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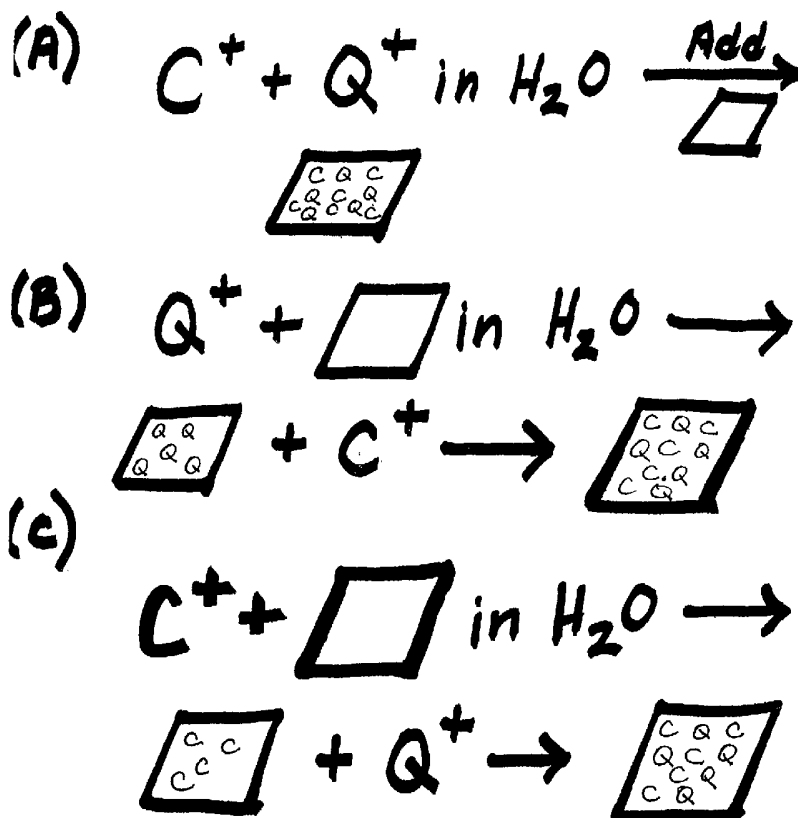
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[Continued on next page]

(54) Title: METHOD FOR INCORPORATING CATIONIC MOLECULES INTO A SUBSTRATE FOR INCREASING DISPERSIBILITY OF CATIONIC MOLECULES



(57) Abstract: The present invention generally provides a method for increasing the dispersibility of an anionic molecule of interest by (A) reacting the cationic molecule C^+ of interest onto the surface of a cationically modified substrate ($[Q^+Q^+]$) having a high surface area. The present invention further provides for the resulting compositions whereby a cationic molecule of interest has been incorporated onto the surface of cationically modified high surface area substrate and where the resulting cation/ cationically modified substrate composition (such as a cation/organoclay composition) experiences greater dispersibility in a target application system than the anionic molecule of interest alone experiences in that same application system. The method of the present invention further serves to substantially reduce the water solubility of the cationic molecule of interest by incorporating it into a cationically modified high surface area substrate such as an organoclay.



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/22446

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B01F 17/00; C04B 14/04; C08K 3/34

US CL : 513/33, 34, 100, 101, 110; 106/487, 488; 524/445, 492; 514/191; 424/401

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. : 513/33, 34, 100, 101, 110; 106/487, 488; 524/445, 492; 514/191; 424/401

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)
Please See Continuation Sheet**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,296,284 A (DURHAM) 22 March 1994 (22.03.1994), see entire document, particularly column 3, lines 43-49; column 6, lines 21 et seq; examples and claims.	1-2, 4-5, 10-12, 16, 18-39
X	US 2,859,234 A (CLEM) 04 November 1958 (04.11.1958), see entire reference; particularly, column 1, lines 42 et seq; column 2, lines 22-28 and 36-38; column 2, lines 64 et seq; column 3, lines 42 et seq; examples and claims.	1-5, 13, 15, 17-21, and 26-27
X --- Y	WO 01/04216 A1 (NEDERLANDSE ORGANISATIE VOOR TOEGEPASTNATUURWETENSCHAPPELIJK ONDERZOEK) 18 January 2001 (18.01.2001), see entire reference; particularly page 5, lines 6-9 and lines 15 et seq; page 6, lines 27 et seq; page 7, lines 21 et seq; page 8, lines 8-11; examples and claims.	1-2, 4-5, 10-12, 16, 18-39 ----- 6-9
X	US 5,516,746 A (ITO) 14 May 1996 (14.05.1996), see entire reference, particularly column 5, lines 16 et seq; column 7, lines 11-42; examples and claims.	1-5, 10-12, 16 and 18-27
X --- Y	US 5,179,065 A (ITO) 12 January 1993 (12.01.1993), see entire reference; particularly the abstract; column 5, lines 9 et seq; column 6, lines 15 et seq; examples and claims.	1-2, 3-5, 10-12, 14, & 18-39 ----- 6-9, 16

☐ 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 application or patent 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

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Name and mailing address of the ISA/US

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International application No.

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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim 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. ☐ Claim 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:
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 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.:

Remark on Protest

☐
☐

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

INTERNATIONAL SEARCH REPORT

PCT/US03/22446

BOX II. 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) 1-17 and 19, drawn to a composition .

Group II, claim(s) 18-21 and 26-27, drawn to methods of making compositions.

Group III, claim(s) 22-25, drawn to methods of making a powder and the powder made.

Group IV, claim(s) 28-39, drawn to methods of making a plastic, polymer or resin and the corresponding plastic, polymer or resin.

The inventions listed as Groups I, II, III, and 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: the prior art cited in this search report is evidence that the claims lack the same or corresponding special technical features because they do not define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art. Said conclusion is evidenced by the art cited in this search report.

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

The species are as follows:

The species include a dye/pigment, a catalyst, a redox agent, and a medicinal substance.

The claims are deemed to correspond to the species listed above in the following manner:

Claims 11, 12, 16, 22-25 and 28-39 correspond to the Dye/pigment,

Claims 13 corresponds to the catalyst,

Claims 14 corresponds to the redox agent, and

Claims 15 and 17 correspond to the medicinal substance.

The following claim(s) are generic: 1-10, 18-21 and 26-27.

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: the claims lack the same or corresponding special technical features because they do not define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art. Said conclusion is evidenced by the art cited in this search report.

Continuation of B. FIELDS SEARCHED Item 3:

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

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EAST/ USPAT, USPGPUB, JPO, EPO, DERWENT

search terms: clay, quatern\$, ((methylene celestine) adj blue), "basic yellow 57", "Jarcol straw yellow", "basic green 4", "basic red 104", (methyl adj green), pyocyanine, phenosafranin, ricinoleic, ricinoleate ricinoleicite, ethylbutanoate, nicotinate, catalyst, redox, zeolite.