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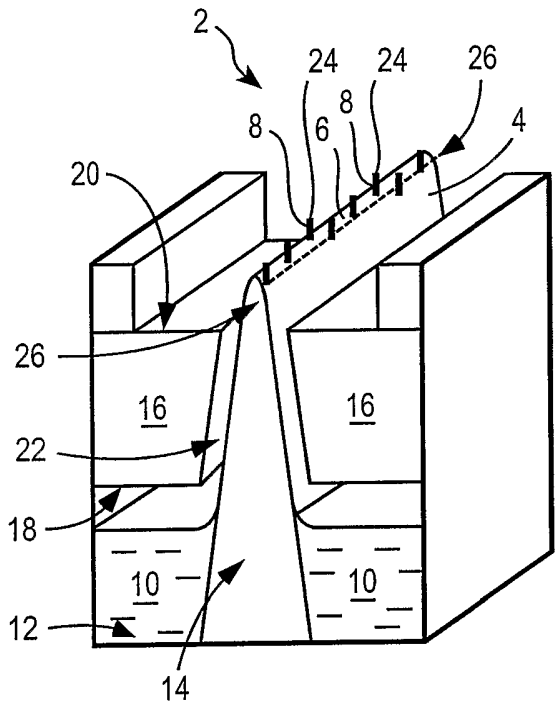
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: FIELD EMISSION ION SOURCE BASED ON NANOSTRUCTURE-CONTAINING MATERIAL



(57) Abstract: A field emission ion source has nanostructure materials on at least an emitting edge of the anode electrode. Metal is transferred from a metal reservoir to the emitting edge of the anode, where the metal is transferred to an emitting end of the nanostructure materials and is ionized under an applied electric field. Plural ion sources can be combined to form a field emission ion source device. The numbers of emitting sources are selectable through electric or mechanical switches and different ion extraction potentials can be applied. Various nanostructure materials include: single wall carbon nanotubes and bundles, few-walled carbon nanotubes and bundles, multi-walled carbon nanotubes and bundles, and carbon fiber. Nanostructure-containing material is integrated into the anode by electrophoresis, dielectrophoresis, CVD, screen printing, and mechanical methods. Metal, preferably alkali metal, is transferred into the nanostructure-containing material by one or a combination of following intercalation methods: vapor transport, solution, electrochemical, and solid state reaction.

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INTERNATIONAL SEARCH REPORT

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PCT/US05/19207

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **H01L 29/06**(2006.01);**H01J 1/02**(2006.01)

USPC: 257/13,14 313/309
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)
U.S. : 257/13,14 313/309

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)
EAST, ion, source, emitting, nanostructure, nanotube, cnt

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,476,409 B2 (Iwasaki et al.) 5 Nov 2002 (5.11.2002), column 7, line 18 to column 8 line 62	1-55
A	US 2004/0032194 A1 (Koga et al.) 19 Feb 2004 (19.02.2004), paragraphs [0039], [0056] and [0069]	1-55

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

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