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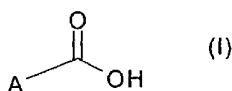
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(54) Title: SURFACTANT COMPOUNDS AND USES THEREOF



(57) Abstract: A pharmaceutical aerosol formulation comprising a particulate medicament, one or more fluorocarbon or hydrogen-containing fluorocarbon propellants and a compound of the general formula (I) or a salt or solvate thereof, wherein A represents a straight chain C₁₋₁₆ alkylene substituted by n groups of formula B; n represents an integer 1 to 3; and B independently represents C₁₋₄ fluoroalkyl, C₀₋₆ alkylene-, C₁₋₄ fluoroalkylC₀₋₆ alkylene-O-, or C₁₋₄ alkylC₀₋₆ alkylene-O- wherein at least one substituent of formula B contains at least one fluorine atom and each C₁₋₄ fluoroalkyl- moiety contains one or more fluorine atoms but not more than 3 consecutive perfluorinated carbon atoms. The invention also extends to uses of compounds of formula (I) and certain novel compounds within the definition of formula (I).

WO 03/013610 A3

INTERNATIONAL SEARCH REPORT

In International Application No
 .../GB 02/03586

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K9/12 C09K3/30 A61K47/12 C07C53/21 A61K31/56
 A61K31/137

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)

IPC 7 A61K C09K C07C

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, PAJ, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 92 00107 A (GLAXO INC) 9 January 1992 (1992-01-09) cited in the application	1-5,44
Y	page 3, paragraph 4 -page 4, paragraph 1 page 5, paragraph 3 -page 6, paragraph 4 page 7, paragraph 2 examples; table 1 ---	6-14, 31-35,45
X	WO 91 14422 A (MINNESOTA MINING & MFG) 3 October 1991 (1991-10-03) cited in the application	1-5,44
Y	page 2, line 5 -page 3, line 7 page 3, line 32 -page 4, line 15 See Tables 6-12 examples 21-29,77,78 ---	6-14, 31-35,45
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Further documents are listed in the continuation of box C.

Patent family members are listed in 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

7 February 2003

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International Application No

F IB 02/03586

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 021 739 A (SONODA NOBORU ;DAIKIN IND LTD (JP); MURAI SHINJI (JP); OKAMURA OIL) 7 January 1981 (1981-01-07) cited in the application	31
Y	See compounds 11,12,13,23,24,47,48 table 1	1-14, 32-35,44
X	--- MULLER, N. ET AL.: "Investigation of micelle structure by fluorine magnetic resonance. I. Sodium 10,10,10-trifluorocaprato and related compounds" J. PHYS. CHEM., vol. 71, no. 4, March 1967 (1967-03), pages 957-962, XP002230279 See Table I the whole document	31-35
X	--- US 3 498 923 A (BERNETT MARIANNE K ET AL) 3 March 1970 (1970-03-03)	31,32
Y	the whole document	1-14, 33-35, 44,45
X	--- GAVLIN, G. ET AL.: "The synthesis of omega-trifluorostearic acid and omega-trifluoro-n-octadecyl amine" J. ORG. CHEM., vol. 21, December 1956 (1956-12), pages 1342-1347, XP002230280	31,32,43
Y	See "Experimental" the whole document	33-35
X	--- PARK, J.D. ET AL.: "Applicability of the Arndt-Eistert reaction to fluorinated acids and their derivatives" J. ORG. CHEM., vol. 23, August 1958 (1958-08), pages 1166-1169, XP002230281	31,43
Y	See "Experimental" the whole document	32-35
X	--- BRACE, N.O.: "Long chain alkanolic and alkenolic acids with perfluoroalkyl terminal segments" J. ORG. CHEM., vol. 27, December 1962 (1962-12), pages 4491-4498, XP001122366 cited in the application	43
Y	See Tables I and II; Fig. 2 See "Experimental" the whole document	31-35
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INTERNATIONAL SEARCH REPORT

 International Application No
 .../GB 02/03586

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GU, C. ET AL.: "Dissociative and reactive hyperthermal ion-surface collisions..." J. AM. CHEM. SOC., vol. 121, 1999, pages 10554-10562, XP001135063 cited in the application	43
Y	See "Experimental sections" the whole document	31-35
X	--- FR 2 613 357 A (ATOCHEM) 7 October 1988 (1988-10-07) cited in the application	43
Y	page 1, line 33 -page 2, line 37 example 1	31-35
X	--- GRAUPE, M. ET AL.: "Terminally perfluorinated long-chain alkanethiols" J. FLUORINE CHEM., vol. 93, no. 2, 4 February 1999 (1999-02-04), pages 107-115, XP004156221 cited in the application See "Experimental" the whole document -----	43

INTERNATIONAL SEARCH REPORT

national application No.
PCT/GB 02/03586

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.: **1-46 partially**
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:
see FURTHER INFORMATION sheet PCT/ISA/210

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 II Observations where unity of invention is lacking (Continuation of item 2 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 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.:
1-46 (partially)

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

Continuation of Box I.2

Claims Nos.: 1-46 partially

Present claims 1-46 relate to an extremely large number of possible compounds (fluoroalkylalkanoic acids or fluoroalkoxyalkanoic acids); to methods of synthesis thereof; to uses in aerosol formulations as surfactants; and to aerosol formulations containing them.

Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found, however, for only a very small proportion of the compounds claimed. In particular, when $n=2$ or $n=3$, the Markush formula (I) as defined in claim 1 encompasses also a large number of possible branched poly(fluoroalkyl)-, poly(fluoroalkoxy)-, fluoroalkylfluoroalkoxy-, or fluoroalkylalkoxy- alkanolic acids which are not disclosed in the application. The synthesis of such branched alkanolic acids, particularly when the n groups of formula B are not identical, poses additional technical problems which are not addressed in the present application.

It follows, that the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Consequently, the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to the compounds of formula (I) wherein $n=1$, and wherein the alkanolic acid is substituted by a fluoroalkyl or a fluoroalkoxy group on the terminal carbon, i.e. straight-chain fluoroalkyl- or fluoroalkoxyalkanoic acids within the meaning of claims 31 and 35, and 36 and 41, respectively.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-46 partially

First group of inventions: straight-chain 1-alkanoic acids (or salt or solvate thereof) having a terminal fluoroalkyl group; method of preparation thereof; use as surfactants in an aerosol formulation; aerosol formulation comprising them. Each different compound constitutes an independent invention.

1.1. Claims: 13,14,35

Wherein the compound is 11,11,12,12,12-pentafluorododecanoic acid.

1.2. Claims: 13,35

Wherein the compound is 13,13,13-trifluorotridecanoic acid.

1.3. Claim : 13

Wherein the compound is 12,12,12-trifluorododecanoic acid.

1.4. Claim : 13

Wherein the compound is 12,12,13,13,13-pentafluorotridecanoic acid.

2. Claims: 1-46 partially

Second group of inventions: straight-chain 1-alkanoic acids (or salt or solvate thereof) having a terminal fluoroalkoxy group; method of preparation thereof; use as surfactants in an aerosol formulation; aerosol formulation comprising them. Each different compound constitutes an independent invention.

Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 02/03586

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