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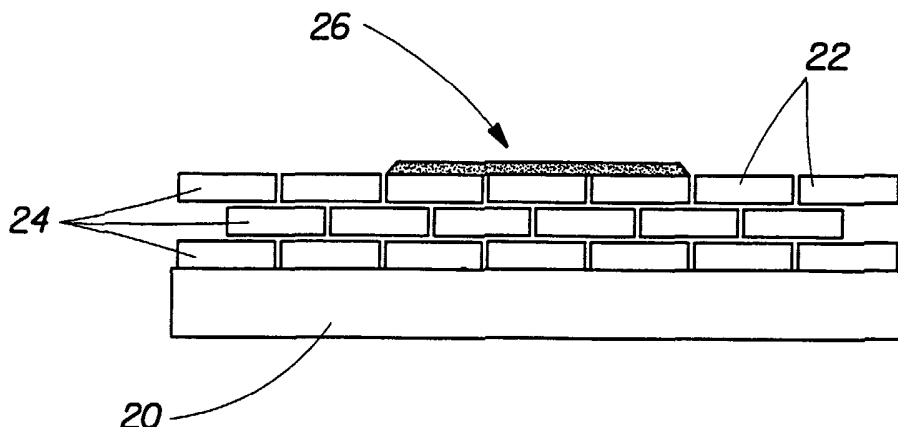
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[Continued on next page]

(54) Title: COATING COMPOSITIONS FOR MODIFYING SURFACES



(57) Abstract: Coating compositions, methods and articles of manufacture comprising a nanoparticle system employing same to impart surface modifying benefits for all types of soft surfaces, and in some cases, hard surfaces, are disclosed. In some embodiments, dispersment of nanoparticles in a suitable carrier medium allows for the creation of coating compositions, methods and articles of manufacture that create multi-use benefits to the modified surfaces. These surface modifications can produce long lasting or semi-permanent multi-use benefits that, in some embodiments, may include at least one of the following improved surface properties: cleaning, wettability, liquid strike-through, comfort, stain resistance, soil removal, malodor control, modification of surface friction, reduced damage to abrasion and color enhancement, relative to the surfaces unmodified with such nanoparticle systems.



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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/02606

## A. CLASSIFICATION OF SUBJECT MATTER

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C09D1/00

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 D06M C11D C09D

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)

WPI Data, PAJ, EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|------------|---|-----------------------|
| X          | DATABASE WPI<br>Week 199937<br>Derwent Publications Ltd., London, GB;<br>AN 1999-439776<br>XP002210192<br>"Hydrophilic coating composition"<br>& JP 11 181339 A (TOTO LTD),<br>6 July 1999 (1999-07-06)<br>cited in the application<br>abstract | 1,5,6,9               |
| X          | ---<br>EP 0 474 415 A (ROHM & HAAS)<br>11 March 1992 (1992-03-11)<br>page 2, line 7 - line 11<br>page 3, line 13 - line 53<br>page 4, line 52 - line 56<br>page 5, line 19 - line 27<br>---   | 1,3,4,9               |
| Y          | ---<br>-/--   | 10                    |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents :

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

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"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.

"&amp;" document member of the same patent family

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## INTERNATIONAL SEARCH REPORT

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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. |
|------------|--|-----------------------|
| Y          | WO 98 01223 A (YEISER JOHN)<br>15 January 1998 (1998-01-15)<br>claims<br>---                                     | 10                    |
| X          | US 5 364 550 A (MANZO ROBERT P ET AL)<br>15 November 1994 (1994-11-15)<br>claims<br>---                          | 1,3,9                 |
| X          | WO 97 28303 A (MINNESOTA MINING & MFG)<br>7 August 1997 (1997-08-07)<br>page 5, line 17 -page 20, line 14<br>--- | 1,3-6,11              |
| X,P        | WO 01 96511 A (PROCTER & GAMBLE)<br>20 December 2001 (2001-12-20)<br>claims<br>-----                             | 1,3,4,<br>10,11       |

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 02/02606

## 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.:  
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 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, 3-7, 11, 9, 10

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ 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: 1,3-7,11,9,10

A coating composition comprising a suitable carrier medium and a plurality of nanoparticles in said carrier medium, said nanoparticles comprising a first group of nanoparticles which comprises at least one type of nanoparticle material other than 2:1 layered silicates.

Group I concerns a coating composition wherein at least one type of nanoparticle material is other than 2:1 layered silicates.

Under this aspect the method claim 9 and the article claimed in claim 10 fall within the scope of group I.

2. Claims: 2-7,11,9,10

A coating composition comprising a suitable carrier medium and a plurality of nanoparticles in said carrier medium wherein the nanoparticles have an aspect ratio of less than 10 and a particle size between greater than 0 and less than or equal to 750 nanometers.

Group II concerns a coating composition comprising nanoparticles which have an aspect ratio of less than 10 and a particle size between greater than 0 and less than or equal to 750 nanometers.

Under this aspect the method claim 9 and the article claimed in claim 10 fall within the scope of group II.

3. Claim : 8

A method of applying a nanoparticle coating composition onto a soft surface wherein said composition is sprayed onto said surface.

4. Claims: 12-14

A method of rendering a material hydrophilic, said method characterized in that it comprises the steps of:

- a) providing a material comprised of hydrophobic or borderline hydrophilic components;
- b) applying a high energy surface treatment to said material to form a treated material and
- c) applying a plurality of nanoparticles to said treated material.

5. Claim : 15

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

A method of applying a plurality of nanoparticles to a surface, said method characterized in that it comprises the steps of:

- a) providing a surface;
- b) providing a composition comprising a plurality of nanoparticles and
- c) printing said nanoparticles in said composition onto said surface using inkjet printing.

6. Claims: 16-20

A colour-enhanced surface, said surface characterized in that it comprises at least some colour regions, wherein at least some of said colour regions having a plurality of nanoparticles thereon, and said nanoparticles have a particle size distribution of less than or equal to about 750 nanometers and a refractive index of greater than or equal to about 1:3.

Group VI concerns the use of nanoparticles having a particle size distribution of less than or equal to about 750 nanometers and a refractive index of greater than or equal to about 1:3.

Under this aspect the method claim 19 fall within the scope of group VI.

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/02606

| Patent document<br>cited in search report |   | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
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