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(54) Title: CRYSTALLINE THIN-FILM PHOTOVOLTAIC STRUCTURES AND METHODS FOR FORMING THE SAME

(57) Abstract: Methods for forming semiconductor devices include providing a textured template, forming a buffer layer over the textured template, forming a substrate layer over the buffer layer, removing the textured template, thereby exposing a surface of the buffer layer, removing oxide from the exposed surface of the buffer layer, and forming a semiconductor layer over the exposed surface of the buffer layer.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/032008

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01L31/0392

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007/044832 A1 (FRITZEMEIER LESLIE G [US]) 1 March 2007 (2007-03-01) cited in the application paragraphs [0076] - [0077]; figures 7-8 -----	1-27, 57-83
X	US 5 282 902 A (MATSUYAMA JINSHO [JP]) 1 February 1994 (1994-02-01) column 13, line 15 - column 14, line 19; figure 7 column 26, line 44 - column 27, line 40; figure 13 -----	73-83
X	US 2008/217622 A1 (GOYAL AMIT [US]) 11 September 2008 (2008-09-11) paragraphs [0111], [0116], [0134], [0135], [0160]; figures 1,2,6,24,25 -----	1-27, 57-83
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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>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 14 October 2010	Date of mailing of the international search report 07/12/2010
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Franche, Vincent
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/032008

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	WO 2010/088366 A1 (WAKONDA TECHNOLOGIES INC [US]; FRITZEMEIER LESLIE G [US]; VINEIS CHRIS) 5 August 2010 (2010-08-05) the whole document	1-27, 57-83

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/032008

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

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

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims 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. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

see additional sheet

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 fees, this Authority did not invite payment of additional fees.
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.:
1-27, 57-83

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-27, 57-83

A semiconductor structure and a method of manufacturing thereof, comprising a substrate, a semiconductor layer and a buffer layer there between.

2. claims: 28-42

A method for forming a semiconductor device, comprising an oxidation-resistant layer between the substrate and the semiconductor layer.

3. claims: 43-56

A method for forming a semiconductor device, comprising an etch-stop and a diffusion barrier layers between the substrate and the semiconductor layers.

4. claims: 84-100

A semiconductor structure comprising an oxide and a buffer layers between the semiconductor layer and the substrate.

5. claims: 101-104

A semiconductor structure comprising an etch-stop between a textured template and a substrate.

6. claims: 105-118

A semiconductor structure comprising a lift-off layer between the template and the substrate.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/032008

Patent document cited in search report	Publication date	Publication date	Patent family member(s)	Publication date
US 2007044832 A1	01-03-2007	NONE		
US 5282902 A	01-02-1994	JP 2908067 B2		21-06-1999
		JP 4334069 A		20-11-1992
US 2008217622 A1	11-09-2008	WO 2008112115 A1		18-09-2008
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