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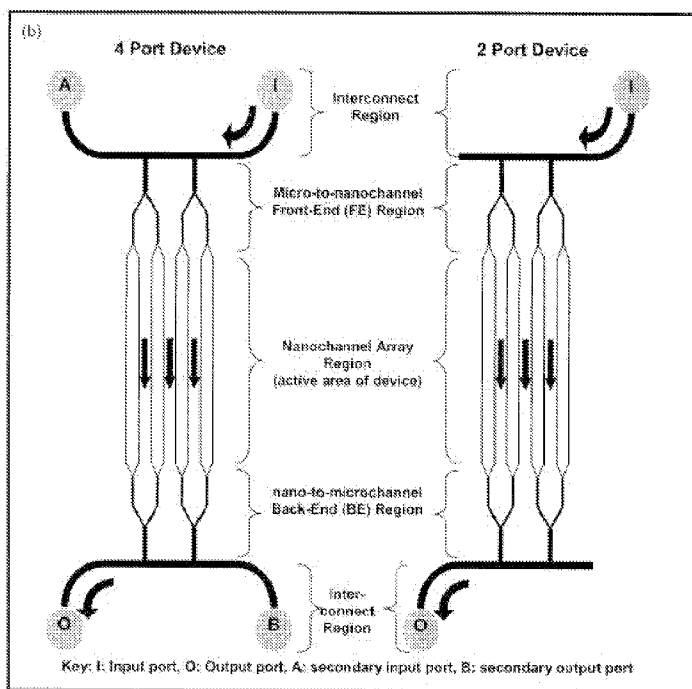
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[Continued on next page]

(54) Title: INTEGRATED NANOFUIDIC ANALYSIS DEVICES, FABRICATION METHODS AND ANALYSIS TECHNIQUES



(57) Abstract: Provided are integrated analysis devices having features of macroscale and nanoscale dimensions, and devices that have reduced background signals and that reduce quenching of fluorophores disposed within the devices. Related methods of manufacturing these devices and of using these devices are also provided.



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TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *with information concerning authorization of rectification of an obvious mistake under Rule 91.3 (b) (Rule 48.2(i))*

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- *with international search report (Art. 21(3))*
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see Notice of 29 April 2010

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/046427A. CLASSIFICATION OF SUBJECT MATTER
INV. B01L3/00

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)
B01L

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/112606 A1 (FUCHS MARTIN [US] ET AL) 26 May 2005 (2005-05-26) paragraphs [0005], [0076], [0087], [0097], [0110], [0112]; figures 23,24 -----	1-45
X	WO 01/13088 A1 (US GENOMICS INC [US]) 22 February 2001 (2001-02-22) page 29, line 6 - page 31, line 7; figures 2a-m, 11-21, page 34, line 4 - page 35, line 23 page 40, line 11 - page 42, line 20 -----	1-45
A	US 2006/275911 A1 (WANG SHIH-YUAN [US] ET AL) 7 December 2006 (2006-12-07) abstract; figures 4a-b ----- -/--	1-45

 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

"E" earlier document but published on or after the international filing date

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"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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Date of mailing of the international search report

11/08/2010

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2006/096123 A1 (OPTOVENT AB [SE]; HAMEDI MAHIAR [SE]; TVINGSTEDT KRISTOFER [SE]; AASBE) 14 September 2006 (2006-09-14) page 3, line 36 - page 4, line 6; figures 1,5 page 5, line 11 - page 5, line 18 page 16, line 11 - page 16, line 29 page 17, line 9 - page 19, line 11 -----	1-45

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/046427

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.:

1-45

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: 1-45

Analysis device comprising two substrates defining a channel which is connected with a nanochannel analysis region and a method of use.

2. claims: 46-59

Method for fabricating an analysis device bonding 2 substrates together.

3. claims: 62-68

Method of analysis making use of a device comprising two channels, whereby the ratio of the widths is between 1 and 10⁷ and the smaller one has a width from 10nm to 1000nm.

4. claims: 69-100

Analysis device comprising two substrates defining a channel, whereby at least one of the substrates is permeable to a certain range of electromagnetic radiation.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2009/046427

Patent document cited in search report	A1	Publication date	Patent family member(s)	Publication date
US 2005112606	A1	26-05-2005	NONE	
<hr/>				
WO 0113088	A1	22-02-2001	AU 6771100 A	13-03-2001
			CA 2381361 A1	22-02-2001
			CN 1379857 A	13-11-2002
			EP 1210578 A1	05-06-2002
			JP 2003507026 T	25-02-2003
<hr/>				
US 2006275911	A1	07-12-2006	NONE	
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WO 2006096123	A1	14-09-2006	EP 1864185 A1	12-12-2007
			US 2009053471 A1	26-02-2009
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