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20 November 2008

(54) Title: COPOLYMERS USEFUL AS DEMULSIFIERS AND CLARIFIERS

(57) Abstract: A copolymer useful as a demulsifier or water clarifier may be prepared by polymerizing at least one aromatic monomer having one or more polymerizable double bonds; at least one oleophilic monomer having one or more polymerizable double bonds; at least one ionizable monomer having a polymerizable double bond; and at least one hydrophilic monomer having one or more polymerizable double bonds, under polymerization conditions sufficient to prepare a copolymer. The copolymer may, in some embodiments, be prepared and used as a latex.



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INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER
 IPC: C08F 12/02(2006.01),12/30(2006.01),14/14(2006.01),14/16(2006.01),18/00(2006.01),20/00(2006.01),20/10(2006.01),22/00(2006.01),22/38(2006.01),22/40(2006.01),26/06(2006.01),28/02(2006.01),122/40(2006.01),226/06(2006.01)
 USPC: 525/258,262,289,291,292.2,305,307.1,310,317.1,318,318.2,318.3,318.4,318.44,326,329.7,346
 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)
 U.S. : 525/258, 262, 289, 291, 292.2, 305, 307.1, 310, 317.1, 318, 318.2, 318.3, 318.4, 318.44, 326, 329.7, 346

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------------|
| X | US 6,646,086 B2 (SLOAN) 11 November 2003 (11.11.2003), column 5, line 11, to column 6, line 20, column 9, lines 1-13, column 12, lines 54 et seq.). | 1-23 |
| X, P | US 7,160,970 (CREAMER et al) 09 January 2007, column 3, line 56, to column 4, line 15, the Examples and claims. | 1-23 |
| X | US 5,239,028 (NAKAGAWA et al) 24 August 1993 (24.08.1993), the Abstract, column 3, line 36, to column 4, line 51, column 8, line 33, to column 10, line 2. | 1-3, 5, 7-22 |
| X | US 3,438,800 (JOHNSON) 15 April 1969 (15.04.1969), column 4, lines 28-44), column 5, lines 13-59, column 7, lines 29-48. | 1-3, 5, 7-9, 11, 12, 14 |
| X | US 7,115,682 B2 (GUO et al) 03 October 2006 (03.10.2006), the Abstract, column 3, lines 28-52, column 4, lines 7-19, column 9, lines 16-67. | 1-3, 5, 7-16, 19-22 |
| Y | US 4,469,615 (Tsuruoka et al) 04 September 1984 (04.09.1984), column 3, lines 25-37, column 3, line 63, to column 5, line 11. | 1-5, 7-9, 11-14, 19, 21, 22 |

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

"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

"E" earlier application or patent published on or after the international filing date

"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

"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)

"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

"O" document referring to oral disclosure, use, exhibition or other means

"&" document member of the same patent family

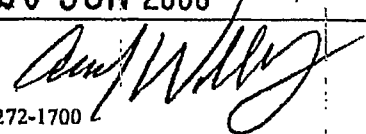
"P" document published prior to the international filing date but later than the priority date claimed

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/66306

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:
Please See Continuation 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 additional fees, this Authority did not invite payment of any 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.: 1-23
- 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.

INTERNATIONAL SEARCH REPORT

International application No.
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BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-20, drawn to a copolymer.

Group II, claim(s) 21 and 22, drawn to a method of making a the copolymer of Group I.

Group III, claim(s) 23, drawn to a method of using the copolymer of Group I.

Group IV, claim(s) 24, drawn to a method of using the copolymer of Group I.

The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Only with regard to Groups III and IV: the Groups are not disclosed as capable of use together and have different functions and effects.

Applicant is entitled to one composition, a method of making that composition and a method of using that composition.
Applicant elected Group III for prosecution with the Groups I and II claims.