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Published:

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— *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))*

(88) Date of publication of the international search report:
12 December 2013

(54) Title: IONIC SILICONES AND COMPOSITIONS CONTAING THE SAME

(57) Abstract: There is provided herein a functionalized ionic silicone composition comprising a silicone of the formula (I): $M^1_a M^2_b M^3_c D^1_d D^2_e D^3_f T^1_g T^2_h T^3_i Q_j$ (I) which contains a monovalent radical bearing ion-pairs and having the formula (II): -A-I^{x-}"M_n^{y+}; where A is a spacing group having at least 2 spacing atoms selected from a divalent hydrocarbon or hydrocarbonoxy group, where I is an ionic group such as sulfonate -SO_3^-, carboxylate -COO^-, phosphonate -PO_3^{2-} group and phosphate - OPO_3^{2-}, where M is hydrogen or a cation independently selected from alkali metals, alkali earth metals, transition metals, metals, quaternary ammonium and phosphonium groups; or, zwitterions having the formula (III): -R'-NR"$_2^+$-R'"-I (III) where I is defined as above, and where the subscript a, b, c, d, e, f, g, h, i, j are zero or positive subject to the following limitations: $2 \leq a+b+c+d+e+f+g+h+i+j \leq 6000$, $b+e+h > 0$ and $c+f+i > 0$.

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A. CLASSIFICATION OF SUBJECT MATTER
INV. C09D183/06 C09D183/08 C09D183/12 C08G77/12 C08G77/14
C08G77/20 C08G77/24 C08G77/26 C08G77/28 C08G77/46
A61K8/894 A61K8/895 A61K8/896 A61K8/897 A61K8/898

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)
C09D C08G A61K A01N

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 practicable, search terms used)
EPO-Internal, WPI Data, COMPENDEX, INSPEC, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 581 296 A2 (DOW CORNING TORAY SILICONE [JP]) 2 February 1994 (1994-02-02)	1,2,4, 6-8, 10-13, 15,18,19
Y	abstract; claims; example 4	14
X	US 2008/293878 A1 (FUNK ENNO [DE] ET AL) 27 November 2008 (2008-11-27)	1,2,4-8, 10
Y	paragraphs [0151], [0152]; claims; examples 3,4	14
X	CN 101 468 301 A (HENKEL AG & CO KGAA [DE]) 1 July 2009 (2009-07-01) abstract page 2, paragraph 1	1,2,4, 8-10,15

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

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"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	Date of mailing of the international search report
22 April 2013	11/10/2013

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Hein, Friedrich

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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.
X	US 2010/233113 A1 (NGUYEN NGHI VAN [US] ET AL) 16 September 2010 (2010-09-16) paragraph [0024] - paragraph [0035]	16,17
A	US 2007/196713 A1 (MAH SANG-KOOK [KR] ET AL) 23 August 2007 (2007-08-23) the whole document	1,2,4-22
A	US 2005/148702 A1 (EIGEN PETER [DE] ET AL) 7 July 2005 (2005-07-07) paragraph [0017] - paragraph [0026]	1,2,4-22
X	WO 00/78844 A1 (EURO MAN & TRUST COMPANY ESTAB [LI]) 28 December 2000 (2000-12-28) claims; examples 4,5	1
A	WO 2006/127924 A2 (DOW CORNING [US]; GENENCOR INT [US]; JOFFRE ERIC JUDE [US]; MCAULIFFE) 30 November 2006 (2006-11-30) the whole document	1,2,4-22

2

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2012/069685

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0581296 A2	02-02-1994	NONE	
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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.:
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.:

2(completely); 1, 4-19(partially)

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: 2(completely); 1, 4-19(partially)

   Functionalized ionic silicone having ion pairs (II) wherein I is an ionic group

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2. claims: 3(completely); 1, 2, 4-19(partially)

   Functionalized ionic silicone having zwitterions (III)

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3. claim: 20

   Composition comprising a functionalized ionic silicone

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4. claim: 21

   Catalyst composition comprising a functionalized ionic silicone

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5. claim: 22

   Macroinitiator composition comprising a functionalized ionic silicone

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6. claims: 23-25

   Heath care composition or product comprising a functionalized ionic silicone

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7. claims: 26, 27

   Personal care product comprising a functionalized ionic silicone

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8. claims: 28-30

   Antifouling product comprising a functionalized ionic silicone

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9. claims: 31-35

   Agricultural product, seed coating or superspreader comprising a functionalized ionic silicone

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

10. claim: 36

Flow additive comprising a functionalized ionic silicone
