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(54) Title: COSMETIC COMPOSITION COMPRISING A FATTY-CHAIN SILANE AND A PARTICULAR STABILIZING SYSTEM AND PROCESS

(57) Abstract: The present invention relates to a cosmetic composition comprising: - one or more fatty-chain silanes of formula (I) below and/or oligomers thereof: $R_1Si(OR_2)_z(R_3)_x(OH)_y$ (I) in which formula (I): • R_1 represents a linear or branched alkyl or alkenyl group comprising from 7 to 18 carbon atoms, • R_2 and R_3, which may be identical or different, represent a linear or branched alkyl group comprising from 1 to 6 carbon atoms, • y denotes an integer ranging from 0 to 3, • z denotes an integer ranging from 0 to 3, preferentially from 1 to 3 and better still equal to 3; and • x denotes an integer ranging from 0 to 2, • with z+x+y=3, - at least one associative polyurethane and at least one polysaccharide. The invention also relates to a process for the cosmetic treatment of keratin fibers using such a composition.

COSMETIC COMPOSITION COMPRISING A FATTY-CHAIN SILANE AND A PARTICULAR STABILIZING SYSTEM AND PROCESS

The present invention relates to a cosmetic composition comprising one or more fatty-chain silanes and a particular stabilizing system and a process for hair.

A recurrent problem in the field of cosmetic haircare consists in caring for keratin fibers subjected to various external attacking factors. Specifically, these fibers may be subject to attack of various origins, such as mechanical attack, for example linked to disentangling or blow-drying, or alternatively chemical attack, for example following dyeing or permanent-waving.

These attacks have consequences on the qualities of the keratin fiber and may lead to difficult disentangling at the time of washing the hair, on dry hair and/or wet hair, and also to degradation of the surface properties of the fibers, which become non-smooth and irregular at the surface, more particularly when the hair is dry.

Cosmetic haircare compositions exist which can limit these phenomena. In particular, it is known practice to use silanes for improving the condition of the hair.

International patent application WO 2004/012691, for example, describes the cosmetic use of silanes for improving the condition of the hair.

Document EP 0 159 628 proposes compositions for reinforcing the elasticity of the hair, comprising an alkyltrialkoxysilane.

Moreover, document EP 1 736 139 describes a hair treatment composition comprising an alkoxysilane, an organic acid and water, the pH of the composition being between 2 and 5.

Finally, patent application EP 0 877 027 discloses a composition comprising an organosilane and a particular polyol.

Among the known silanes, fatty-chain silanes are effective in caring for the hair. However, they are difficult to use, which is reflected by an instability of the cosmetic compositions and/or low availability of these silanes because of interaction with the other ingredients of the cosmetic composition, hence a decrease in their effectiveness.

Thus, there is a need to develop new formulatory systems which make it possible to satisfactorily use fatty-chain alkoxysilanes while keeping, moreover, good use properties.

This objective is achieved with the present invention, the subject of which is a process for hair comprising the application on hair of a cosmetic composition comprising at least one fatty-chain silane of formula (I) below and/or oligomers thereof:

$$R_1Si(OR_2)_z(R_3)_x(OH)_y \qquad (I)$$

in which:

- R1 represents a linear or branched alkyl or alkenyl group comprising from 7 to 18 carbon atoms,
- R_2 and R_3, which may be identical or different, represent a linear or branched alkyl group comprising from 1 to 6 carbon atoms,
- y denotes an integer ranging from 0 to 3, and
- z denotes an integer ranging from 0 to 3, and
- x denotes an integer ranging from 0 to 2,
- with z+x+y=3,

- at least one associative polyurethane and
- at least one polysaccharide.

This particular combination makes it possible to obtain a process for hair with a fatty-chain-silane-based cosmetic composition with acceptable stability over time and it makes possible to obtain a process which is sufficiently effective for haircare. It in particular makes it possible to confer a smooth, natural and soft feel on the fibers after disentangling. It also makes it possible to obtain acceptable use qualities, in particular by limiting the runny nature of the compositions when they are seized.

A subject of the invention is, moreover, a process for hair with a composition which results from the mixture of at least one associative polyurethane polymer and from at least one polysaccharide and from one or more fatty-chain silanes of formula (I) and/or oligomers thereof.

Other subjects, characteristics, aspects and advantages of the invention will become even more clearly apparent on reading the description and examples that follow.

In the context of the invention, the expression "at least one" is intended to mean one or more of the compounds cited. When ranges of values are given, the extreme values are included in the definition given.

In the context of the invention, when the term "silane" is used, this means the silanes but also the silane oligomers and any other compound which derives therefrom.

The fatty-chain silane(s) that may be used in the composition according to the invention are those corresponding to formula (I) below:

$$R_1Si(OR_2)_z(R_3)_x(OH)_y \qquad (I)$$

in which:

- R1 represents a linear or branched alkyl or alkenyl group comprising from 7 to 18 carbon atoms,
- R_2 and R_3, which may be identical or different, represent a linear or branched alkyl group comprising from 1 to 6 carbon atoms,
- y denotes an integer ranging from 0 to 3,
- z denotes an integer ranging from 0 to 3, and
- x denotes an integer ranging from 0 to 2,
- with z+x+y=3.

The term "oligomer" is intended to mean the products of polymerization of the compounds of formula (I) comprising from 2 to 10 silicon atoms.

Preferably, R3 represents an alkyl group comprising from 1 to 4 carbon atoms, better still a linear alkyl group comprising from 1 to 4 carbon atoms, and preferably methyl or ethyl groups.

Preferably, R_2 represents an alkyl group comprising from 1 to 4 carbon atoms, better still a linear alkyl group comprising from 1 to 4 carbon atoms, and preferably the ethyl group.

Preferably, R_1 represents an alkyl group and even more preferentially a linear alkyl group. According to one particular embodiment, R_1 is a linear alkyl radical comprising from 7 to 12 carbon atoms.

Even more preferentially, R_1 is an n-octyl radical.

Preferably, z ranges from 1 to 3. Even more preferentially, z is equal to 3.

Preferably, the fatty-chain silane is an alkoxysilane chosen from octyltriethoxysilane, dodecyltriethoxysilane, octadecyltriethoxysilane and hexadecyltriethoxysilane.

More particularly, the composition comprises octyltriethoxysilane (OTES).

The silane(s) are present in the composition according to the invention in proportions of generally between 0.1% and 50% by weight, more preferentially from 0.5% to 20% by weight and better still from 2% to 20% by weight, relative to the total weight of the composition.

The term "associative polyurethane" is intended to mean a polyurethane which has at least one end or pendent alkyl chain comprising at least 10 carbon atoms. This type

of polymer is capable of interacting with itself or with particular compounds such as surfactants so as to result in thickening of the medium.

The associative polyurethanes used in the invention can be cationic, anionic or nonionic. Preferably, they are anionic or nonionic.

By way of example of an anionic associative polyurethane, mention may in particular be made of an acrylic terpolymer which is soluble or swellable in alkalis. It is characterized in that it comprises:

a) approximately 20% to 70% by weight and preferably 25% to 55% by weight of an α, ß-monoethylenically unsaturated carboxylic acid;

b) approximately 20% to 80% by weight and preferably 30% to 65% by weight of a nonsurfactant monoethylenically unsaturated monomer different than a), and

c) approximately 0.5% to 60% by weight and preferably 10% to 50% by weight of a nonionic urethane monomer which is the reaction product of a monohydric nonionic surfactant with a monoethylenically unsaturated monoisocyanate.

