

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 December 2007 (13.12.2007)

PCT

(10) International Publication Number
WO 2007/141811 A3

(51) International Patent Classification:
C12Q 1/68 (2006.01)

(21) International Application Number:
PCT/IT2006/000420

(22) International Filing Date: 6 June 2006 (06.06.2006)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant: STMicroelectronics S.r.l. [IT/IT]; Via C. Olivetti, 2, I-20041 Agrate Brianza (IT).

(72) Inventors; and

(75) Inventors/Applicants (for US only): FROSINI Andrea [IT/IT]; Via Spaccante, 85, 73047 MONTERONI DI LECCE (IT). FISCHETTI Alessandra [IT/IT]; Via Palmieri, 57, 73100 LECCE (IT).

(74) Agents: JORIO Paolo et al.; c/o STUDIO TORTA S.r.l., Via Viotti, 9, I-10121 TORINO (IT).

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

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, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

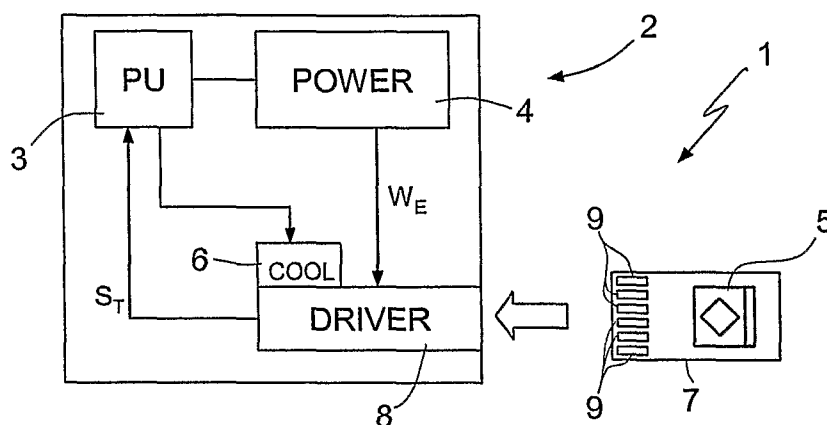
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, 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:
28 February 2008

(54) Title: PROCESS FOR PREPARING A SEMICONDUCTOR SUBSTRATE FOR BIOLOGICAL ANALYSIS



(57) Abstract: A process for preparing a semiconductor substrate for biological analysis in an integrated device, the biological analysis comprising the steps of amplifying DNA and detecting amplified DNA in the same chamber, comprises the steps of a) forming a silicon dioxide surface on said semiconductor substrate b) treating said silicon dioxide surface with a silane; c) forming a silanized surface; d) grafting nucleic acid probes; e) treating said silanized surface with a deactivating agent and f)

forming a deactivated substrate sequentially. Further the process can include the step of cleaning the silicon dioxide substrate before the step of treating said silicon dioxide surface with a silane and the step of reacting the terminal group of the silane with a cross-linker or alternatively the step of reacting the derivatized nucleic acid probes with a cross-linker, before the grafting step.

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2006/000420

A. CLASSIFICATION OF SUBJECT MATTER

INV. C12Q1/68

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)

C12Q 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, BIOSIS, EMBASE, MEDLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/005039 A (AGILENT TECHNOLOGIES INC [US]; HARGREAVES JOHN S [US]) 20 January 2005 (2005-01-20) paragraphs [0039], [0048] - paragraphs [0067], [0103] - [0105], [0120] - [0130] & US 6 284 465 B1 (WOLBER PAUL K [US]) 4 September 2001 (2001-09-04) the whole document -----	1-26
X	EP 1 413 352 A (AGILENT TECHNOLOGIES INC [US]) 28 April 2004 (2004-04-28) the whole document -----	1-26
X	WO 01/12846 A (PAMGENE BV [NL]; VENEMA F [NL]) 22 February 2001 (2001-02-22) page 2 - page 6; claims 1-19; example 1 ----- -/--	1-23

☒ 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

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.

G document member of the same patent family

Date of the actual completion of the international search

7 January 2008

Date of mailing of the international search report

14/01/2008

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

Botz, Jürgen

INTERNATIONAL SEARCH REPORT

International application No

PCT/IT2006/000420

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 688 642 A (CHRISEY LINDA A [US] ET AL) 18 November 1997 (1997-11-18) column 4 - column 9; claims 1-18; figures 1-6 -----	1-23
X	WO 90/05910 A (I STAT CORP [US]) 31 May 1990 (1990-05-31) the whole document -----	1-26
X	WO 03/040700 A (CIPHERGEN BIOSYSTEMS INC [US]; UM PIL-JE [US]; POHL CHRISTOPHER A [US]) 15 May 2003 (2003-05-15) pages 19-28; claims 1-56; example 1 -----	1-23
X	US 5 919 523 A (SUNDBERG STEVEN A [US] ET AL) 6 July 1999 (1999-07-06) the whole document -----	1-23
X	US 6 387 626 B1 (SHI JUFANG [US] ET AL) 14 May 2002 (2002-05-14) paragraphs [0023] - [0055]; claims 1-27; examples 1-6 -----	1-23
X	WO 2004/001506 A (AFFYMETRIX INC [US]; TRULSON MARK [US]; MCGALL GLENN H [US]; SYWE BEI-) 31 December 2003 (2003-12-31) the whole document -----	1-26
X	WO 2005/029042 A (MASSACHUSETTS INST TECHNOLOGY [US]; MANALIS SCOTT [US]; BURG THOMAS [U]) 31 March 2005 (2005-03-31) claims 1-160 -----	1-26

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IT2006/000420

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2005005039	A	20-01-2005	US 2004265476 A1	30-12-2004
US 6284465	B1	04-09-2001	NONE	
EP 1413352	A	28-04-2004	JP 2004144752 A	20-05-2004
			US 2004076963 A1	22-04-2004
WO 0112846	A	22-02-2001	AU 767709 B2	20-11-2003
			AU 7274100 A	13-03-2001
			CA 2378717 A1	22-02-2001
			JP 2003507695 T	25-02-2003
US 5688642	A	18-11-1997	NONE	
WO 9005910	A	31-05-1990	AT 213833 T	15-03-2002
			CA 2002848 A1	14-05-1990
			DE 68929373 D1	04-04-2002
			DE 68929373 T2	10-10-2002
			EP 0442969 A1	28-08-1991
			JP 3137612 B2	26-02-2001
			JP 2000065791 A	03-03-2000
			JP 4503249 T	11-06-1992
			JP 3105919 B2	06-11-2000
			US 5200051 A	06-04-1993
			US 5466575 A	14-11-1995
WO 03040700	A	15-05-2003	NONE	
US 5919523	A	06-07-1999	NONE	
US 6387626	B1	14-05-2002	NONE	
WO 2004001506	A	31-12-2003	AU 2003251589 A1	06-01-2004
			CA 2490122 A1	31-12-2003
			CN 1668767 A	14-09-2005
			EP 1540005 A2	15-06-2005
			JP 2005530180 T	06-10-2005
			US 2003235824 A1	25-12-2003
WO 2005029042	A	31-03-2005	CA 2540111 A1	31-03-2005
			EP 1718728 A2	08-11-2006
			JP 2007506977 T	22-03-2007