(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 299 255 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
14.05.2014 Bulletin 2014/20

(43) Date of publication A2:
23.03.2011 Bulletin 2011/12

(21) Application number: **10184812.5**

(22) Date of filing: **25.03.2003**

(51) Int Cl.:
G01N 13/04 *(2006.01)* ***B01L 3/00*** *(2006.01)*

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

(30) Priority: **06.08.2002 US 401432 P**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
03728299.3 / 1 527 330

(71) Applicant: **The Regents of the University of California**
Oakland, CA 94607 (US)

(72) Inventor: **Sullivan, Benjamin**
San Diego, CA 92122 (US)

(74) Representative: **Schley, Jan Malte**
Fish & Richardson P.C.
Highlight Business Towers
Mies-van-der-Rohe-Str. 8
80807 München (DE)

(54) Tear film osmometry

(57) Osmolarity measurement of a sample fluid, such as tear film, is achieved by depositing an aliquot-sized sample on a sample receiving substrate. The sample fluid is placed on a sample region of the substrate. Energy is imparted to the sample fluid and energy properties of the fluid can be detected to produce a sample fluid reading that indicates osmolarity of the sample fluid. An aliquot-sized volume can comprise, for example, a volume of no more than 20 microliters (μL) . The aliquot-sized sample volume can be quickly and easily obtained, even from dry eye sufferers. The imparted energy can comprise electrical, optical or thermal energy. In the case of electrical energy, the energy property of the sample fluid can comprise electrical conductivity. In the case of optical energy, the energy property can comprise fluorescence. In the case of thermal energy, the measured property can be the freezing point of the sample fluid. The substrate can be packaged into a chip, such as by using semiconductor fabrication techniques. An ex vivo osmolarity sensor system that uses the chip can detect energy from the sample region and can provide an accurate osmolarity measurement without user intervention.

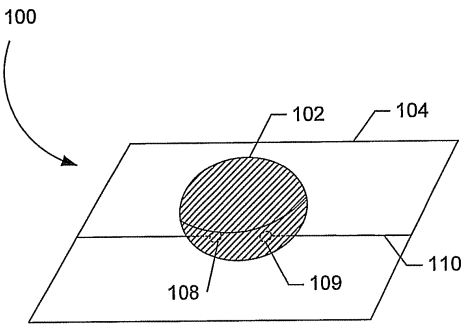

FIG. 1

EP 2 299 255 A3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 10 18 4812

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 96/14571 A (UNIV CALIFORNIA) 17 May 1996 (1996-05-17) * page 6, line 5 - page 7, line 12 * * page 11, line 22 - page 11, line 31 * * page 18, line 4 - page 20, line 9 * * page 21, line 23 - page 22, line 6 * * page 24, line 9 - page 25, line 24 * * page 26, line 21 - page 27, line 5 * * figures 1-3 * -----	1-9, 12-15	INV. G01N13/04 B01L3/00
X	DE 34 14 866 A (SCHICKLE KARL DIPL PHYS;STRIGL ERWIN DIPL ING) 31 October 1985 (1985-10-31) * page 6, paragraph 1 - page 6, paragraph 3 * * page 7, paragraph 4 - page 9, paragraph 2 * * page 10, paragraph 2 - page 12, paragraph 2 * * figures 1,2 * -----	1-9, 12-15	
X	US 5 143 080 A (YORK KENNETH K) 1 September 1992 (1992-09-01) * column 1, line 24 - column 2, line 59 * * column 3, line 29 - column 5, line 50 * * figures 1-8 * -----	1-9, 12-15	TECHNICAL FIELDS SEARCHED (IPC) G01N B01L G01R B01J A61M A61B
X	US 5 388 449 A (LEVEEN HARRY H [US] ET AL) 14 February 1995 (1995-02-14) * the whole document * -----	1-9, 12-15	
X	US 4 123 701 A (JOSEFSEN TURI L H ET AL) 31 October 1978 (1978-10-31) * the whole document * -----	1-9, 12-15	
X	US 4 951 683 A (DAVIS JEFFREY P [US]) 28 August 1990 (1990-08-28) * the whole document * -----	1-9, 12-15	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	26 March 2014	Cantalapiedra, Igor

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 18 4812

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-03-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9614571 A	17-05-1996	AU 4146396 A	31-05-1996
		WO 9614571 A1	17-05-1996
DE 3414866 A	31-10-1985	----------	
US 5143080 A	01-09-1992	NONE	
US 5388449 A	14-02-1995	NONE	
US 4123701 A	31-10-1978	CA 1082773 A1	29-07-1980
		DE 2729131 A1	09-02-1978
		FR 2356933 A1	27-01-1978
		GB 1543129 A	28-03-1979
		JP S535690 A	19-01-1978
		US 4123701 A	31-10-1978
US 4951683 A	28-08-1990	AU 5026290 A	13-08-1990
		CA 2007903 A1	19-07-1990
		EP 0429555 A1	05-06-1991
		JP 2619305 B2	11-06-1997
		JP H03503971 A	05-09-1991
		US 4951683 A	28-08-1990
		WO 9007902 A1	26-07-1990

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	泪膜渗透压		
公开(公告)号	EP2299255A3	公开(公告)日	2014-05-14
申请号	EP2010184812	申请日	2003-03-25
[标]申请(专利权)人(译)	加利福尼亚大学董事会		
申请(专利权)人(译)	加利福尼亚大学董事会		
当前申请(专利权)人(译)	加利福尼亚大学董事会		
[标]发明人	SULLIVAN BENJAMIN		
发明人	SULLIVAN, BENJAMIN		
IPC分类号	G01N13/04 B01L3/00 G01N33/483 A61B5/00 G01N27/02 G01N27/06 G01N33/50 G01N37/00		
CPC分类号	G01N13/04		
优先权	60/401432 2002-08-06 US		
其他公开文献	EP2299255A2		
外部链接	Espacenet		

摘要(译)

通过在样品接收基底上沉积等分试样大小的样品来实现样品流体（例如泪膜）的渗透压测量。将样品流体置于基底的样品区域上。将能量赋予样品流体并且可以检测流体的能量性质以产生指示样品流体的渗透压的样品流体读数。等分试样大小的体积可包含例如不超过20微升（μL）的体积。即使是干眼症患者，也可以快速轻松地获得等分试样大小的样品体积。赋予的能量可包括电能，光能或热能。在电能的情况下，样品流体的能量特性可以包括导电性。在光能的情况下，能量特性可以包括荧光。在热能的情况下，测量的性质可以是样品流体的凝固点。可以将衬底封装到芯片中，例如通过使用半导体制造技术。使用该芯片的离体渗透压传感器系统可以检测来自样品区域的能量，并且可以在无需用户干预的情况下提供准确的渗透压测量。

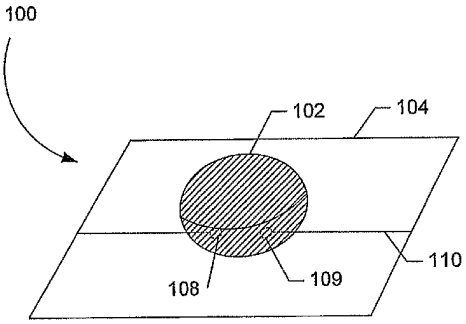

FIG. 1