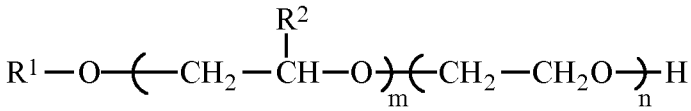
The α, ß-monoethylenically unsaturated carboxylic acid a) can be chosen from numerous acids and in particular acrylic acid, methacrylic acid, itaconic acid and maleic acid. Methacrylic acid is preferred. A large proportion of acid is essential to give a polymer structure which solubilizes and provides a thickener by reaction with an alkaline compound such as sodium hydroxide, alkanolamines, aminomethylpropanol or aminomethylpropanediol.

The terpolymer must also contain a large proportion indicated above of a monoethylenically unsaturated monomer b) which does not have any surfactant property. The preferred monomers are those which give polymers which are insoluble in water when they are homopolymerized and are illustrated by C_1-C_4 alkyl acrylates and methacrylates, for instance methyl acrylate, ethyl acrylate, butyl acrylate or the corresponding methacrylates. The most particularly preferred monomers are methyl and ethyl (meth)acrylates. Other monomers which can be used are styrene, vinyltoluene, vinyl acetate, acrylonitrile and vinylidene chloride. Nonreactive monomers are preferred, these monomers being those in which the sole ethylene group is the only reactive group under the polymerization conditions. However, monomers which contain groups that are reactive under the action of heat can be used in certain situations, such as hydroxyethyl acrylate.

The monohydric nonionic surfactants used for obtaining the nonionic urethane monomer c) are well known and are generally alkoxylated hydrophobic compounds

containing an alkylene oxide forming the hydrophilic part of the molecule. The hydrophobic compounds are generally made up of an aliphatic alcohol or an alkylphenol in which a carbon-based chain containing at least six carbon atoms constitutes the hydrophobic part of the surfactant.

The preferred monohydric nonionic surfactants have the formula:



in which R^1 is a C_6-C_{30} alkyl or C_8-C_{30} aralkyl group, R^2 is a C_1-C_4 alkyl group, n is an average number ranging from approximately 5 to 150 and m is an average number ranging from approximately 0 to 50, on the condition that n is at least as big as m and that n + m = 5-150.

By way of preferred C_6-C_{30} alkyl groups, mention may be made of dodecyl and C_{18}-C_{26} alkyl radicals. By way of aralkyl groups, mention may more particularly be made of (C_8-C_{13})alkylphenyl groups. The preferred R^2 group is the methyl group.

The monoethylenically unsaturated monoisocyanate used to form the nonionic urethane monomer c) can be chosen from very varied compounds. Use may be made of a compound containing any copolymerizable unsaturation, such as an acrylic or methacrylic unsaturation. An allylic unsaturation conferred by allyl alcohol can also be used. The preferred monoethylenic monoisocyanates are α,α-dimethyl-m-isopropenylbenzyl isocyanate and methylstyrene isopropyl isocyanate.

The acrylic terpolymer defined above is obtained by aqueous-emulsion copolymerization of the components a), b) and c), which is customary and described in patent application EP-A-0 173 109.

As examples of anionic associative polyurethanes that can be used according to the present invention, mention may in particular be made of copolymers of methacrylic or acrylic acid comprising at least one C1-C30 alkyl (meth)acrylate unit and one urethane unit substituted with a fatty chain. Mention may in particular be made of the polyethoxylated methacrylic acid/methyl methacrylate/methylstyrene isopropyl isocyanate/behenyl alcohol copolymer (comprising 40 ethoxy units) sold under the brand Viscophobe® DB 1000 by the company Union Carbide.

By way of cationic associative polyurethane, mention may be made of the cationic associative polyurethanes described in document FR 2811193; they can be represented by general formula (Ia) below:

$$R\text{-}X\text{-}(P)_n\text{-}[L\text{-}(Y)_m]_r\text{-}L'\text{-}(P')_p\text{-}X'\text{-}R' \qquad \textbf{(Ia)}$$

in which:

- R and R', which may be identical or different, represent a hydrophobic group or a hydrogen atom;
- X and X', which may be identical or different, represent a group comprising an amine function optionally bearing a hydrophobic group, or alternatively a group L";
- L, L' and L", which may be identical or different, represent a group derived from a diisocyanate;
- P and P', which may be identical or different, represent a group comprising an amine function optionally bearing a hydrophobic group;
- Y represents a hydrophilic group;
- r is an integer between 1 and 100, preferably between 1 and 50 and in particular between 1 and 25;
- n, m and p are each, independently of one another, between 0 and 1000;

the molecule containing at least one protonated or quaternized amine function and at least one hydrophobic group.

In one preferred embodiment of these polyurethanes, the only hydrophobic groups are the groups R and R' at the chain ends.

One preferred family of cationic associative polyurethanes is the one corresponding to formula **(Ia)** described above and in which:

- R and R' both independently represent a hydrophobic group,
- X and X' each represent a group L",
- n and p are integers that are between 1 and 1000, and
- L, L', L", P, P', Y and m have the meaning indicated above.

Another preferred family of cationic associative polyurethanes is the one corresponding to formula **(Ia)** above in which:

- n and p are 0, which means that these polymers do not comprise units derived from a monomer containing an amine function, incorporated into the polymer during the polycondensation.
- The protonated amine functions of these polyurethanes result from the hydrolysis of excess isocyanate functions, at the chain end, followed by alkylation of the primary amine functions formed with alkylating agents containing a hydrophobic group, i.e. compounds of the type RQ or R'Q, in which R and R' are as defined above and Q denotes a leaving group such as a halide, a sulfate, etc.

Yet another preferred family of cationic associative polyurethanes is the one corresponding to formula (Ia) above in which:

- R and R' both independently represent a hydrophobic group,
- X and X' both independently represent a group comprising a quaternary amine,
- n and p are zero, and
- L, L', Y and m have the meaning given above.

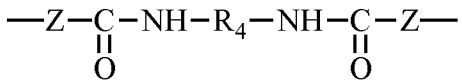
The number-average molecular mass of the cationic associative polyurethanes is preferably between 400 and 500 000, in particular between 1000 and 400 000 and ideally between 1000 and 300 000.

The term "hydrophobic group" means a radical or polymer containing a saturated or unsaturated, linear or branched hydrocarbon-based chain, which may contain one or more heteroatoms such as P, O, N or S, or a radical containing a perfluoro or silicone chain. When the hydrophobic group denotes a hydrocarbon-based radical, it comprises at least 10 carbon atoms, preferably from 10 to 30 carbon atoms, in particular from 12 to 30 carbon atoms and more preferentially from 18 to 30 carbon atoms.

Preferentially, the hydrocarbon-based group is derived from a monofunctional compound.

By way of example, the hydrophobic group may be derived from a fatty alcohol such as stearyl alcohol, dodecyl alcohol or decyl alcohol. It may also denote a hydrocarbon-based polymer, for instance polybutadiene.

The groups L, L' and L" represent a group of formula:



in which:

- Z represents -O-, -S- or -NH-; and
- R_4 represents a linear or branched alkylene radical containing from 1 to 20 carbon atoms, optionally comprising a saturated or unsaturated ring, or an arylene radical, one or more of the carbon atoms possibly being replaced with a heteroatom chosen from N, S, O and P.

