

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
27 December 2007 (27.12.2007)

PCT

(10) International Publication Number
WO 2007/147745 A1

(51) International Patent Classification:

C11D 3/40 (2006.01)

(21) International Application Number:

PCT/EP2007/055699

(22) International Filing Date: 11 June 2007 (11.06.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

06115817.6 21 June 2006 (21.06.2006) EP

(71) Applicant (for all designated States except US): **CIBA SPECIALTY CHEMICALS HOLDING INC.** [CH/CH]; Klybeckstrasse 141, CH-4057 Basel (CH).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MERKLE, Gerhard** [DE/DE]; Bürgerwehrstrasse 12, 79102 Freiburg (DE). **EVANGELISTA, Leonardo Giuseppe** [CA/CH]; Gundeldingerrain 37, CH-4059 Basel (CH). **DUBINI, Mario** [CH/CH]; Härelenstrasse 29, CH-4435 Niederdorf (CH).

(74) Common Representative: **CIBA SPECIALTY CHEMICALS HOLDING INC.**; Patent Department, Klybeckstrasse 141, CH-4057 Basel (CH).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HAND-WASHING PROCESS OF LAUNDRY

(57) Abstract: A method of hand-washing of laundry is provided which comprises treating the laundry with a washing liquor containing a detergent composition comprising a surfactant and a metal complexing agent as an indicator compound indicating the current effective activity of the washing liquor. Consequently, the washing liquor can be always maintained at its optimal cleaning strength so that good washing results are obtained.



WO 2007/147745 A1

Hand-washing process of laundry

The present invention relates to a method for evaluating the effective hand-washing of laundry by using a color indicator system which facilitates indicating to the user the current effective activity, i.e. the actual amount of detergent in a washing liquor available to be delivered onto the laundry substrate. The color indicator system uses metal-complexing agents (dyes) that show an observable change of color upon complexation with selected metal cations.

In many (eastern and southern) countries hand washing processes of laundry are very common. These processes are very often continuous processes, not carried out in a washing machine (batch process), but in open basins. The process of measuring the amount of soap (detergent) and water per load of laundry is, as a rule, not optimally performed, particularly with regard to water hardness.

Regularly, too much detergent is used to quench the cations, e.g. calcium, magnesium and/or iron cations, responsible for water hardness, on the one hand, while on the other hand, timely attention is not drawn to the matter of fact that the washing liquor may become depleted, and will lose, therefore, its optimal activity (cleaning strength), leading to incomplete and uncomfortable washing results.

It has now been found that this problem can be solved by a real time visual guide to the consumer indicated by the color (color change) of the laundry liquor. The visual indication assists the consumers in ensuring them that during the whole washing process the laundry is being subjected to an optimal cleaning environment irrespective of e.g. the water quality or the amount of laundry to be washed.

As the washing liquor loses its cleaning strength (depletion of detergents), there is a visual color change, which prompts the consumer to revitalize the depleted washing liquor.

In one aspect of the present invention, therefore, there is provided a method of hand-washing of laundry which comprises treating the laundry with a washing liquor containing a detergent composition comprising a surfactant and a metal complexing agent as an indicator compound indicating the current effective activity of the washing liquor.

In another aspect, the invention provides a detergent composition for a hand-washing process of laundry which comprises a metal-complexing agent in uncomplexed form as an indicator compound indicating the current effective activity of a washing liquor by an observable color change when in contact (being complexed) with certain cations.

5

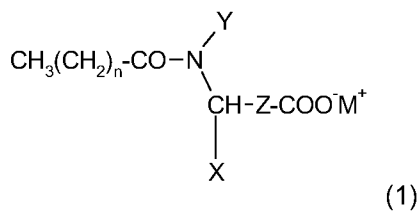
In still another aspect of the invention, there is provided the use of a metal complexing agent as an indicator compound indicating the current effective activity of the washing liquor in a hand-washing process of laundry.

10 These and other aspects of the present invention will be described in more detailed manner in the following.

Suitable surfactants useful in compositions for the inventive hand-washing method may be selected from the group consisting of anionic, non-ionic, amphoteric or zwitter-ionic, or
15 cationic surfactants, or mixtures thereof.

