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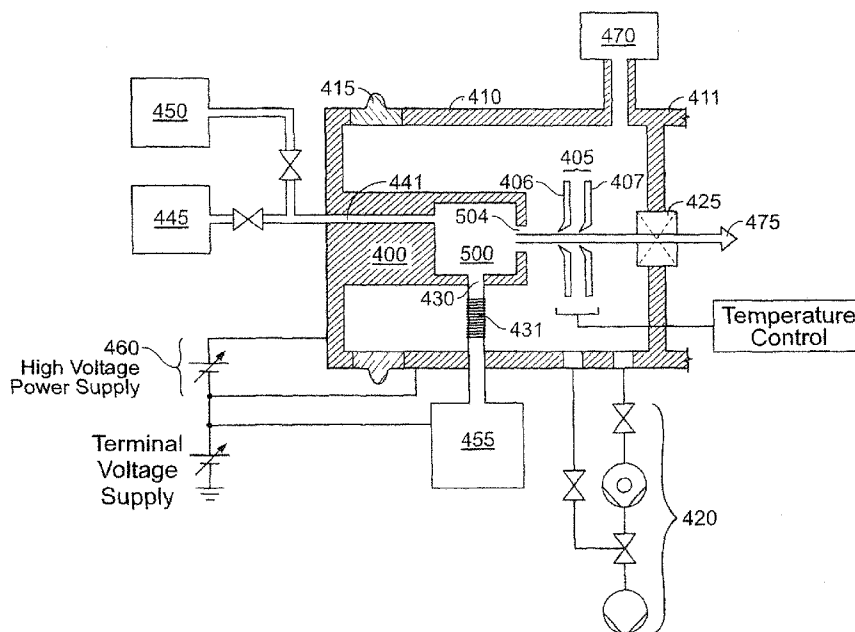
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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR EXTRACTING IONS FROM AN ION SOURCE FOR USE IN ION IMPLANTATION



(57) Abstract: Thermal control is provided for an extraction electrode of an ion-beam producing system that prevents formation of deposits and unstable operation and enables use with ions produced from condensable vapors and with ion sources capable of cold and hot operation. Electrical heating of the extraction electrode is employed for extracting decaborane or octadecaborane ions. Active cooling during use with a hot ion source prevents electrode destruction, permitting the extraction electrode to be of heat-conductive and fluorine-resistant aluminum composition.

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PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*
- *of inventorship (Rule 4.17(iv))*

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*
- *with information concerning one or more priority claims considered void*

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/70929

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H01J 27/00 (2008.04)

USPC - 250/423

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)

USPC: 250/423

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

USPC: 250/424-425 (search terms below)

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

DialogPRO: ion, ion and beam, (ion or electron) and (beam or stream), ion not cooling

USPTO: ion AND beam, electron AND beam, extraction AND ion, ion AND implantation

EPO: ion and beam, electron and beam, extraction and ion, ion and implantation, electrode and condensation

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006/0097185 A2 (MACK) 11 May 2006 (11.05.2006), entire document especially col 39, line 21; col 40, lines 19-20; col 14, lines 15-22	1-35
Y	US 4,847,504 A (AITKEN) 11 July 1989 (11.07.1989), entire document especially col 14, lines 15-22	1-35
Y	US 6,358,766 B1 (KASAHARA) 19 March 2002 (19.03.2002), entire document especially	2-4
Y	WO 2005/059942 A2 (HORSKY et al.) 30 June 2005 (30.06.2005), entire document especially the Abstract	8-10, 25-26 and 28-29
A	US 7,022,999 B2 (HORSKY et al.) 04 April 2006 (04.04.2006), entire document	1-35

Further documents are listed in the continuation of Box C.



* Special categories of cited documents:

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

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"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

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