As regards the meaning of Y, the term "hydrophilic group" means a polymeric or nonpolymeric water-soluble group.

By way of example, when it is not a polymer, mention may be made of ethylene glycol, diethylene glycol and propylene glycol.

When it is a hydrophilic polymer, in accordance with one preferred embodiment, mention may be made, for example, of polyethers, sulfonated polyesters, sulfonated polyamides or a mixture of these polymers. The hydrophilic compound is preferentially a polyether and especially a poly(ethylene oxide) or poly(propylene oxide).

The cationic associative polyurethanes of formula **(Ia)** according to the invention are formed from diisocyanates and from various compounds bearing functions containing a labile hydrogen. The functions containing a labile hydrogen may be alcohol, primary or secondary amine or thiol functions, giving, after reaction with the diisocyanate functions, polyurethanes, polyureas and polythioureas, respectively. The term "polyurethanes" in the present invention encompasses these three types of polymer, namely polyurethanes per se, polyureas and polythioureas, and also copolymers thereof.

The hydrophilic group denoted Y in formula **(Ia)** is optional. Specifically, the units containing a protonated or quaternary amine function may suffice to provide the solubility or water-dispersibility required for this type of polymer in an aqueous solution. Although the presence of a hydrophilic group Y is optional, cationic associative polyurethanes comprising such a group are, however, preferred.

By way of nonionic associative polyurethanes, mention may be made of polyurethane polyethers comprising in their chain both hydrophilic blocks usually of polyoxyethylenated nature and hydrophobic blocks, which may be aliphatic sequences alone and/or cycloaliphatic and/or aromatic sequences.

Preferably, the polyurethane polyethers comprise at least two hydrocarbon-based lipophilic chains containing from 6 to 30 carbon atoms, separated by a hydrophilic block, the hydrocarbon-based chains possibly being pendent chains or chains at the end of the

hydrophilic block. In particular, it is possible for one or more pendent chains to be envisioned. In addition, the polymer may comprise a hydrocarbon-based chain at one end or at both ends of a hydrophilic block.

The polyurethane polyethers may be multiblock, in particular in triblock form. The hydrophobic blocks may be at each end of the chain (for example: triblock copolymer containing a hydrophilic central block) or distributed both at the ends and in the chain (for example multiblock copolymer). These same polymers may also be graft polymers or star polymers.

The nonionic fatty-chain polyurethane polyethers can be triblock copolymers in which the hydrophilic block is a polyoxyethylenated chain comprising from 50 to 1000 oxyethylene groups. The nonionic polyurethane polyethers comprise a urethane bond between the hydrophilic blocks, whence arises the name.

By extension, also included among the nonionic fatty-chain polyurethane polyethers are those in which the hydrophilic blocks are linked to the lipophilic blocks via other chemical bonds.

The polyurethane polyethers that may be used according to the invention are in particular those described in the article by G. Fonnum, J. Bakke and Fk. Hansen - Colloid Polym. Sci 271, 380.389 (1993).

By way of examples of nonionic fatty-chain polyurethane polyethers that may be used in the invention, it is also possible to use Rheolate 205® containing a urea function, sold by the company Rheox, or Rheolate® 208, 204 or 212, and also Acrysol RM 184®.

Mention may also be made of the product Elfacos T210® containing a C_{12}-C_{14} alkyl chain, and the product Elfacos T212® containing a C_{18} alkyl chain, from Akzo.

The product DW 1206B® from Röhm & Haas containing a C_{20} alkyl chain and a urethane bond, sold at a solids content of 20% in water, may also be used.

It is also possible to use solutions or dispersions of these polymers, in particular in water or in aqueous-alcoholic medium. Examples of such polymers that may be mentioned are Rheolate® 255, Rheolate® 278 and Rheolate® 244 sold by the company Rheox. The products DW 1206F and DW 1206J sold by the company Röhm & Haas may also be used.

Even more particularly, according to the invention, it is preferred to use a polyurethane polyether that may be obtained by polycondensation of at least three compounds comprising:

(i) at least one polyethylene glycol comprising from 150 to 180 mol of ethylene oxide,

(ii) stearyl alcohol or decyl alcohol and

(iii) at least one diisocyanate.

Such polyurethane polyethers are sold especially by the company Röhm & Haas under the names Aculyn 46® and Aculyn 44® [Aculyn 46® is a polycondensate of polyethylene glycol containing 150 or 180 mol of ethylene oxide, of stearyl alcohol and of methylenebis(4-cyclohexyl isocyanate) (SMDI), at 15% by weight in a matrix of maltodextrin (4%) and water (81%); Aculyn 44® is a polycondensate of polyethylene glycol containing 150 or 180 mol of ethylene oxide, of decyl alcohol and of methylenebis(4-cyclohexyl isocyanate) (SMDI), at 35% by weight in a mixture of propylene glycol (39%) and water (26%)].

In a first variant of the invention, the associative polymers are chosen from those obtained by polycondensation of at least three of the compounds (i), (ii) and (iii) described above.

According to one particularly preferred embodiment, the associative polyurethane polymer is nonionic.

By way of preferred polymers according to the invention, mention may particularly be made of the nonionic polyurethanes aculyn 44® and aculyn 46®.

The associative polyurethane polymer(s) used in the composition according to the invention may be present in an amount ranging from 0.1% to 5%, preferably in an amount of less than 2% and even more preferentially in an amount ranging from 0.2% to 1% by weight, better still from 0.3% to 0.7% by weight, relative to the total weight of the composition.

The composition of the invention comprises at least one polysaccharide. Polysaccharides are polymers which have monosaccharides or disaccharides as base units.

In general, the compounds of this type that may be used in the present invention are chosen from those described especially in Kirk-Othmer's *Encyclopedia of Chemical Technology*, Third Edition, 1982, volume 3, pp. 896-900, and volume 15, pp. 439-458, in *Polymers in Nature* by E.A. MacGregor and C.T. Greenwood, published by John Wiley & Sons, Chapter 6, pp. 240-328, 1980, and in *Industrial Gums – Polysaccharides and their Derivatives*, edited by Roy L. Whistler, Second Edition, published by Academic Press Inc.

The polysaccharides are in particular chosen from fructans, glucans, modified or unmodified starches (such as those derived, for example, from cereals, for instance wheat, corn or rice, from legumes, for instance yellow pea, and tubers, for instance potato or cassava), amylose, amylopectin, glycogen, dextrans, celluloses and derivatives thereof (methylcelluloses, hydroxyalkylcelluloses, ethylhydroxyethylcelluloses,

carboxymethylcelluloses), xylans such as arabinoxylans and glucuronoxylans, arabans, galactans, galacturonans, chitin, chitosans, glucans such as xyloglucans and glycosaminoglucans, pectic acids and pectins, alginic acid and alginates, arabinogalactans, carrageenans, agars, gum arabics, gum tragacanths, ghatti gums, karaya gums, locust bean gums, mannans such as glucomannans and galactomannans such as guar gums and nonionic derivatives thereof (hydroxypropyl guar) and xanthan gums, and mixtures thereof.

Use will preferably be made of cellulose-based derivatives, in particular hydroxyalkylcelluloses and biopolysaccharides derived from microorganisms, in particular xanthan gum. According to one particular embodiment, the composition contains at least one xanthan gum and at least one hydroxyalkylcellulose.