Suitable anionic surfactants are for example

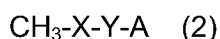
- sulfates, for example fatty alcohol sulfates, the alkyl chain of which has from 8 to 18 carbon atoms, for example sulfated lauryl alcohol;
- 20 - fatty alcohol ether sulfates, for example the acid esters or salts thereof of a polyaddition product of from 2 to 30 mol of ethylene oxide and 1 mol of a C₈-C₂₂ fatty alcohol;
- alkylamide sulfates;
- alkylamine sulfates, for example monoethanolamine lauryl sulfate;
- alkylamide ether sulfates;
- 25 - alkylaryl polyether sulfates;
- monoglyceride sulfates;
- alkanesulfonates, the alkyl chain of which contains from 8 to 20 carbon atoms, for example dodecyl sulfonate;
- alkylamide sulfonates;
- 30 - alkylaryl sulfonates;
- α -olefin sulfonates;
- sulfosuccinic acid derivatives, for example alkyl sulfosuccinates, alkyl ether sulfosuccinates or alkylsulfosuccinamide derivatives;
- N-[alkylamidoalkyl]amino acids of formula



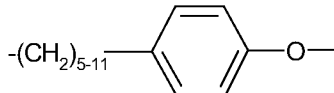
wherein

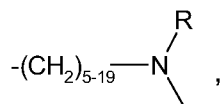
- X is hydrogen, C₁-C₄alkyl or -COO⁻M⁺,
- Y is hydrogen or C₁-C₄alkyl,
- 5 Z -(CH₂)_{m₁}
- m₁ is an integer of 1 to 5,
- n is an integer from 6 to 18 and
- M is an alkali metal cation or amine cation,
- alkyl and alkylaryl ether carboxylates of formula

10



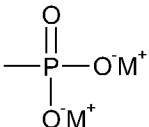
wherein

- X is a radical of formula -(CH₂)₅₋₁₉-O-,  or



15

- R is hydrogen or C₁-C₄alkyl,
- Y is -(CHCHO)₁₋₅₀-,

- A is (CH₂)_{m₂-1}-COO⁻M⁺ or 

- m₂ is an integer of 1 to 6 and
- M is an alkali metal cation or amine cation.

20

Also used as anionic surfactants are fatty acid methyl taurides, alkyl isothionates, fatty acid polypeptide condensation products and fatty alcohol phosphoric acid esters. The alkyl radicals occurring in those compounds preferably have from 8 to 24 carbon atoms.

The anionic surfactants may be generally in the form of their water-soluble salts, such as the alkali metal, ammonium or amine salts. Examples of such salts include lithium, sodium, potassium, ammonium, triethylamine, ethanolamine, diethanolamine and triethanolamine salts. The sodium, potassium or ammonium ($\text{NR}_1\text{R}_2\text{R}_3\text{R}_4$) salts, especially, are used, with R_1 ,
5 R_2 , R_3 and R_4 each independently of the others being hydrogen, C_1 - C_4 alkyl or C_1 - C_4 hydroxyalkyl.

As further anionic surfactants there may also be used the salts of saturated and unsaturated C_8 - C_{22} fatty acids either alone or in the form of a mixture with one another or in the form of a
10 mixture with other surfactants mentioned above. Examples of such fatty acids include, for example, capric, lauric, myristic, palmitic, stearic, arachidic, behenic, caproic, dodecenoic, tetradecenoic, octadecenoic, oleic, eicosenoic and erucic acid, and the commercial mixtures of such acids, such as, for example, coconut fatty acid. Such acids are present in the form of salts, there coming into consideration as cations alkali metal cations, such as sodium and
15 potassium cations, metal atoms, such as zinc and aluminium atoms, and nitrogen-containing organic compounds of sufficient alkalinity, such as amines and ethoxylated amines. Such salts may also be prepared *in situ*.

Especially preferred anionic surfactants in the composition according to the invention are
20 monoethanolamine lauryl sulfate or the alkali metal salts of fatty alcohol sulfates, especially sodium lauryl sulfate and the reaction product of from 2 to 4 mol of ethylene oxide and sodium lauryl ether sulfate.

