

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
13 December 2007 (13.12.2007)

PCT

(10) International Publication Number  
WO 2007/142911 A3

(51) International Patent Classification:  
H01L 21/268 (2006.01) H01L 21/00 (2006.01)  
H01L 21/762 (2006.01)

(74) Agent: SCOTT, Steven, J.; Corning Incorporated,  
SP-TI-3-1, Patent Department, Corning, New York 14831  
(US).

(21) International Application Number:  
PCT/US2007/012603

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH,  
CN, CO, CR, CU, CZ, DE, DK, DM, 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, PG, PH, PL, PT, RO,  
RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(22) International Filing Date: 24 May 2007 (24.05.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/809,881 31 May 2006 (31.05.2006) US  
11/726,290 21 March 2007 (21.03.2007) US

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,  
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,  
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (for all designated States except US): CORNING INCORPORATED [US/US]; 1 Riverfront Plaza, Corning, New York 14831 (US).

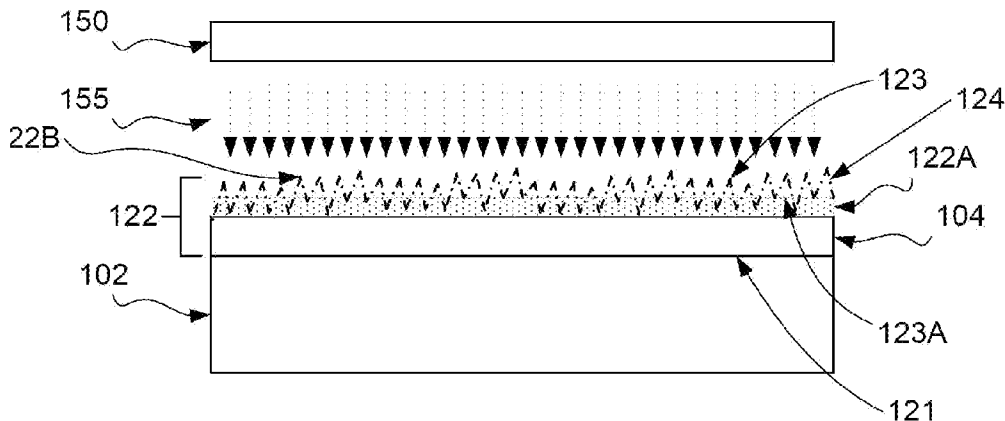
(72) Inventors; and

(75) Inventors/Applicants (for US only): COUILLARD, James, G. [US/US]; 266 Westwood Knoll, Ithaca, New York 14850 (US). LEHUEDE, Philippe [FR/FR]; 48, rue Pierre Lofi, F-91330 Yerres (FR). VALLON, Sophie, A. [FR/FR]; 10, rye des Ardennes, F-91220 Bretigny sur Orge (FR).

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

[Continued on next page]

(54) Title: SEMICONDUCTOR ON INSULATOR STRUCTURE MADE USING RADIATION ANNEALING



(57) Abstract: Systems and methods for and products of a semiconductor-on-insulator (SOI) structure including subjecting to at least one unfinished surface to a laser annealing process. Production of the SOI structure further may include subjecting an implantation surface of a donor semiconductor wafer to an ion implantation process to create an exfoliation layer in the donor semiconductor wafer; bonding the implantation surface of the exfoliation layer to an insulator substrate; separating the exfoliation layer from the donor semiconductor wafer, thereby exposing at least one cleaved surface; and subjecting the at least one cleaved surface to the laser annealing process.

WO 2007/142911 A3



---

**(88) Date of publication of the international search report:**  
10 April 2008

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2007/012603

**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. H01L21/268 H01L21/762 H01L21/00

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 G02F B23K

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 practical, search terms used)  
 EPO-Internal, WPI Data, INSPEC

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X          A	FR 2 610 450 A (FRANCE ETAT [FR]; CENTRE NAT RECH SCIENT [FR]) 5 August 1988 (1988-08-05) page 7, lines 27-33 page 8, lines 1-9 page 10, lines 11-21 page 15, line 1 - page 16, line 25 figures 9,10   <div style="text-align: center;">----- -/--</div>	1-3, 8-11,13, 15-29          4-7,12, 14

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

- \* Special categories of cited documents :
- |  |  |
|--|--|
| <p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*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)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p> | <p>*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</p> <p>*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</p> <p>*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.</p> <p>*&amp;* document member of the same patent family</p> |
|--|--|

Date of the actual completion of the international search  <div style="text-align: center; font-weight: bold;">15 February 2008</div>	Date of mailing of the international search report  <div style="text-align: center; font-weight: bold;">22/02/2008</div>
---	--

Name and mailing address of the ISA/ European Patent Office, P.B. 5816 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  <div style="text-align: center; font-weight: bold;">Ekoué, Adamah</div>
---	---

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/012603

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/055999 A1 (CHEN YU-CHENG [TW] ET AL) 25 March 2004 (2004-03-25)	1,3,6, 8-13, 17-19, 21,22
A	page 1, paragraphs 12,13 page 2, paragraph 24-26	2,4,5,7, 14-16, 20,23-29
X	US 2004/232488 A1 (FORBES LEONARD [US]) 25 November 2004 (2004-11-25)	1,3-6, 8-11, 14-22
A	page 5, paragraphs 45,49,50 claim 28	2,7,12, 13,23-29
X	US 6 534 380 B1 (YAMAUCHI SHOICHI [JP] ET AL) 18 March 2003 (2003-03-18)	1,3-6, 8-11,13, 15,16, 18,19, 21-24, 28,29
Y	column 5, lines 34-42 column 8, lines 29-63 column 9, lines 39-53	7
A		2,12,14, 17,20, 25-27
Y	US 4 390 392 A (ROBINSON JOHN T ET AL) 28 June 1983 (1983-06-28) column 1, line 32 - column 2, line 11	7
X	US 2005/014315 A1 (YAMAMOTO YOSHITAKA [JP] ET AL) 20 January 2005 (2005-01-20)	1,3,8,9, 18,19, 21-29
A	page 3, paragraph 44 page 5, paragraph 62 page 6, paragraph 69 - page 7, paragraph 75	2,4-7, 10-17,20
X	US 2003/060026 A1 (YAMAZAKI SHUNPEI [JP] ET AL) 27 March 2003 (2003-03-27)	23-26, 28,29
A	page 7, paragraph 153-158 page 8, paragraph 187 figure 1	1-22,27
	----- -/--	

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2007/012603

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 486 008 B1 (LEE TIEN-HSI [TW]) 26 November 2002 (2002-11-26) column 8, lines 30-45 claim 24	23, 27-29
A	-----	1-22, 24-26

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2007/012603
---

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
FR 2610450	A	05-08-1988	NONE	
US 2004055999	A1	25-03-2004	JP 2004111912 A	08-04-2004
US 2004232488	A1	25-11-2004	US 2006001094 A1	05-01-2006
US 6534380	B1	18-03-2003	NONE	
US 4390392	A	28-06-1983	NONE	
US 2005014315	A1	20-01-2005	CN 1574216 A JP 2004363241 A KR 20040104430 A US 2006040436 A1	02-02-2005 24-12-2004 10-12-2004 23-02-2006
US 2003060026	A1	27-03-2003	NONE	
US 6486008	B1	26-11-2002	JP 2001244444 A TW 452866 B	07-09-2001 01-09-2001