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(54) **LAUNDRY TREATMENT COMPOSITIONS**

ZUSAMMENSETZUNGEN ZUR WÄSCHEBEHANDLUNG

COMPOSITIONS DE TRAITEMENT DE BLANCHISSERIE

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Description**FIELD OF INVENTION**

5 [0001] The present invention relates to use of insoluble ester wax particles to prevent damage to clothes.

BACKGROUND

10 [0002] Coloured clothes are extremely popular with consumers. To remove dirt on washing, the clothes are vigorously agitated in water with a washing formulation. This process leads to damage on the surface of the clothes, which reduces their aesthetic appeal. This damage is particularly a problem when granular laundry compositions are used.

[0003] US 2006/0052271 discloses a method of treating fabrics for reducing fabric abrasion in the wash, the method comprising applying to the fabrics in a wash liquor a polysaccharide and deformable, water-insoluble particles of a size in the range 0.05-5 microns.

15 [0004] EP 1 478 720 (Procter & Gamble) discloses the use of dispersible polyolefin waxes in detergent formulations with mean particle sizes from 5nm to 5 microns.

SUMMARY OF INVENTION

20 [0005] We have found that insoluble ester wax particles provide improved colour care by reducing damage caused by fabric laundering.

[0006] The invention provides the use of insoluble ester wax particles to prevent damage to clothes being laundered during a domestic main wash process.

DETAILED DESCRIPTION OF THE INVENTION

[0007] The amount of components present in the laundry treatment composition quoted herein are wt.% of total composition unless otherwise stated.

30 [0008] Except in the operating and comparative examples, or where otherwise explicitly indicated, all numbers in this description indicating amounts or ratios of materials or conditions of reaction, physical properties of materials and/or use are to be understood as modified by the word "about".

[0009] The laundry treatment composition may take the form of an isotropic liquid, a surfactant-structured liquid, a granular, spray-dried or dry-blended powder, a tablet, a paste, a molded solid or any other laundry detergent form known to those skilled in the art. The composition is preferably a liquid or granular laundry composition, most preferably a granular laundry composition.

35 [0010] An ester wax is obtained by a condensation reaction of carboxylic acid and alcohol to form an ester. The ester wax molecules contain less than three ester linkages per molecule. Preferably the ester wax molecule contains only one ester linkage per molecule.

[0011] The ester wax may be a natural secretions of plants or animals, artificially produced by purification from natural petroleum or completely synthetic.

40 [0012] The insoluble ester wax particle can be made from a single ester wax type, or from a mixture of two or more ester wax types.

[0013] By 'insoluble' used herein in relation to the ester wax particles, it is meant that the ester wax particle should not dissolve in water or surfactant solutions. Such that when 1g/L of particles are placed into an aqueous solution containing 2g/L of sodium dodecyl sulphate at room temperature and shaken at 100 RPM on a rotator shaker at 293K for 2 hours, then removed from solution by filtering through a sieve or filter paper of appropriate size and dried, then the weight of the particle removed is within 95% more preferably 99% by weight of that added.

[0014] The insoluble ester wax particles are present in the laundry treatment composition at a level of from 0.05 to 40 wt.%, preferably from 0.1 to 5 wt.%.

50 [0015] The insoluble ester wax particle has a size of from 1 to 3000 microns, preferably from 5 to 2500 microns.

[0016] The size of the insoluble ester wax particle means the maximum value of the largest dimension of the particle.

[0017] The size of the insoluble ester wax particle is measured using graded sieves and it is that which is retained or passes through such sieves.

55 [0018] The insoluble ester wax particle comprises one or more ester wax molecules at a level of greater than 50% by weight of the particle, preferably greater than 70% by weight of the particle. For example the insoluble ester wax particle may comprise one or more ester wax molecules at a level of greater than 50 wt.% to 100 wt.% or preferably greater than 70 wt.% to 100 wt.% by weight of ester wax particle.

[0019] The insoluble ester wax particle may contain other chemical species, for example alkanes, fatty acids, primary

and secondary alcohols, diols, ketones, aldehydes. If present at all, they are present at a level of less than 50%, preferably 70% by weight of ester wax particle.

[0020] The ester wax molecules present in the insoluble ester wax particle have a molecular weight of less than 5000 Dalton, preferably less than 2000 Dalton. The molecular weight may be measured by standard chemical techniques such as mass spectroscopy.