Suitable zwitter-ionic and amphoteric surfactants include C_8 - C_{18} betaines,
25 C_8 - C_{18} sulfobetaines, C_8 - C_{24} alkylamido- C_1 - C_4 alkylenebetaines, imidazoline carboxylates, alkylamphocarboxylic acids, alkylamphocarboxylic acids (e.g. lauroamphoglycinate) and N-alkyl- β -aminopropionates or -iminodipropionates, with preference being given to C_{10} - C_{20} alkylamido- C_1 - C_4 alkylenebetaines and especially to coconut fatty acid amide propylbetaine.

30 Nonionic surfactants that may be mentioned include, for example, derivatives of the adducts of propylene oxide/ethylene oxide having a molecular weight of from 1000 to 15 000, fatty alcohol ethoxylates (1-50 EO), alkylphenol polyglycol ethers (1-50 EO), polyglucosides, ethoxylated hydrocarbons, fatty acid glycol partial esters, for example diethylene glycol

monostearate, fatty acid alkanolamides and dialkanolamides, fatty acid alkanolamide ethoxylates and fatty amine oxides.

5 Cationic surfactants when utilized in the detergent compositions of the present invention may be selected e.g. from alkoxylate quaternary ammonium compounds, dimethyl-hydroxyethyl quaternary ammonium compounds, polyamine cationic surfactants and cationic ester surfactants (cf. US-A-6'136'769, 6'004'922, 6'022'844 and WO 98/35002).

10 Suitable cationic surfactants may also be selected from compounds also known as fabric softening additives such as ditallow dimethyl ammonium chloride, tritallow methyl ammonium chloride, ditallowoyl-oxyethyl dimethyl ammonium chloride, dihydrogenated-tallowoyl-oxyethyl dimethyl ammonium chloride, methyl bis(tallow amido ethyl)-2-hydroxyethyl ammonium methyl sulfate and others; and also mixtures thereof.

15 The surfactants may be present in the detergent compositions in effective amounts known to the artisan. The upper limit may be at about 40% by weight of the composition.

20 Suitable and preferred metal-complexing agents are metal complexing dyes which are used in their uncomplexed form in the detergent compositions. They provide an observable color change when in contact (complexed) with selected cations which are generally those responsible for the hardness of water. Preferably they are the cations of alkaline earth metals (e.g. Mg^{++} , Ca^{++} , Sr^{++} , Ba^{++}), rare earth metals (e.g. La^{+++}), manganese (e.g. Mn^{++} , Mn^{4+}) and iron (e.g. Fe^{3+}), or mixtures thereof.

25 The cations are present in form of their salts which may be e.g. the carbonates, hydrogen-carbonates, the sulfates, phosphates, silicates and also some chlorides, nitrates, oxides and hydroxides; further also the water-insoluble salts (Ca-, Mg-salts) of tensides, comprising e.g. the salts of C_6 - C_{22} -, preferably C_8 - C_{18} -fatty acids.

30 Suitable indicator compounds may be compounds of aromatic and/or heterocyclic hydrocarbon ring structure containing at least one OH-group bonded to a carbon atom of that ring structure, mesomeric structures of the OH-group, viz. $-O^-$ and $=O$ are also comprised

Preferred are indicator compounds which are metal complexing dyes selected from the group consisting of mono-, dis- and tris-azo dyes, nitroso dyes, triphenylmethane dyes (phthaleines

and sulfo-phthaleines), xanthenes, thioxanthenes and acridines, or mixtures thereof. These dyes are known compounds which are used e.g. as indicators in complexometric titrations.

5 Examples for the azo-type dyes are 3-hydroxy-4-(2-hydroxy-4-sulfo-1-naphthylazo)-2-naphthalene carboxylic acid (Calconcarboxylic Acid^R), 3-hydroxy-1-(1-hydroxy-4-methyl-2-phenylazo)-4-naphthalene sulfonic acid (Calmagite^R), 1',2'-dihydroxy-6-nitro-1,2'-azonaphthalene-4-sulfonic acid (Eriochrome^R Black T), sodium 1-azo-2-hydroxy-3-(2,4-dimethylcarboxyanilido)naphthalene-1'-(2-hydroxybenzene-5-sulfonate) (Xylidyl^R Blue), 1,8-dihydroxy-2-(4-sulfophenylazo)-naphthalene-3,6-disulfonic acid (Azochromotrop^R Sulfonic acid) and the tris-azo dye Diamine Green^R.

A nitroso dye is for example di-sodium-3-hydroxy-4-nitroso-naphthalene-2,7-disulfonate (Nitroso-R-Salt^R).