The polysaccharide(s) are generally present at a concentration ranging from 0.01% to 5% by weight, relative to the total weight of the composition, preferably from 0.1% to 2% by weight and better still from 0.2% to 1% by weight.

Preferably, the polyurethane(s)/polysaccharide(s) weight ratio is less than or equal to 2.5 and preferably less than or equal to 2. According to one preferred embodiment, the ratio ranges from 1 to 2.5 and preferably from 1 to 2.

The composition according to the invention may also comprise at least one surfactant.

The surfactants are chosen from anionic, cationic, nonionic, amphoteric and zwitterionic surfactants.

The term "anionic surfactant" means a surfactant comprising only anionic groups as ionic or ionizable groups. These anionic groups are preferably chosen from the groups -C(O)OH, –C(O)O-, -SO_3H, -$S(O)_2O$-, -$OS(O)_2OH$, -$OS(O)_2O$-, -$P(O)OH_2$, -$P(O)_2O$-, -$P(O)O_2$-, -$P(OH)_2$, =P(O)OH, -P(OH)O-, =P(O)O-, =POH and =PO-, the anionic parts comprising a cationic counterion such as an alkali metal, an alkaline-earth metal or an ammonium.

By way of examples of anionic surfactants that may be used in the composition according to the invention, mention may be made of alkyl sulfates, alkyl ether sulfates, alkylamido ether sulfates, alkylarylpolyether sulfates, monoglyceride sulfates, alkylsulfonates, alkylamidesulfonates, alkylarylsulfonates, α-olefin sulfonates, paraffin sulfonates, alkylsulfosuccinates, alkylether sulfosuccinates, alkylamide sulfosuccinates, alkylsulfoacetates, acylsarcosinates, acylglutamates, alkylsulfosuccinamates, acylisethionates and N-acyltaurates, salts of alkyl monoesters of polyglycoside-polycarboxylic acids, acyllactylates, D-galactoside uronic acid salts, alkyl ether carboxylic acid salts, alkylaryl ether carboxylic acid salts, alkylamido ether carboxylic acid salts; and the

corresponding non-salified forms of all these compounds; the alkyl and acyl groups of all these compounds comprising from 6 to 40 carbon atoms and the aryl group denoting a phenyl group.

These compounds can be oxyethylenated and then preferably comprise from 1 to 50 ethylene oxide units.

The salts of C_6-C_{24} alkyl monoesters of polyglycoside-polycarboxylic acids can be chosen from C_6-C_{24} alkyl polyglycoside-citrates, C_6-C_{24} alkyl polyglycoside-tartrates and C_6-C_{24} alkyl polyglycoside-sulfosuccinates.

When the anionic surfactant(s) are in salt form, it (they) may be chosen from alkali metal salts such as the sodium or potassium salt and preferably the sodium salt, ammonium salts, amine salts and in particular amino alcohol salts or alkaline-earth metal salts such as the magnesium salts.

Examples of amino alcohol salts that may in particular be mentioned include monoethanolamine, diethanolamine and triethanolamine salts, monoisopropanolamine, diisopropanolamine or triisopropanolamine salts, 2-amino-2-methyl-1-propanol salts, 2-amino-2-methyl-1,3-propanediol salts and tris(hydroxymethyl)aminomethane salts.

Alkali metal or alkaline-earth metal salts, and in particular sodium or magnesium salts, are preferably used.

Use is preferably made, among the anionic surfactants mentioned, of (C_6-C_{24})alkyl sulfates, (C_6-C_{24})alkyl ether sulfates comprising from 2 to 50 ethylene oxide units, in particular in the form of alkali metal, ammonium, amino alcohol and alkaline-earth metal salts, or a mixture of these compounds.

In particular, it is preferable to use (C_{12}-C_{20})alkyl sulfates, (C_{12}-C_{20})alkyl ether sulfates comprising from 2 to 20 ethylene oxide units, in particular in the form of alkali metal, ammonium, amino alcohol and alkaline-earth metal salts, or a mixture of these compounds. Better still, it is preferred to use sodium lauryl ether sulfate containing 2.2 mol of ethylene oxide.

Examples of additional nonionic surfactants that may be used in the compositions of the present invention are described, for example, in the *Handbook of Surfactants* by M.R. Porter, published by Blackie & Son (Glasgow and London), 1991, pp 116-178. They are in particular chosen from alcohols, α-diols and (C_1–C_{20})alkylphenols, these compounds being etherified with ethoxylated, propoxylated or glycerolated groups and containing at least one fatty chain comprising, for example, from 8 to 18 carbon atoms, the number of ethylene oxide

or propylene oxide groups possibly ranging in particular from 2 to 50, and the number of glycerol groups possibly ranging in particular from 2 to 30.

Mention may also be made of condensates of ethylene oxide and of propylene oxide with fatty alcohols; polyethoxylated fatty amides preferably having from 2 to 30 ethylene oxide units, polyglycerolated fatty amides containing on average 1 to 5 and in particular 1.5 to 4 glycerol groups, ethoxylated fatty acid esters of sorbitan containing from 2 to 30 ethylene oxide units, fatty acid esters of sucrose, fatty acid esters of polyethylene glycol, (C_6-C_{24} alkyl)polyglycosides, N-(C_6-C_{24} alkyl)glucamine derivatives, amine oxides such as (C_{10}-C_{14} alkyl)amine oxides or N-(C_{10}-C_{14} acyl)aminopropylmorpholine oxides.

The amphoteric or zwitterionic surfactants which can be used in the present invention may in particular be secondary or tertiary aliphatic amine derivatives in which the aliphatic group is a linear or branched chain containing from 8 to 22 carbon atoms, said amine derivatives containing at least one anionic group, for instance a carboxylate, sulfonate, sulfate, phosphate or phosphonate group. Mention may be made in particular of (C_8-C_{20} alkyl)betaines, sulfobetaines, (C_8-C_{20} alkyl)amido(C_6-C_8 alkyl)betaines and (C_8-C_{20} alkyl)amido(C_6-C_8 alkyl)sulfobetaines.

Among the optionally quaternized secondary or tertiary aliphatic amine derivatives that can be used, as defined above, mention may also be made of the compounds of respective structures (B1) and (B2) below:

R_a-C(O)-NH-CH_2-CH_2-$N^+(R_b)(R_c)$-$CH_2C(O)O^-$, M^+, X^- (B1)

in which formula:

- R_a represents a C_{10}-C_{30} alkyl or alkenyl group derived from an acid R_a-COOH preferably present in hydrolyzed coconut oil, or a heptyl, nonyl or undecyl group;
- R_b represents a β-hydroxyethyl group; and
- R_c represents a carboxymethyl group;
- M^+ represents a cationic counterion derived from an alkali metal or alkaline-earth metal, such as sodium, an ammonium ion or an ion derived from an organic amine, and
- X^- represents an organic or inorganic anionic counterion, such as that chosen from halides, acetates, phosphates, nitrates, (C_1-C_4)alkyl sulfates, (C_1-C_4)alkyl- or (C_1-C_4)alkylarylsulfonates, in particular methyl sulfate and ethyl sulfate; or alternatively M^+ and X^- are absent;

$R_{a'}$-C(O)-NH-CH_2-CH_2-N(B)(B') (B2)

in which formula:

- B represents the group -CH_2-CH_2-O-X';
- B' represents the group -$(CH_2)_z$Y', with z = 1 or 2;
- X' represents the group -CH_2-C(O)OH, -CH_2-C(O)OZ', -CH_2-CH_2-C(O)OH, -CH_2-CH_2-C(O)OZ', or a hydrogen atom;
- Y' represents the group –C(O)OH, -C(O)OZ', -CH_2-CH(OH)-SO_3H or the group -CH_2-CH(OH)-SO_3-Z';
- Z' represents a cationic counterion derived from an alkali metal or alkaline-earth metal, such as sodium, an ammonium ion or an ion derived from an organic amine;
- $R_{a'}$ represents a C_{10}-C_{30} alkyl or alkenyl group of an acid R_a-C(O)OH preferably present in hydrolyzed linseed oil or coconut oil, an alkyl group, especially of C_{17} and its iso form, or an unsaturated C_{17} group.