[0021] For the avoidance of doubt, the ester wax molecules which make up the insoluble ester wax particle described herein are not triglyceride esters of glycerine (propan-1,2,3-triol) with three fatty acids.

[0022] The insoluble ester wax particle is thus free from triglyceride esters of glycerine (propan-1,2,3-triol) with three fatty acids.

[0023] In an alternative embodiment, the insoluble ester wax particle does not contain any ester wax molecules that comprise cationic groups.

[0024] Preferably the insoluble ester wax particle is free from cationic groups.

[0025] Preferably the insoluble ester wax particles are white such that when their colour is measured using a reflectometer (UV excluded) and expressed as CIE $L^*a^*b^*$ values, $L^*>70$, a^* is between -3 and +3 and b^* is between 5 and -10.

SURFACTANT

[0026] The composition comprises between 2 to 70 wt.% of a surfactant, most preferably 10 to 30 wt.%. In general, the nonionic and anionic surfactants of the surfactant system may be chosen from the surfactants described "Surface Active Agents" Vol. 1, by Schwartz & Perry, Interscience 1949, Vol. 2 by Schwartz, Perry & Berch, Interscience 1958, in the current edition of "McCutcheon's Emulsifiers and Detergents" published by Manufacturing Confectioners Company or in "Tenside-Taschenbuch", H. Stache, 2nd Edn., Carl Hauser Verlag, 1981. Preferably the surfactants used are saturated.

[0027] Suitable nonionic detergent compounds which may be used include, in particular, the reaction products of compounds having a hydrophobic group and a reactive hydrogen atom, for example, aliphatic alcohols, acids, amides or alkyl phenols with alkylene oxides, especially ethylene oxide either alone or with propylene oxide. Specific nonionic detergent compounds are C_6 to C_{22} alkyl phenol-ethylene oxide condensates, generally 5 to 25 EO, i.e. 5 to 25 units of ethylene oxide per molecule, and the condensation products of aliphatic C_8 to C_{18} primary or secondary linear or branched alcohols with ethylene oxide, generally 5 to 40 EO.

[0028] Suitable anionic detergent compounds which may be used are usually water-soluble alkali metal salts of organic sulphates and sulphonates having alkyl radicals containing from about 8 to about 22 carbon atoms, the term alkyl being used to include the alkyl portion of higher acyl radicals. Examples of suitable synthetic anionic detergent compounds are sodium and potassium alkyl sulphates, especially those obtained by sulphating higher C_8 to C_{18} alcohols, produced for example from tallow or coconut oil, sodium and potassium alkyl C_9 to C_{20} benzene sulphonates, particularly sodium linear secondary alkyl C_{10} to C_{15} benzene sulphonates; and sodium alkyl glyceryl ether sulphates, especially those ethers of the higher alcohols derived from tallow or coconut oil and synthetic alcohols derived from petroleum. The preferred anionic detergent compounds are sodium C_{11} to C_{15} alkyl benzene sulphonates and sodium C_{12} to C_{18} alkyl sulphates. Also applicable are surfactants such as those described in EP-A-328 177 (Unilever), which show resistance to salting-out, the alkyl polyglycoside surfactants described in EP-A-070 074, and alkyl monoglycosides.

[0029] Preferred surfactant systems are mixtures of anionic with nonionic detergent active materials, in particular the groups and examples of anionic and nonionic surfactants pointed out in EP-A-346 995 (Unilever). Especially preferred is surfactant system that is a mixture of an alkali metal salt of a C_{16} to C_{18} primary alcohol sulphate together with a C_{12} to C_{15} primary alcohol 3 to 7 EO ethoxylate.

[0030] The nonionic detergent is preferably present in amounts greater than 10%, e.g. 25 to 90 wt.% of the surfactant system. Anionic surfactants can be present for example in amounts in the range from about 5 wt.% to about 40 wt.% of the surfactant system.

BUILDERS OR COMPLEXING AGENTS

[0031] The composition optionally comprises from 1 to 50 wt.% of a builder. Preferably the builder is present at a level of from 1 to 40 wt.%.

[0032] Builder materials may be selected from 1) calcium sequestrant materials, 2) precipitating materials, 3) calcium ion-exchange materials and 4) mixtures thereof.