15 Phthaleines and sulfophthaleines are e.g. 3,3'-dimethyl-phenolphthaleine (o-Cresolphthaleine), p-xylenolesulfophthaleine (Xylenol Blue^R), pyrogallolsulfo-phthaleine (Pyrogallol Red^R) or 3,3',5,5'-tetrabromo-phenolsulfophthaleine (Bromophenol Blue^R)

20 A xanthene dye is fluoresceine-2,7-bis(methyleneimino)-di-acetic acid, di.sodium salt (Calcein^R).

Further, the ammonium salt of purpuric acid (Murexide^R).

25 The following table shows the test results of some complexing dyes with standard soaps (based on Ca/Mg/metal complexometry).

Commercial Chemical Name	Initial colour (Water)	Initial Colour of Soap with Basel HardWater	Effect observed after adding more Hardwater
Calcein	colorless	colorless	Fluorescence emitting
Sulfonic acid, Azochromotrop	Light red	Light purple	No color change
o-Cresolphthalein complexon	Clear	purple	No color change
Murexide	Purple	Light pink	No color change
Nitroso-R salt	Yellow	Light yellow/green	Light yellow

Commercial Chemical Name	Initial colour (Water)	Initial Colour of Soap with Basel HardWater	Effect observed after adding more Hardwater
Diamine Green	Green/blue	Same	Gets bluer
Bromopyrogallol red	Red	Reddish	Pink
Calmagite	Red wine	Purple/blue	Purple/pink
Calconcarboxylic acid	Purple	Light blue	Purple
Eriochrome Black	Purple	Light blue/purple	Blue to purple
Xylidyl Blue, Na Salt	Purple	Pink	Purple to pink

The metal-complexing compounds (dyes) may be added to the detergent composition in any suitable form, for example in a solid form like powders, granules, tablets, capsules or combinations of any of these forms; or in liquid or semi-liquid (gel) form.

5

In these particular forms the metal-complexing dyes show a certain stability so that a controlled release to the washing liquor is given; on the other hand the carrier material should not unusually retard the desired dissolution/disintegration step to release the needed amount of the complexing dyes.

10 Corresponding techniques to prepare such carriers containing active agents by mixing, grinding, precipitation, granulation, encapsulation, tableting and other methods are well known in the art.

15 The detergent compositions comprise an effective amount of the metal-complexing dye in its uncomplexed form, preferably from 0.001 to 0.5%, or according to more preferred embodiments from 0.01 to 0.2% or from 0.01 to 0.1% by weight of the whole composition. As used herein, "uncomplexed" means that the metal-complexing dye has not yet interacted with a metal ion to give the desired visual indication.

20 In addition to the components mentioned, the detergents may generally contain one or more of the following components:

- inorganic and organic acids, like hydrochloric acid, phosphoric acid, citric acid, acetic acid or sulfuric acid,
- 25 - for basic products inorganic (NaOH or KOH) or organic bases like triethanolamine,
- abrasives for improved cleaning of surfaces, such as silicas, seed kernel or polyethylene
- waxes and/or silicones for maintenance and protection of surfaces,

- polyphosphates,
- substances, which eliminate hypochlorite or halogens;
- peroxides comprising bleaching activators like TAED, for example sodium perborate, H₂O₂ or hypochlorite;
- 5 - enzymes;
- filling agents like silicates, polyphosphates, such as sodium or potassium triphosphate, zeolites for powdery cleaning agents;
- pigments, lakes or soluble dyes;
- fluorescent whitening agents (FWAs);
- 10 photo catalysts;
- dye fixatives;
- perfumes; and
- light stabilizers, antioxidants, antimicrobials, UV-absorbers and chelating agents
(cf. for example WO 2004/050815)

15

These components as well as their use in laundry detergent compositions are well known in the art.

The inventive method of hand-washing of laundry may be carried out for example in open washing troughs or corresponding basins at temperatures of about 20 to 50°C, preferably 20
20 to 35°C.

The following examples describe the present invention in further detail. However, the present invention is not limited to these examples.

