(19) World Intellectual Property Organization

International Bureau



(43) International Publication Date 9 August 2007 (09.08.2007)

(51) International Patent Classification: G02B 3/14 (2006.01)

(21) International Application Number:

PCT/IB2007/000219

(22) International Filing Date: 31 January 2007 (31.01.2007)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

06356010.6

1 February 2006 (01.02.2006) EP

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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

(10) International Publication Number WO 2007/088454 A3

AT, AU, AZ, BA, BB, BG, 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, LV, LY, MA, MD, 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.

(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, 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).

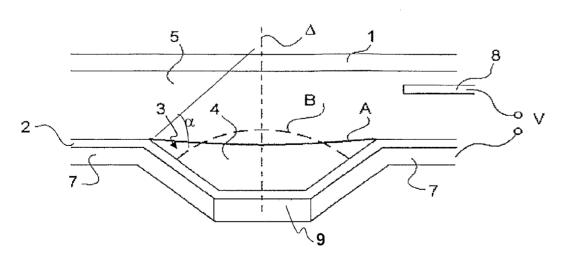
Published:

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

29 November 2007

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.

(54) Title: MULTI-PHASE LIQUID COMPOSITION AND VARIABLE-FOCUS OPTICAL LENS DRIVEN BY ELEC-TROWETTING THAT INCORPORATES THE SAME



2007/088454 A3 ||||||||||||| (57) Abstract: The present invention relates to a multi-phase liquid composition comprising a conductive fluid and a non-conductive fluid, the non-conductive fluid being immiscible in the conductive fluid, the composition having a mean arithmetic cinematic viscosity of between about 1.5 cSt and about 40 cSt, within a temperature range of about 20°C to about +70°C. The invention also pertains to an optical electrowetting device comprising said multi-phase liquid composition, as well as an optical lens driven by electrowetting, and apparatus comprising the same.



International application No PCT/IB2007/000219

A. CLASSIFICATION OF SUBJECT MATTER INV. G02B3/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

 $\label{lem:minimum} \mbox{Minimum documentation searched (classification system followed by classification symbols)} \\ \mbox{G02B}$

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

Category Citation of document, with indication, where appropriate, of the relevant passages X S.KUIPER, B.H.W.HENDRIKS: "Variable focus liquid lens for miniature cameras" 24-26, APPLIED PHYSICS LETTERS, vol. 85, no. 7, 16 August 2004 (2004-08-16), pages 1128-1130, XP002390971 the whole document A BERGE B ET AL: "Variable focal lens controlled by an external voltage: an application of electrowetting" 29-32 EUROPEAN PHYSICAL JOURNAL E. SOFT MATTER, EDP SCIENCES, IT, vol. 3, no. 2, October 2000 (2000-10), pages 159-163, XP002285977 ISSN: 1292-8941 Section 2: "Principle and realisation"	C. DOCUM	ENTS CONSIDERED TO BE RELEVANT	
liquid lens for miniature cameras" APPLIED PHYSICS LETTERS, vol. 85, no. 7, 16 August 2004 (2004-08-16), pages 1128-1130, XP002390971 the whole document A BERGE B ET AL: "Variable focal lens controlled by an external voltage: an application of electrowetting" EUROPEAN PHYSICAL JOURNAL E. SOFT MATTER, EDP SCIENCES, IT, vol. 3, no. 2, October 2000 (2000-10), pages 159-163, XP002285977 ISSN: 1292-8941 Section 2: "Principle and realisation"	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X Further documents are listed in the continuation of Box C.	X 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 "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) "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 11 July 2007	Date of mailing of the international search report 02/10/2007		
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Authorized officer Ward, Seamus		

International application No
PCT/IB2007/000219

C(Continua	Hard DOCUMENTS CONCIDENCE TO BE DELEVIOUR	PC1/1B200//000219
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2004/099845 A (KONINKLIJKE PHILIPS ELECTRONICS N.V; RENDERS, CHRISTINA, A; HENDRIKS,) 18 November 2004 (2004-11-18) claims 1-7	1-12, 24-26, 29-32
A	WO 2004/099844 A (KONINKLIJKE PHILIPS ELECTRONICS N.V; RENDERS, CHRISTINA, A; KUIPER, ST) 18 November 2004 (2004-11-18) claims 1-7	1-12, 24-26, 29-32
A	WO 2004/099830 A (KONINKLIJKE PHILIPS ELECTRONICS N.V; KUIPER, STEIN; HENDRIKS, BERNARDU) 18 November 2004 (2004-11-18) claims 1-9	1-12, 24-26, 29-32

International application No. PCT/IB2007/000219

Box 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:
Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
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 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
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.: See annex
Remark on Protest The additional search fees were accompanied by the applicant's protest. 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: 1-12,24-26 and 29-32

Multiphase liquid composition having specifically selected compounds for the non-conductive fluid

2. claims: 13-15

Multiphase liquid composition having wetting agent, e.g. a monohalogenated aromatic compound and/or an alpha, omega-dihalogenated alkyl.

3. claims: 16-21,26-28

Multiphase liquid composition having hydrolysis resistant compound, in particular of the form represented in formula (I) or formula (II).

4. claims: 22,23

Multiphase liquid composition having anti-oxidants and/or biocides

International application No
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