[0033] It is preferred that when an insoluble inorganic builder, e.g., zeolite is used, the size is in the range 0.1 to 10 microns (as measured by The Mastersizer 2000 particle size analyzer using laser diffraction ex Malvern™).

[0034] Examples of calcium sequestrant builder materials include alkali metal polyphosphates, such as sodium tripolyphosphate and organic sequestrants, such as ethylene diamine tetraacetic acid.

[0035] Examples of precipitating builder materials include sodium orthophosphate and sodium carbonate.

[0036] Examples of calcium ion-exchange builder materials include the various types of water-insoluble crystalline or amorphous aluminosilicates, of which zeolites are the best known representatives, e.g. zeolite A, zeolite B (also known as zeolite P), zeolite C, zeolite X, zeolite Y and also the zeolite P-type as described in EP-A-0,384,070.

[0037] The composition may also contain 0-50 wt. % of a builder or complexing agent such as ethylenediaminetetraacetic acid, diethylenetriamine-pentaacetic acid, alkyl- or alkenylsuccinic acid, nitrilotriacetic acid or the other builders mentioned below. Many builders are also bleach-stabilising agents by virtue of their ability to complex metal ions.

[0038] Zeolite and carbonate (carbonate (including bicarbonate and sesquicarbonate) are preferred builders.

[0039] The composition may contain as builder a crystalline aluminosilicate, preferably an alkali metal aluminosilicate, more preferably a sodium aluminosilicate. This is typically present at a level of less than 15 wt.%. Aluminosilicates are materials having the general formula:

$0.8-1.5 M_2O \cdot Al_2O_3 \cdot 0.8-6 SiO_2$ where M is a monovalent cation, preferably sodium. These materials contain some bound water and are required to have a calcium ion exchange capacity of at least 50 mg CaO/g. The preferred sodium aluminosilicates contain 1.5-3.5 SiO_2 units in the formula above. They can be prepared readily by reaction between sodium silicate and sodium aluminate, as amply described in the literature. The ratio of surfactants to aluminosilicate (where present) is preferably greater than 5:2, more preferably greater than 3:1.

[0040] Alternatively, or additionally to the aluminosilicate builders, phosphate builders may be used. In this art the term 'phosphate' embraces diphosphate, triphosphate, and phosphonate species. Other forms of builder include silicates, such as soluble silicates, metasilicates, layered silicates (e.g. SKS-6 from Hoechst).

[0041] Preferably the laundry detergent formulation is a non-phosphate built laundry detergent formulation, i.e., contains less than 1 wt.% of phosphate.

SHADING AGENT

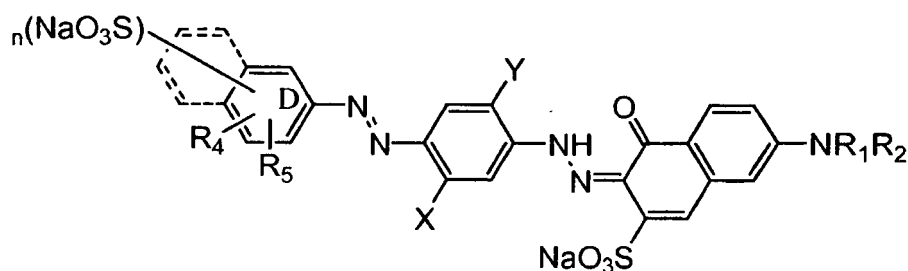
[0042] The laundry treatment composition preferably comprises a blue or violet shading agent in the range from 0.0001 to 0.01 wt.%. The shading agents reduce the perception of damage to many coloured garments and increase whiteness of white garments.

[0043] The shading agents are preferably selected from blue and violet dyes of the solvent disperse basic, direct and acid type listed in the colour index (Society of Dyers and Colourists and American Association of Textile Chemists and Colorists 2002).

