



(51) International Patent Classification:

G01N 35/08 (2006.01) G01N 33/48 (2006.01)
G01N 33/68 (2006.01) G01N 33/53 (2006.01)

(21) International Application Number:

PCT/US2011/066889

(22) International Filing Date:

22 December 2011 (22.12.2011)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/429,392 3 January 2011 (03.01.2011) US

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

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, 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, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: METHODS AND MICROFLUIDIC DEVICES FOR CONCENTRATING AND TRANSPORTING PARTICLES

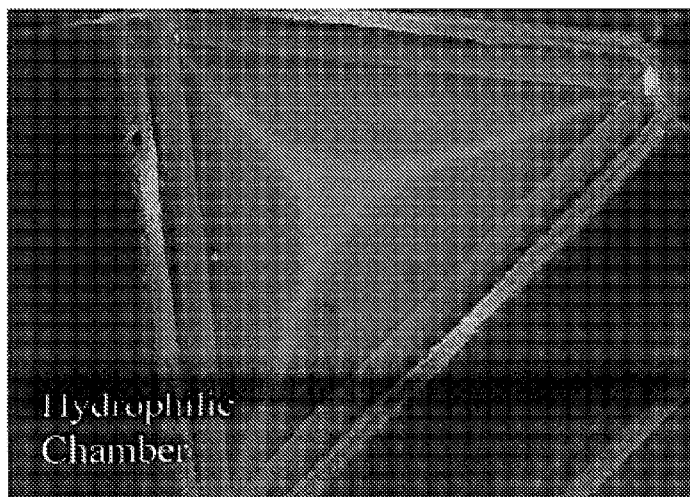


FIG. 1

(57) Abstract: Shaped hydrophilic surfaces are capable of concentrating and transporting particles in a liquid mixture, and are useful in microfluidic devices as described herein. Such devices use small amounts of samples and it is desirable that the analyte may be concentrated, and/or transported into a zone where the analyte is detected by a microfluidic device.





Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

Published:

— *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:

18 October 2012

A. CLASSIFICATION OF SUBJECT MATTER*G01N 35/08(2006.01)i, G01N 33/68(2006.01)i, G01N 33/48(2006.01)i, G01N 33/53(2006.01)i*

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)

G01N 35/08; A01N 1/02; F15C 1/06; C02F 1/46; B01J 19/00; C03C 15/00; C12M 1/34

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: closed, loop, concentrating, transporting, chamber, microfluidic, analysis, hydrophilic, and surface

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	US 2007-0163967 A1 (GERALD H. POLLACK) 19 July 2007 See abstract; claims 1-6,16-20; paragraphs 5,20,100-103; figs. 1-2,14.	8 1-4,9-10 5-7
Y	US 2009-0004059 A1 (MICHAEL J. PUGIA et al.) 01 January 2009 See abstract; claim 1; paragraphs 21-30; fig. 1.	1-4,9-10
A	US 6387290 B1 (JAMES P. BRODY et al.) 14 May 2002 See abstract; claims 5,8; column 6, lines 58-64; fig. 1.	1-10
A	US 2004-0121449 A1 (MICHAEL J. PUGIA et al.) 24 June 2004 See abstract; claim 1; paragraphs 12,31-32; fig. 1.	1-10
A	US 7681595 B2 (SUNG-JIN KIM et al.) 23 March 2010 See abstract; claim 1; column 3, lines 24-32; figs. 1A,3.	1-10

 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 application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"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

"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

22 AUGUST 2012 (22.08.2012)

Date of mailing of the international search report

24 AUGUST 2012 (24.08.2012)

Name and mailing address of the ISA/KR

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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.: 12,16
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:

The claims refer to a multiple dependent claim that refers to other multiple dependent claims. Therefore, the meaning of the technical feature to which they refer is vague and unclear.

3. Claims Nos.: 11,13-15,17-20
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:

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 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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2011/066889

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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