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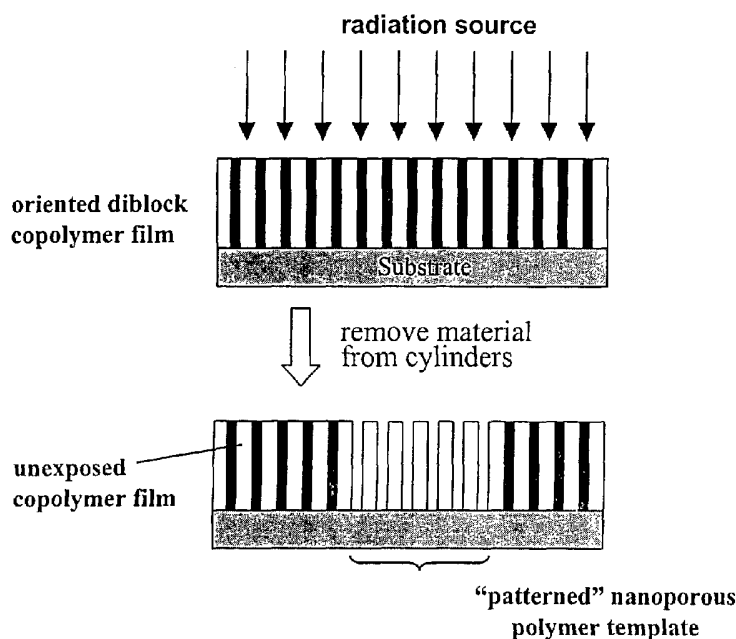
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[Continued on next page]

(54) Title: NANOFABRICATION



(57) Abstract: Pathways to rapid and reliable fabrication of three-dimensional nanostructures are provided. Simple methods are described for the production of well-ordered, multilevel nanostructures. This is accomplished by patterning block copolymer templates with selective exposure to a radiation source. The resulting multi-scale lithographic template can be treated with post-fabrication steps to produce multilevel, three-dimensional, integrated nanoscale media, devices, and systems.



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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.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/07769

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H01L 29/15, 35/00
US CL : 257/9, 10, 28; 438/962

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. : 257/9, 10, 28; 438/962

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---	US 6,187,165 B1 (CHIEN et al) 13 February 2001 (13.02.2001), col. 2-6.	1-14,18,21,22,25,26, 32-34
Y		-----
X ---	US 5,306,661 A (TONUCCI et al) 26 April 1994 (26.04.1994), col. 6, line 14; cols. 9-10; col. 12, lines 1-6.	15-17,19,20,23,24,27 1-16,19,20
Y		-----
Y,E	US 6,388,185 B1 (FLEURIAL et al) 14 May 2002 (14.05.2002), col. 24, lines 38-44.	17,18,21,22-27,32-34 1,15,17,24
A	MANSKY et al, Monolayer films of diblock copolymer microdomains for nanolithographic applications, Journal of Materials, 1995, Vol. 30, pages 1987-1992.	1-34
A	FAN et al, Self-Oriented Regular Arrays of Carbon Nanotubes and Their Field Emission Properties, 22 January 1999, Science Vol. 283, pages 512-514.	1-34



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	"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
"B" earlier application or patent published on or after the international filing date	"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
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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
"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	"&" document member of the same patent family

Date of the actual completion of the international search

15 July 2002 (15.07.2002)

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/07769

Box I Observations where certain claims were found unsearchable 1. because they relate to subject matter not required to be searched by this Authority, namely:

Claim 23 ultimately depends from claim 2, which recites a conductive layer contacting the opposite end of the nanowires. The specification does not provide adequate description or support for a field emitter wherein the opposite end is covered with a (semi)conductive layer.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/07769

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claim Nos.: 23
because they relate to subject matter not required to be searched by this Authority, namely:
Please See Continuation Sheet
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
 2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
- Remark on Protest** ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.