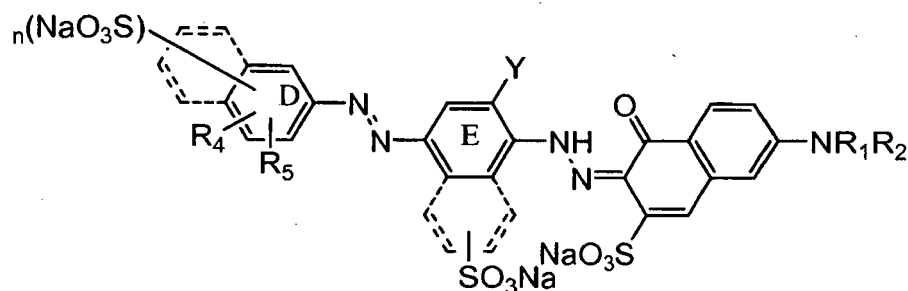
[0044] Preferably a direct violet or direct blue dyes is present. Preferably the dyes are *bis*-azo, *tris*-azo dyes or triphenyldioxazine dye. The carcinogenic benzidine based dyes are not preferred.

[0045] Bis-azo copper containing dyes such as direct violet 66 may be used.

[0046] The most preferred bis-azo dyes have the following structure:



or



wherein:

ring D and E may be independently naphthyl or phenyl as shown;

R₁ is selected from: hydrogen and C1-C4-alkyl, preferably hydrogen;

R₂ is selected from: hydrogen, C1-C4-alkyl, substituted or unsubstituted phenyl and substituted or unsubstituted naphthyl, preferably phenyl;

R₃ and R₄ are independently selected from: hydrogen and C1-C4-alkyl, preferably hydrogen or methyl;

X and Y are independently selected from: hydrogen, C1-C4-alkyl and C1-C4-alkoxy; preferably the dye has X= methyl; and, Y = methoxy and n is 0, 1 or 2, preferably 1 or 2.

[0047] Preferred bis-azo dyes are direct violet 7, direct violet 9, direct violet 11, direct violet 26, direct violet 31, direct violet 35, direct violet 40, direct violet 41, direct violet 51, and direct violet 99.

[0048] Preferred solvent and disperse dyes, are selected from, mono-azo or anthraquinone dyes, most preferably, solvent violet 13, disperse violet 27 disperse violet 26, disperse violet 28, disperse violet 63 and disperse violet 77.

[0049] A preferred pigment is pigment violet 23.

ENZYMES

[0050] The laundry treatment composition preferably comprises one or more enzymes which provide cleaning performance and/or fabric care benefits. Examples of suitable enzymes include, but are not limited to, hemicellulases, peroxidases, proteases, cellulases, xylanases, lipases, phospholipases, esterases, cutinases, pectinases, mannanases, pectate lyases, keratinases, reductases, oxidases, phenoloxidases, lipoxygenases, ligninases, pullulanases, tannases, pentosanases, malanases, arabinosidases, hyaluronidase, chondroitinase, laccase, and amylases, or mixtures thereof. A typical combination is an enzyme cocktail that may comprise, for example, a protease and lipase in conjunction with amylase. When present in a cleaning composition, the aforementioned additional enzymes may be present at levels from about 0.00001 wt.% to about 2 wt.%, from about 0.0001 wt.% to about 1 wt.% or even from about 0.001 wt.% to about 0.5 wt.% enzyme protein by weight of the composition.

[0051] Preferred enzymes are cellulases.

FLUORESCENT AGENT

[0052] The composition preferably comprises a fluorescent agent (optical brightener). Fluorescent agents are well known and many such fluorescent agents are available commercially. Usually, these fluorescent agents are supplied and used in the form of their alkali metal salts, for example, the sodium salts. The total amount of the fluorescent agent or agents used in the composition is generally from 0.005 to 2 wt.%, more preferably 0.01 to 0.1 wt.%. Preferred classes of fluorescer are: Di-styryl biphenyl compounds, e.g. Tinopal (Trade Mark) CBS-X, Di-amine stilbene di-sulphonic acid compounds, e.g. Tinopal DMS pure Xtra and Blankophor (Trade Mark) HRH, and Pyrazoline compounds, e.g. Blankophor SN. Preferred fluorescers are: sodium 2-(4-styryl-3-sulfophenyl)-2H-naphthol[1,2-d]triazole, disodium 4,4'-bis[[4-anilino-6-(N-methyl-N-2-hydroxyethyl)amino]-1,3,5-triazin-2-yl]amino}stilbene-2,2'-disulfonate, disodium 4,4'-bis[[4-anilino-6-morpholino-1,3,5-triazin-2-yl]amino}stilbene-2,2'-disulfonate, and disodium 4,4'-bis(2-sulfoslyryl)biphenyl.