These compounds of formula (B1) and (B2) are classified in the CTFA dictionary, 5th edition, 1993, under the names disodium cocoamphodiacetate, disodium lauroamphodiacetate, disodium caprylamphodiacetate, disodium capryloamphodiacetate, disodium cocoamphodipropionate, disodium lauroamphodipropionate, disodium caprylamphodipropionate, disodium capryloamphodipropionate, lauroamphodipropionic acid and cocoamphodipropionic acid.

By way of example, mention may be made of the cocoamphodiacetate sold by the company Rhodia under the trade name Miranol® C2M Concentrate.

Use may also be made of compounds of formula (B'2):

$R_{a''}$-NH-CH(Y'')-(CH2)n-C(O)-NH-(CH_2)n'-N(Rd)(Re) (B'2)

in which formula:

- Y'' represents the group –C(O)OH, -C(O)OZ'', -CH_2-CH(OH)-SO_3H or the group -CH_2-CH(OH)-SO_3-Z'';
- Rd and Re, independently of one another, represent a C_1-C_4 alkyl or hydroxyalkyl radical;
- Z'' represents a cationic counterion derived from an alkali metal or alkaline-earth metal, such as sodium, an ammonium ion or an ion derived from an organic amine;
- $R_{a''}$ represents a C_{10}-C_{30} alkyl or alkenyl group of an acid R_a-C(O)OH preferably present in hydrolyzed linseed oil or coconut oil;

- n and n', independently of one another, denote an integer ranging from 1 to 3.

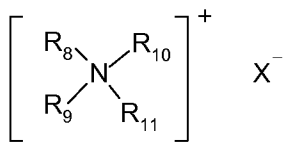
Among the compounds of formula (B'2), mention may be made of the compound classified in the CTFA dictionary under the name sodium diethylaminopropyl cocoaspartamide and sold by the company Chimex under the name Chimexane HB.

Among the amphoteric or zwitterionic surfactants mentioned above, use is preferably made of (C_8-C_{20})alkylbetaines such as cocobetaine, (C_8-C_{20})alkylamido(C_3-C_8)alkylbetaines such as cocamidopropylbetaine, the compounds of formula (B'2), such as the sodium salt of diethylaminopropyl laurylaminosuccinamate (INCI name: sodium diethylaminopropyl cocoaspartamide) and mixtures thereof. More preferentially, the amphoteric or zwitterionic surfactant(s) are chosen from cocamidopropylbetaine and cocobetaine.

The cationic surfactant(s) which can be used in the composition useful for the invention comprise, for example, salts of optionally polyoxyalkylenated primary, secondary or tertiary fatty amines, quaternary ammonium salts, and mixtures thereof.

Examples of quaternary ammonium salts that may in particular be mentioned include:

- those corresponding to general formula **(B1)** below:



(B1)

in which formula:

- R_8 to R_{11}, which may be identical or different, represent a linear or branched aliphatic group comprising from 1 to 30 carbon atoms, or an aromatic group such as aryl or alkylaryl, it being understood that at least one of the groups R_8 to R_{11} comprises from 8 to 30 carbon atoms and preferably from 12 to 24 carbon atoms; and
- X^- represents an organic or inorganic anionic counterion, such as that chosen from halides, acetates, phosphates, nitrates, (C_1-C_4)alkyl sulfates, (C_1-C_4)alkyl or (C_1-C_4)alkylaryl sulfonates, in particular methyl sulfate and ethyl sulfate.

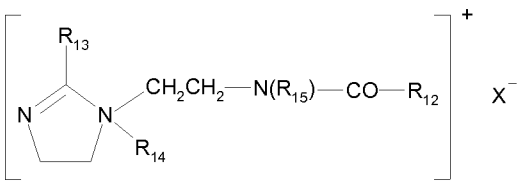
The aliphatic groups of R_8 to R_{11} may also comprise heteroatoms especially such as oxygen, nitrogen, sulfur and halogens.

The aliphatic groups of R_8 to R_{11} are chosen, for example, from C_1-C_{30} alkyl, C_1-C_{30} alkoxy, polyoxy(C_2-C_6)alkylene, C_1-C_{30} alkylamide, (C_{12}-C_{22})alkylamido(C_2-C_6)alkyl, (C_{12}-

C_{22})alkyl acetate and C_1-C_{30} hydroxyalkyl groups, X^- is an anionic counterion chosen from halides, phosphates, acetates, lactates, (C_1-C_4)alkyl sulfates and (C_1-C_4)alkyl- or (C_1-C_4)alkylarylsulfonates.

Among the quaternary ammonium salts of formula (B1), preference is given, firstly, to tetraalkylammonium chlorides, such as, for example, dialkyldimethylammonium or alkyltrimethylammonium chlorides in which the alkyl group comprises approximately from 12 to 22 carbon atoms, in particular behenyltrimethylammonium, distearyldimethylammonium, cetyltrimethylammonium or benzyldimethylstearylammonium chlorides, or else, secondly, to distearoylethylhydroxyethylmethylammonium methosulfate, dipalmitoyl-ethylhydroxyethylammonium methosulfate or distearoylethylhydroxyethylammonium methosulfate, or else, lastly, to palmitylamidopropyltrimethylammonium chloride or stearamidopropyldimethyl(myristyl acetate)ammonium chloride, sold under the name Ceraphyl® 70 by the company Van Dyk;

- quaternary ammonium salts of imidazoline, such as, for example, those of formula (B2) below:



(B2)

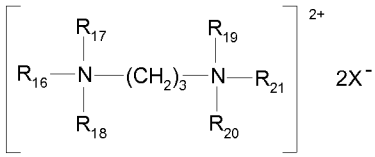
in which formula:

- R_{12} represents an alkenyl or alkyl group comprising from 8 to 30 carbon atoms, for example fatty acid derivatives of tallow;
- R_{13} represents a hydrogen atom, a C_1-C_4 alkyl group or an alkenyl or alkyl group comprising from 8 to 30 carbon atoms;
- R_{14} represents a C_1-C_4 alkyl group;
- R_{15} represents a hydrogen atom or a C_1-C_4 alkyl group;
- X^- represents an organic or inorganic anionic counterion, such as that chosen from halides, phosphates, acetates, lactates, (C_1-C_4)alkyl sulfates, (C_1-C_4)alkyl or (C_1-C_4)alkylaryl sulfonates.

