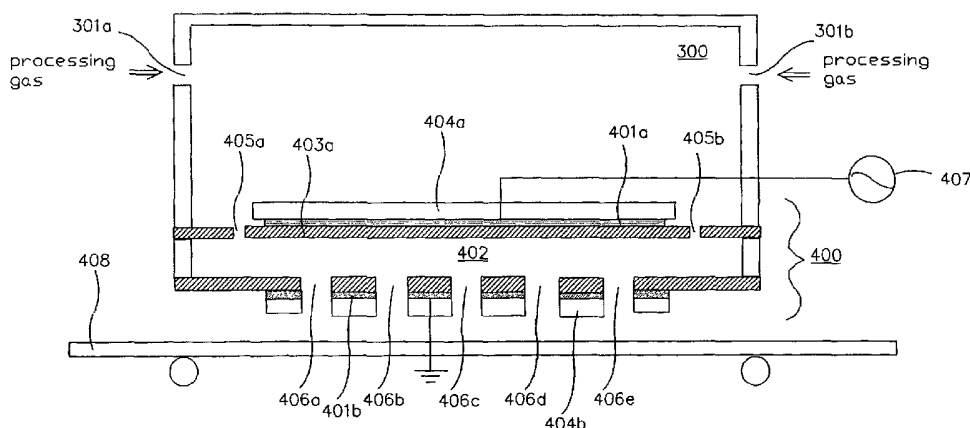
PCT

(10) International Publication Number
WO 2004/051702 A3

- (51) International Patent Classification⁷: **C23C 16/50** (74) Agent: **KIM, Jin-Hak**; #1106, Kumsan Bldg., 17-1, Youido-dong, Youngdeungpo-ku, Seoul 150-727 (KR).
- (21) International Application Number:
PCT/KR2003/002485 (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, 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, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, 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.
- (22) International Filing Date:
19 November 2003 (19.11.2003) (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
10-2002-0076071
2 December 2002 (02.12.2002) KR
- (71) Applicant (*for all designated States except US*): **SEM TECHNOLOGY CO., LTD** [KR/KR]; 5th Floor, Dongkoong Town Bldg., 91-2, Chongdam-dong, kangnam-ku, 135-100 Seoul (KR).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): **LEE, Hag-Joo** [KR/KR]; #104-507, Hyundai Apartment, Dohwa 1-dong, Mapo-ku, 121-041 Seoul (KR).
- Published:
— with international search report
- (88) Date of publication of the international search report:
2 December 2004

[Continued on next page]

(54) Title: APPARATUS FOR TREATING SURFACES OF A SUBSTRATE WITH ATMOSPHERIC PRESSURE PLASMA



(57) Abstract: There is provided a surface treatment apparatus with atmospheric pressure plasma. The surface treatment apparatus is comprised of a processing gas storage part and a plasma generating part located below the processing gas storage part in which a) the processing gas storage part comprises a first inlet port through which a processing gas is introduced, and b) the plasma generating part comprising an upper electrode and a lower electrode facing each other, a plasma generating space formed between the electrodes, at least one dielectric insulating the upper electrode and the lower electrode, a radiator lowering the surface temperature of the electrode, a second inlet port through which the processing gas is introduced from the processing gas storage part into the plasma generating space, an outlet port through which a plasma and the processing gas which has not been converted into the plasma are driven to outside of the plasma generating space, and an alternating current supply applying an alternating current voltage, wherein both the upper electrode and the lower electrode are flat-panel electrodes, the outlet port is formed on the lower electrode, and a substrate is located below the lower electrode. The apparatus is not limited to a shape of the substrate, and makes it possible to widen effective processing area of the substrate as well as to perform consecutive processes under atmospheric pressure.



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.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2003/002485

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 C23C 16/50

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)

IPC7 C23C, H01J

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

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

KIPO internal database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 09-279350 (ANELVA COR.) 28. October 1997 see Abstract and Fig. 1.	1 - 11
A	JP 07-278850 (FUJITSU LTD.) 24 October 1995 see Claims.	1 - 11
A	EP 0 383 550 (NIPPON LIGHT METAL CO.) 22 August 1990 see Claims.	1 - 11
A	EP 0 749 147 (IPSEN IND INT GMBH) 18 Decemger 1996 see Claims.	1 - 11



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

23 FEBRUARY 2004 (23.02.2004)

Date of mailing of the international search report

23 FEBRUARY 2004 (23.02.2004)

Name and mailing address of the ISA/KR



Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701,
Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

CHO, Ji Hun

Telephone No. 82-42-481-5528