PERFUME

[0053] Preferably the composition comprises a perfume. The perfume is preferably in the range from 0.001 to 3 wt.%, most preferably 0.1 to 1 wt.%. Many suitable examples of perfumes are provided in the CTFA (Cosmetic, Toiletry and Fragrance Association) 1992 International Buyers Guide, published by CFTA Publications and OPD 1993 Chemicals Buyers Directory 80th Annual Edition, published by Schnell Publishing Co.

[0054] It is commonplace for a plurality of perfume components to be present in a formulation. In the compositions of the present invention it is envisaged that there will be four or more, preferably five or more, more preferably six or more or even seven or more different perfume components.

[0055] In perfume mixtures preferably 15 to 25 wt.% are top notes. Top notes are defined by Poucher (Journal of the Society of Cosmetic Chemists 6(2):80 [1955]). Preferred top-notes are selected from citrus oils, linalool, linalyl acetate, lavender, dihydromyrcenol, rose oxide and cis-3-hexanol.

[0056] Perfume and top note may be used to cue the fabric care benefit of the invention.

[0057] It is preferred that the laundry treatment composition does not contain a peroxygen bleach, e.g., sodium percarbonate, sodium perborate, and peracid.

POLYMERS

[0058] The composition may comprise one or more polymers. Examples are carboxymethylcellulose, poly(ethylene glycol), poly(vinyl alcohol), polycarboxylates such as polyacrylates, maleic/acrylic acid copolymers and lauryl methacrylate/acrylic acid copolymers.

[0059] Polymers present to prevent dye deposition, for example poly(vinylpyrrolidone), poly(vinylpyridine-N-oxide), and poly(vinylimidazole), are preferably absent from the formulation.

HYDROTROBE

[0060] For compositions in the form of a liquid, it is useful to include a hydrotrope, which prevents liquid crystal formation. The addition of the hydrotrope thus aids the clarity/transparency of the composition. Suitable hydrotropes include but are not limited to propylene glycol, ethanol, urea, salts of benzene sulphonate, toluene sulphonate, xylene sulphonate or cumene sulphonate. Suitable salts include but are not limited to sodium, potassium, ammonium, monoethanolamine, triethanolamine. Preferably, the hydrotrope is selected from the group consisting of propylene glycol, xylene sulfonate, ethanol, and urea to provide optimum performance. The amount of the hydrotrope is generally in the range of from 0 to 30%, preferably from 0.5 to 30%, more preferably from 0.5 to 30%, most preferably from 1 to 15%.

Experimental

Example 1

[0061] Three knitted cotton fabric swatches (20 by 20 cm) dyed with Vat Blue 4 were washed in a compartment of a QuickWash Plus™ fabric testing system (SDL international). In a separate compartment, equivalent knitted cotton swatches were placed, these were dyed with Reactive Orange 16. The machine was filled with 3.5 litres of 26° French Hard water and 24.5 g of Persil-Colour Powder (ex UK), which is a Las/Non-ionic surfactant powder built with zeolite and carbonate. To this was added 0.5 g of antifoam. The wash took 15 minutes, and following this the machine was drained, spun, and then three 90 second rinses performed, draining and spinning after each. Following the wash the fabric was tumble dried. The procedure was repeated 5 times. The whole experiment was then repeated but with the addition of 1g/L of various additives.

[0062] Following the washes the reflectances of the VAT Blue cloths at 430nm and the Reactive Orange cloths at 650nm were measured on a Murakami Goniospectrophotometer with an incident angle of 65° and a measurement angle of 55°. The reflectance of the new cloths was 27.20 for the Vat Blue and 65.13 for the reactive Orange. The reflectance was compared to the reflectance of new unwashed fabric, and expressed as $\Delta R = |R(\text{new}) - R(\text{washed})|$. The ΔR (powder control) for Vat Blue was 6.06 and for Reactive Orange was 5.36. In the results shown in table 1, the average ΔR between the blue and orange cloths is given to 1 decimal place.

Table 1

Product	$\Delta R_{\text{average}}$
Powder Control	6.1
Ceridust 5551 An ester wax of mean particle size 7.5-9.5 μm	3.7
Licowax W400 A cationic montan ester wax	5.1
Licowax OP A saponified montan ester particle size <250 μm	3.5

[0063] Materials were obtained from Clariant™.