R_{12} and R_{13} preferably denote a mixture of alkyl or alkenyl groups containing from 12 to 21 carbon atoms, for example tallow fatty acid derivatives, R_{14} denotes a methyl group, and

R_{15} denotes a hydrogen atom. Such a product is sold, for example, under the name Rewoquat® W 75 by the company Rewo;

- di- or triquaternary ammonium salts in particular of formula (B3) below:



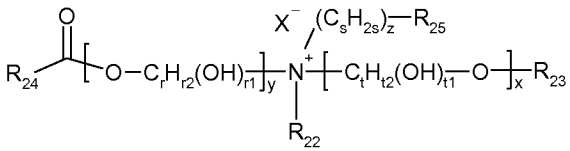
(B3)

in which formula:

- R_{16} denotes an alkyl group comprising approximately from 16 to 30 carbon atoms, which is optionally hydroxylated and/or interrupted with one or more oxygen atoms;
- R_{17} is chosen from hydrogen, an alkyl group comprising from 1 to 4 carbon atoms or a group $-(CH_2)_3-N^+(R_{16a})(R_{17a})(R_{18a})$, X^-;
- R_{16a}, R_{17a}, R_{18a}, R_{18}, R_{19}, R_{20} and R_{21}, which may be identical or different, are chosen from hydrogen and an alkyl group comprising from 1 to 4 carbon atoms; and
- X^-, which may be identical or different, represent an organic or inorganic anionic counterion, such as that chosen from halides, acetates, phosphates, nitrates, (C_1-C_4)alkyl sulfates, (C_1-C_4)alkyl or (C_1-C_4)alkylaryl sulfonates, in particular methyl sulfate and ethyl sulfate.

Such compounds are, for example, Finquat CT-P, sold by the company Finetex (Quaternium 89), and Finquat CT, sold by the company Finetex (Quaternium 75);

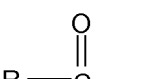
- quaternary ammonium salts comprising one or more ester functions, such as those of formula (B4) below:



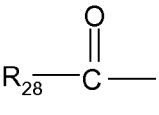
(B4)

in which formula:

- R_{22} is chosen from C_1-C_6 alkyl groups and C_1-C_6 hydroxyalkyl or C_1-C_6 dihydroxyalkyl groups,
- R_{23} is chosen from:

  - the group ,

- linear or branched, saturated or unsaturated C_1-C_{22} hydrocarbon-based groups R_{27},
- a hydrogen atom,

- R_{25} is chosen from:
  - the group  ,
  - linear or branched, saturated or unsaturated C_1-C_6 hydrocarbon-based groups R_{29},
  - a hydrogen atom,
- R_{24}, R_{26} and R_{28}, which may be identical or different, are chosen from linear or branched, saturated or unsaturated C_7-C_{21} hydrocarbon-based groups;
- r, s and t, which may be identical or different, are integers ranging from 2 to 6,
- r1 and t1, which may be identical or different, are equal to 0 or 1, with r2+r1=2r and t1+t2=2t,
- y is an integer ranging from 1 to 10,
- x and z, which may be identical or different, are integers ranging from 0 to 10,
- X^- represents an organic or inorganic anionic counterion,

with the proviso that the sum x + y + z equals from 1 to 15, that, when x is 0, then R_{23} denotes R_{27} and that, when z is 0, then R_{25} denotes R_{29}.

The alkyl groups R_{22} may be linear or branched, and more particularly linear.

Preferably, R_{22} denotes a methyl, ethyl, hydroxyethyl or dihydroxypropyl group, and more particularly a methyl or ethyl group.

Advantageously, the sum x + y + z has a value from 1 to 10.

When R23 is an R27 hydrocarbon-based group, it may be long and may have from 12 to 22 carbon atoms, or may be short and may have from 1 to 3 carbon atoms.

When R_{25} is an R_{29} hydrocarbon-based group, it preferably contains 1 to 3 carbon atoms.

Advantageously, R24, R26 and R28, which may be identical or different, are chosen from linear or branched, saturated or unsaturated C11-C21 hydrocarbon-based groups, and more particularly from linear or branched, saturated or unsaturated C11-C21 alkyl and alkenyl groups.

Preferably, x and z, which may be identical or different, are equal to 0 or 1.

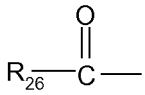
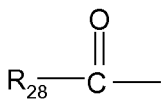
Advantageously, y is equal to 1.

Preferably, r, s and t, which may be identical or different, are equal to 2 or 3, and even more particularly are equal to 2.

The anionic counterion X^- is preferably a halide, such as chloride, bromide or iodide; a (C_1-C_4)alkyl sulfate or a (C_1-C_4)alkyl- or (C_1-C_4)alkylarylsulfonate. However, it is possible to use methanesulfonate, phosphate, nitrate, tosylate, an anion derived from an organic acid, such as acetate or lactate, or any other anion that is compatible with the ammonium comprising an ester function.

The anionic counterion X^- is even more particularly chloride, methyl sulfate or ethyl sulfate.

Use is made more particularly, in the composition useful for the invention, of the ammonium salts of formula **(B4)** in which:

- R_{22} denotes a methyl or ethyl group,
- x and y are equal to 1,
- z is equal to 0 or 1,
- r, s and t are equal to 2,
- R_{23} is chosen from:
  - the group 
  - methyl, ethyl or $C_{14}-C_{22}$ hydrocarbon-based groups,
  - a hydrogen atom,
- R_{25} is chosen from:
  - the group 
  - a hydrogen atom,
- R_{24}, R_{26} and R_{28}, which may be identical or different, are chosen from linear or branched, saturated or unsaturated $C_{13}-C_{17}$ hydrocarbon-based groups, and preferably from linear or branched, saturated or unsaturated $C_{13}-C_{17}$ alkyl and alkenyl groups.

Advantageously, the hydrocarbon-based radicals are linear.

Among the compounds of formula **(B4)**, examples that may be mentioned include salts, in particular the chloride or methyl sulfate, of diacyloxyethyldimethylammonium, diacyloxyethylhydroxyethylmethylammonium, monoacyloxyethyldihydroxyethylmethylammonium, triacyloxyethylmethylammonium or monoacyloxyethylhydroxyethyldimethylammonium, and mixtures thereof. The acyl groups preferably contain from 14 to 18 carbon atoms and originate more particularly from a plant oil, such as palm oil or sunflower oil. When the compound comprises several acyl groups, these groups may be identical or different.

These products are obtained, for example, by direct esterification of triethanolamine, triisopropanolamine, an alkyldiethanolamine or an alkyldiisopropanolamine, which are optionally oxyalkylenated, with fatty acids or with fatty acid mixtures of plant or animal origin, or by transesterification of the methyl esters thereof. This esterification is followed by a quaternization by means of an alkylating agent such as an alkyl halide, preferably methyl or ethyl halide, a dialkyl sulfate, preferably dimethyl or diethyl sulfate, methyl methanesulfonate, methyl para-toluenesulfonate, glycol chlorohydrin or glycerol chlorohydrin.

Such compounds are sold, for example, under the names Dehyquart® by the company Henkel, Stepanquat® by the company Stepan, Noxamium® by the company Ceca or Rewoquat® WE 18 by the company Rewo-Witco.

The composition useful for the invention may contain, for example, a mixture of quaternary ammonium salts of monoesters, diesters and triesters with a weight majority of diester salts.

Use may also be made of the ammonium salts containing at least one ester function that are described in patents US-A-4 874 554 and US-A-4 137 180.

Use may be made of behenoylhydroxypropyltrimethylammonium chloride, sold by Kao under the name Quatarmin BTC 131.

Preferably, the ammonium salts containing at least one ester function contain two ester functions.