25 Parts and percentages are by weight, if not otherwise indicated. The temperature is indicated in degrees centigrade.

30

Examples

Example 1

5 Depleted washing liquor: need for more detergent:

3g/l of a commercial detergent containing the indicator Calmagite (0.00667% o.w.o.d.) in form of speckles is added to 500 ml of an aqueous solution containing 37.5 mg of CaCO_3 . The color of this washing liquor changes to blue: a indication that the free (undesired) Ca-ions are fully complexed by sodium tripolyphosphate (STPP) or other sequestrants.

10 When adding more hard water (containing 75 ppm of CaCO_3) the color of the washing liquor changes to red-violet (indicating free Ca^{++} ions), whereas the blue color returns when detergent (containing said indicator) is added.

Preparation of the speckles: 0.25 g of Calmagite is dissolved in 1000 ml of water (stock
15 solution). 3 g of sodium chloride (NaCl) are dissolved in 8 ml of this stock solution. The water is evaporated and the obtained dry crystalline mixture of Calmagite and NaCl is then granulated through a sieve with a mesh size lower than 800 μm to form speckles. With a second sieve having a mesh size lower than 315 μm dust is removed from the speckles. The speckles can be used as indicated above in this Example. 0.15 g of the speckles are
20 added to 1.5 g of detergent, the final concentration of Calmagite in the detergent is about 0.007%.

Example 2

25 Deactivation of detergent

(a) Preparation of soiled textiles:

Swatches of cotton fabric (weight 5 g each) are wetted with deionized water, then 50 mg of garden mud was added as homogenously as possible to the swatches. The garden mud is then removed from the surface of the swatches and they are washed with a washing liquor
30 containing a detergent. The washing and rinsing liquors used are free of Ca^{++} and Mg^{++} ions. After the washing step, the swatches are not completely unsoiled.

After drying the swatches an aqueous solution of CaCO_3 is dropped onto the swatches (5.6 mg Ca on each swatch) which are then dried again. The so prepared swatches are used in the following washing experiment.

(b) Washing experiment.

3 g/l of a detergent (e.g. Syndet^R 2) containing the indicator compound Calmagite^R (0.00667% o.w.o.d.) in form of speckles are added to 500 ml of an aqueous solution containing 117.5 mg CaCO₃.

5 The color of the washing liquor changes to blue.

This shows that free (undesired) Ca⁺⁺ ions are fully complexed by STPP or other sequestrants and indicates to the user that the washing liquor is ready to use.

A first soiled swatches is hand-washed in this liquor and after a short swirling wash motion removed from it.

10 A second soiled swatch is washed like the first one, and when a third soiled swatch is washed, the color of the washing liquor turns to red-violet.

By this color change, the user is informed that the maximum cleaning performance is no longer given: the washing liquor is depleted (STPP consumption due to water hardness).

15 By adding more detergent containing the indicator compound speckles, the color of the washing liquor changes again to blue indicating its full cleaning strength.

20

25

30

Claims

1. A method of hand-washing of laundry which comprises treating the laundry with a washing liquor containing a detergent composition comprising a surfactant and a metal-complexing agent as an indicator compound indicating the current effective activity of the washing liquor.
5
2. The method according to claim 1 wherein the surfactant is an anionic, a non-ionic, an amphoteric or zwitter-ionic or a cationic surfactant, or a mixture thereof.
- 10 3. The method according to claim 1 wherein the metal-complexing agent is a metal-complexing dye.
4. The method according to claim 3 wherein the metal-complexing dye provides an observable color change when in contact with selected cations.
15
5. The method according to claim 4 wherein the selected cations are those responsible for the hardness of water, preferably the cations of alkaline earth metals, rare earth metals, manganese and iron, or mixtures thereof.
- 20 6. The method according to claim 1 wherein the metal-complexing agent (indicator compound) comprises compounds of aromatic and/or heterocyclic hydrocarbon ring structure containing at least one OH-group bonded to a carbon atom of said ring structure.
7. The method according to claim 6 wherein the indicator compounds are metal complexing dyes selected from the group consisting of mono-, dis- and tris-azo dyes, nitroso dyes, triphenylmethan dyes (phthaleine and sulfo-phthaleine dyes), (thio)xanthenes, acridines or mixtures thereof.
25
8. The method according to claim 1 which comprises treating the laundry with the washing liquor at temperatures of 20 to 50°C, preferably 20 to 35°C.
30
9. A detergent composition for a hand-washing process of laundry which comprises a metal-complexing agent in uncomplexed form as an indicator compound indicating the current

effective activity of a washing liquor by an observable color change when in contact with selected cations.