[0064] The results show an improvement in the reflectance values when the ester wax particles are incorporated. The lower reflectance values indicate less fabric damage from the laundering process.

Example 2

[0065]

Exemplary Granular Laundry Formulations A,B,C,D

Formulation	A	B	C	D
NaLAS	15	20	10	14
NI (7EO)	-	-	-	10
Na tripolyphosphate	-	15	-	-
Soap	-	-	-	2
Zeolite A24	7	-	-	17
Sodium silicate	5	4	5	1
Sodium carbonate	25	20	30	20
Sodium sulphate	40	33	40	22
Carboxy methylcellulose	0.2	0.3	-	0.5
Sodium chloride	-	-	-	5
lipase	0.005	0.01	-	0.005
Protease	0.005	0.01	-	0.005
Amylase	0.001	0.003	-	-
Cellulase	-	0.003	-	-
Fluorescer	0.1	0.15	0.05	0.3
Direct Violet 9	0.0002'	0.00015	-	0.0001
Solvent Violet 13	-	0.002	-	0.001
Ceridust 5551	1	0.5	0.5	0.5
Sulfonated Zn Pthalocyanine photobleach	0.002	0.004	-	-
Water, impurities & minors	To 100 wt. %	To 100 wt. %	To 100 wt. %	To 100 wt. %

[0066] Enzyme levels are given as percent pure enzyme. Levels of direct violet 9, solvent violet 13 and Sulfonated Zn Pthalocyanine photobleach are given as pure dye. NI (7EO) refers to $R-(OCH_2CH_2)_nOH$, where R is an alkyl chain of C12 to C15, and n is 7.

[0067] The formulations are prepared by adding direct violet 9 and the Sulfonated Zn Pthalocyanine photobleach into the slurry which is then spray dried. Alternatively, the dyes and photobleach may be added via post-dosed $MgSO_4$ granules.

[0068] The solvent violet 13 was dissolved in non-ionic surfactant (7EO) and granulated onto bentonite clay, to give a granule containing 0.2 wt. % dye. This was post-dosed to the formulation.

[0069] The Ceridust 5551 particles were post dosed to the formulation.

Example 3

[0070] The following exemplary liquid laundry formulations E-H were created.

Formulation	E	F	G	H
NaLAS	14	10	15	21
NI (7EO)	10	5	21	15
SLES (3EO)	7	10	7	-
Soap	2	4	1	0
Citric acid	1	1	-	1
Glycerol	0	1	5	0

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(continued)

Formulation	E	F	G	H
Propylene glycol	5	3	0	4
Sodium chloride	1	-	-	-
Amine ethoxylated polymers	0.5	1	-	-
Triethanol amine	0	0.5	3	1
Perfume	0.2	0.1	0.3	0.4
Fluorescer	0.05	0.1	0.15	0.2
Protease	0.005	0.01	-	0.005
Amylase	0.001	0.003	-	-
Lipase	-	0.003	-	-
Fluorescer	0.1	0.15	0.05	0.3
Ceridust 5551	0.1	0.2	0.15	0.5
Solvent Violet 13	-	0.002	0	0.001
Water, impurities & minors	To 100 wt. %	To 100 wt. %	To 100 wt. %	To 100 wt. %

[0071] Enzyme levels are given as percent pure enzyme. Levels of solvent violet 13 are given as pure dye. NI (7EO) refers to $R-(OCH_2CH_2)_nOH$, where R is an alkyl chain of C12 to C15, and n is 7. NaLAS is linear alkyl benzene sulphonate (LAS) and (SLES (3EO)) is C_{12} - C_{18} alkyl polyethoxylate (3.0) sulphate.

Claims

1. Use of insoluble ester wax particles to prevent damage to clothes laundered during a domestic main wash process.

Patentansprüche

1. Verwendung von unlöslichen Esterwachs-Partikeln zur Verhinderung von Schäden an während eines häuslichen Hauptwaschverfahrens gewaschenen Stoffen.

Revendications

1. Utilisation de particules de cire d'ester insoluble pour prévenir un endommagement de vêtements nettoyés durant un procédé de lavage principal domestique.

REFERENCES CITED IN THE DESCRIPTION

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