Among the cationic surfactants that may be present in the composition according to the invention, it is more particularly preferred to choose cetyltrimethylammonium, behenyltrimethylammonium and dipalmitoylethylhydroxyethylmethylammonium salts, and mixtures thereof, and more particularly behenyltrimethylammonium chloride, cetyltrimethylammonium chloride and dipalmitoylethylhydroxyethylammonium methosulfate, and mixtures thereof.

When they are present, the surfactants may represent from 0.01% to 30%, preferably from 0.1% to 20% by weight and better still from 1% to 10% by weight, relative to the total weight of the composition.

In addition, the composition may contain at least one fatty substance.

For the purposes of the present invention, the term “fatty substance” is intended to mean an organic compound which is insoluble in water at normal temperature (25°C) and at atmospheric pressure (760 mmHg, i.e. 1.013×10^5 Pa), that is to say with a solubility of less than 4% by weight, preferably of less than 1% by weight and even more preferentially of less than 0.1% by weight. They exhibit, in their structure, at least one hydrocarbon-based chain comprising at least 6 carbon atoms or a sequence of at least two siloxane groups. In addition, the fatty substances are soluble in organic solvents under the same temperature and pressure conditions, for instance chloroform, ethanol or benzene.

The fatty substances are not etherified with oxyalkylenated or glycerolated groups.

The fatty substances of the invention may be liquid or non-liquid at ambient temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013×10^5 Pa).

The liquid fatty substances of the invention preferably have a viscosity of less than or equal to 2 Pa.s, better still less than or equal to 1 Pa.s and even better still less than or equal to 0.1 Pa.s at a temperature of 25°C and at a shear rate of 1 s^{-1}.

By way of a liquid fatty substance, mention may be made of silicone or non-silicone oils.

The term "*non-silicone oil*" means an oil not containing any silicon atoms (Si) and the term "*silicone oil*" means an oil containing at least one silicon atom.

More particularly, the fatty substances are chosen from C_6-C_{16} hydrocarbons, hydrocarbons containing more than 16 carbon atoms, non-silicone oils of animal origin, plant oils of triglyceride type, synthetic triglycerides, fluoro oils, fatty alcohols, fatty acid and/or fatty alcohol esters other than triglycerides and plant waxes, non-silicone waxes and silicones, and mixtures thereof.

It should be remembered that fatty alcohols, esters and acids more particularly exhibit at least one saturated or unsaturated and linear or branched hydrocarbon-based group which comprises from 6 to 30 and better still from 8 to 30 carbon atoms and which is optionally substituted, in particular with one or more hydroxyl groups (in particular 1 to 4). If they are unsaturated, these compounds may comprise one to three conjugated or unconjugated carbon-carbon double bonds.

As regards the C_6-C_{16} hydrocarbons, they are linear, branched or optionally cyclic, and are preferably alkanes. By way of examples mention may be made of hexane, dodecane and isoparaffins such as isohexadecane and isodecane.

By way of hydrocarbon-based oils of animal origin, mention may be made of perhydrosqualene.

The triglyceride oils of plant or synthetic origin are preferably chosen from liquid fatty acid triglycerides containing from 6 to 30 carbon atoms, for instance heptanoic or octanoic acid triglycerides, or alternatively, for example, sunflower oil, corn oil, soybean oil, marrow oil, grapeseed oil, sesame seed oil, hazelnut oil, apricot oil, macadamia oil, arara oil, sunflower oil, castor oil, avocado oil, caprylic/capric acid triglycerides, for instance those sold by the company Stearineries Dubois or those sold under the names Miglyol® 810, 812 and 818 by the company Dynamit Nobel, jojoba oil and shea butter oil.

The linear or branched hydrocarbons of mineral or synthetic origin having more than 16 carbon atoms are preferably chosen from liquid paraffins, petrolatum, liquid petrolatum, polydecenes or hydrogenated polyisobutene, such as Parleam®.

As regards the C_6-C_{16} alkanes, they are linear, branched or optionally cyclic. By way of examples mention may be made of hexane, dodecane and isoparaffins such as isohexadecane and isodecane.

As oils of animal, plant, mineral or synthetic origin that may be used in the composition of the invention, examples that may be mentioned include:

fluoro oils which may be chosen from perfluoromethylcyclopentane and perfluoro-1,3-dimethylcyclohexane, sold under the names Flutec® PC1 and Flutec® PC3 by the company BNFL Fluorochemicals; perfluoro-1,2-dimethylcyclobutane; perfluoroalkanes such as dodecafluoropentane and tetradecafluorohexane, sold under the names PF 5050® and PF 5060® by the company 3M, or bromoperfluorooctyl sold under the name Foralkyl® by the company Atochem; nonafluoromethoxybutane and nonafluoroethoxyisobutane; perfluoromorpholine derivatives such as 4-trifluoromethyl perfluoromorpholine sold under the name PF 5052® by the company 3M.

The fatty alcohols which are suitable for the implementation of the invention are more particularly chosen from saturated or unsaturated and linear or branched alcohols comprising from 6 to 30 carbon atoms and preferably from 8 to 30 carbon atoms. Mention may be made, for example, of cetyl alcohol, stearyl alcohol and their mixture (cetearyl alcohol),

octyldodecanol, 2-butyloctanol, 2-hexyldecanol, 2-undecylpentadecanol, oleyl alcohol or linoleyl alcohol.

As regards the fatty acid and/or fatty alcohol esters, which are advantageously different from the triglycerides mentioned above, mention may be made in particular of esters of saturated or unsaturated and linear or branched C_1-C_{26} aliphatic monoacids or polyacids and of saturated or unsaturated and linear or branched C_1-C_{26} aliphatic monoalcohols or polyalcohols, the total carbon number of the esters being greater than or equal to 6 and more advantageously greater than or equal to 10.

Among the monoesters, mention may be made of dihydroabietyl behenate; octyldodecyl behenate; isocetyl behenate; cetyl lactate; C_{12}-C_{15} alkyl lactate; isostearyl lactate; lauryl lactate; linoleyl lactate; oleyl lactate; (iso)stearyl octanoate; isocetyl octanoate; octyl octanoate; cetyl octanoate; decyl oleate; isocetyl isostearate; isocetyl laurate; isocetyl stearate; isodecyl octanoate; isodecyl oleate; isononyl isononanoate; isostearyl palmitate; methylacetyl ricinoleate; myristyl stearate; octyl isononanoate; 2-ethylhexyl isononate; octyl palmitate; octyl pelargonate; octyl stearate; octyldodecyl erucate; oleyl erucate; ethyl and isopropyl palmitates, 2-ethylhexyl palmitate, 2-octyldecyl palmitate, alkyl myristates such as isopropyl, butyl, cetyl, 2-octyldodecyl, myristyl or stearyl myristate, hexyl stearate, butyl stearate, isobutyl stearate; dioctyl malate, hexyl laurate, 2-hexyldecyl laurate.

Still within the context of this variant, esters of C_4-C_{22} dicarboxylic or tricarboxylic acids and of C_1-C_{22} alcohols and esters of mono-, di- or tricarboxylic acids and of C_2-C_{26} di-, tri-, tetra- or pentahydroxy alcohols may also be used.