10. The detergent composition according to claim 9 wherein the selected cations are those
5 responsible for the hardness of water, preferably the cations of alkaline earth metals, rare earth metals, manganese and iron, or mixtures thereof.

11. The detergent composition according to claim 9 wherein the metal-complexing agents
10 comprises compounds of aromatic and/or heterocyclic hydrocarbon ring structure containing at least one OH-group bonded to a carbon atom of said ring structure.

12. The detergent composition according to claim 11 wherein the metal-complexing agent in
uncomplexed form is a metal complexing dye selected from the group consisting of mono-,
dis- and tris-azo dyes, nitroso dyes, triphenylmethan dyes (phthaleine and sulfo-phthaleine
15 dyes), (thio)xanthenes, acridines or mixtures thereof

13. The detergent composition according to claim 9 comprising from 0.001 to 0.5% by weight
of the composition of the metal-complexing agent in uncomplexed form.

20 14. Use of a metal complexing agent as an indicator compound indicating the current effective activity of the washing liquor in a hand-washing process of laundry.

15. The use according to claim 13 wherein the metal complexing agent is a metal complexing
dye providing an observable color change when in contact with selected cations.

25

16. The use according to claim 14 wherein the metal-complexing agent (indicator compound)
comprises compounds of aromatic and/or heterocyclic hydrocarbon ring structure containing
at least one OH-group bonded to a carbon atom of said ring structure.

30 17. The use according to claim 16 wherein the metal complexing agent is a metal-complexing dye selected from the group consisting of mono-, dis- and tris-azo dyes, nitroso dyes, triphenylmethan dyes (phthaleine and sulfo-phthaleine dyes), (thio)xanthenes,

acridines or mixtures thereof, and the selected cations are those responsible for the hardness of water, preferably the cations of alkaline earth metals, rare earth metals, manganese and iron, or mixtures thereof.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2007/055699

A. CLASSIFICATION OF SUBJECT MATTER

INV. C11D3/40

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)
C11D

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/041739 A (THE PROCTER & GAMBLE COMPANY) 20 April 2006 (2006-04-20) page 3 - page 7; claims; tables	1-17
X	US 5 180 517 A (WOODS ET AL) 19 January 1993 (1993-01-19) column 4; claims; examples	1-17
X	GB 1 313 180 A (UNILEVER LTD) 11 April 1973 (1973-04-11) page 2, line 118 - page 3, line 14; claims; example 2	9-13
	----- -/--	

 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 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.
- *G* document member of the same patent family

Date of the actual completion of the international search

24 August 2007

Date of mailing of the international search report

21/09/2007

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Pfannenstein, Heide

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2007/055699

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE WPI Section Ch, Week 199317 Derwent Publications Ltd., London, GB; Class A97, AN 1993-141619 XP002397885 & SU 1 731 794 A1 (SINTEZPAV SCI PRDN ASSOC) 7 May 1992 (1992-05-07) abstract -----	1-17
X	DE 25 32 532 A1 (LONZA AG) 26 February 1976 (1976-02-26) page 2; claims -----	9-13
X	AT 337 330 B (DAINICHISEIKA COLOR CHEM [JP]) 27 June 1977 (1977-06-27) claims; examples -----	1-17

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2007/055699

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2006041739	A	20-04-2006	NONE	
US 5180517	A	19-01-1993	CA 2072757 A1	06-05-1992
			EP 0507917 A1	14-10-1992
			JP 2558407 B2	27-11-1996
			JP 5502852 T	20-05-1993
			WO 9207790 A1	14-05-1992
			US 5326494 A	05-07-1994
GB 1313180	A	11-04-1973	AT 326798 B	29-12-1975
			BE 773003 A1	23-03-1972
			CH 564598 A5	31-07-1975
			DE 2147268 A1	30-03-1972
			ES 395327 A1	16-09-1975
			FR 2108419 A5	19-05-1972
			IT 942622 B	02-04-1973
SU 1731794	A1	07-05-1992	NONE	
DE 2532532	A1	26-02-1976	CH 609310 A5	28-02-1979
			FR 2276397 A1	23-01-1976
			IT 1041130 B	10-01-1980
			SE 7508726 A	09-02-1976
AT 337330	B	27-06-1977	NONE	