Mention may in particular be made of: diethyl sebacate; diisopropyl sebacate; diisopropyl adipate; di(n-propyl) adipate; dioctyl adipate; diisostearyl adipate; dioctyl maleate; glyceryl undecylenate; octyldodecyl stearoyl stearate; pentaerythrityl monoricinoleate; pentaerythrityl tetraisononanoate; pentaerythrityl tetrapelargonate; pentaerythrityl tetraisostearate; pentaerythrityl tetraoctanoate; propylene glycol dicaprylate; propylene glycol dicaprate; tridecyl erucate; triisopropyl citrate; triisostearyl citrate; glyceryl trilactate; glyceryl trioctanoate; trioctyldodecyl citrate; trioleyl citrate; propylene glycol dioctanoate; neopentyl glycol diheptanoate; diethylene glycol diisononanoate; and polyethylene glycol distearates.

Among the esters mentioned above, use is preferably made of ethyl, isopropyl, myristyl, cetyl or stearyl palmitate, 2-ethylhexyl palmitate, 2-octyldecyl palmitate, alkyl myristates, such as isopropyl, butyl, cetyl or 2-octyldodecyl myristate, hexyl stearate, butyl

stearate, isobutyl stearate; dioctyl malate, hexyl laurate, 2-hexyldecyl laurate, isononyl isononanoate or cetyl octanoate.

The composition may also comprise, as fatty ester, sugar esters and diesters of C_6-C_{30} and preferably C_{12}-C_{22} fatty acids. It is recalled that the term "sugar" is understood to mean oxygen-bearing hydrocarbon-based compounds that contain several alcohol functions, with or without aldehyde or ketone functions, and that comprise at least 4 carbon atoms. These sugars can be monosaccharides, oligosaccharides or polysaccharides.

Mention may be made, as suitable sugars, for example, of sucrose (or saccharose), glucose, galactose, ribose, fucose, maltose, fructose, mannose, arabinose, xylose and lactose, and derivatives thereof, in particular alkyl derivatives, such as methyl derivatives, for instance methylglucose.

The sugar esters of fatty acids may be chosen in particular from the group comprising the esters or mixtures of esters of sugars described previously and of linear or branched, saturated or unsaturated C_6-C_{30} and preferably C_{12}-C_{22} fatty acids. If they are unsaturated, these compounds may comprise one to three conjugated or unconjugated carbon-carbon double bonds.

The esters according to this variant can also be chosen from mono-, di-, tri- and tetraesters, polyesters, and mixtures thereof.

These esters can, for example, be oleates, laurates, palmitates, myristates, behenates, cocoates, stearates, linoleates, linolenates, caprates, arachidonates or mixtures thereof, such as, in particular, oleate/palmitate, oleate/stearate or palmitate/stearate mixed esters.

More particularly, use is made of monoesters and diesters and in particular mono- or di-oleate, -stearate, -behenate, -oleate/palmitate, -linoleate, -linolenate or -oleate/stearate of sucrose, of glucose or of methylglucose.

An example that may be mentioned is the product sold under the name Glucate® DO by the company Amerchol, which is a methylglucose dioleate.

Examples of esters or mixtures of esters of sugar and of fatty acid that may also be mentioned include:

- the products sold under the names F160, F140, F110, F90, F70 and SL40 by the company Crodesta, respectively denoting sucrose palmitostearates formed from 73% monoester and 27% diester and triester, from 61% monoester and 39% diester, triester and tetraester, from 52% monoester and 48% diester, triester and tetraester, from 45%

monoester and 55% diester, triester and tetraester, from 39% monoester and 61% diester, triester and tetraester, and sucrose monolaurate;

- the products sold under the name Ryoto Sugar Esters, for example referenced B370 and corresponding to sucrose behenate formed from 20% monoester and 80% diester-triester-polyester;

- the sucrose monopalmitate/stearate-dipalmitate/stearate sold by the company Goldschmidt under the name Tegosoft® PSE.

The non-silicone wax(es) are chosen in particular from carnauba wax, candelilla wax, esparto wax, paraffin wax, ozokerite, plant waxes, such as olive tree wax, rice wax, hydrogenated jojoba wax or absolute flower waxes, such as the blackcurrant blossom essential wax sold by the company Bertin (France), or animal waxes, such as beeswaxes or modified beeswaxes (cerabellina); other waxes or waxy starting materials which can be used according to the invention are in particular marine waxes, such as that sold by the company Sophim under the reference M82, polyethylene waxes or polyolefin waxes in general.

The silicones that may be used in the cosmetic compositions of the present invention are volatile or non-volatile, cyclic, linear or branched silicones, which are unmodified or modified with organic groups, having a viscosity from 5×10^{-6} to 2.5 m^2/s at 25°C, and preferably 1×10^{-5} to 1 m^2/s.

The silicones which can be used in accordance with the invention can be in the form of oils, waxes, resins or gums.

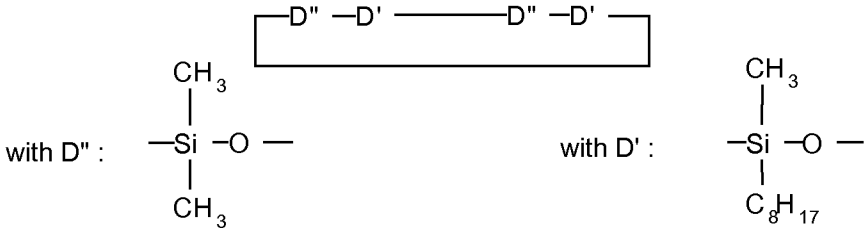
Preferably, the silicone is chosen from polydialkylsiloxanes, in particular polydimethylsiloxanes (PDMSs), and organomodified polysiloxanes comprising at least one functional group chosen from amino groups and alkoxy groups.

Organopolysiloxanes are defined in greater detail in Walter Noll's "Chemistry and Technology of Silicones" (1968), Academic Press. They can be volatile or non-volatile.

When they are volatile, the silicones are more particularly chosen from those having a boiling point of between 60°C and 260°C, and more particularly still from:

(i) cyclic polydialkylsiloxanes containing from 3 to 7 and preferably from 4 to 5 silicon atoms. These are, for example, octamethylcyclotetrasiloxane sold in particular under the name Volatile Silicone® 7207 by Union Carbide or Silbione® 70045 V2 by Rhodia, decamethylcyclopentasiloxane sold under the name Volatile Silicone® 7158 by Union Carbide, and Silbione® 70045 V5 by Rhodia, and mixtures thereof.

Mention may also be made of cyclocopolymers of the dimethylsiloxane/methylalkylsiloxane type, such as Volatile Silicone® FZ 3109 sold by the company Union Carbide, of formula:



Mention may also be made of mixtures of cyclic polydialkylsiloxanes with organosilicon compounds, such as the mixture of octamethylcyclotetrasiloxane and tetra(trimethylsilyl)pentaerythritol (50/50) and the mixture of octamethylcyclotetrasiloxane and oxy-1,1'-bis(2,2,2',2',3,3'-hexatrimethylsilyloxy)neopentane;

(ii) linear volatile polydialkylsiloxanes containing 2 to 9 silicon atoms and having a viscosity of less than or equal to 5×10^{-6} m²/s at 25°C. An example is decamethyltetrasiloxane sold in particular under the name SH 200 by the company Toray Silicone. Silicones coming within this category are also described in the paper published in Cosmetics and Toiletries, Vol. 91, Jan. 76, pp. 27-32, Todd & Byers, "Volatile Silicone Fluids for Cosmetics".

Use is preferably made of non-volatile polydialkylsiloxanes, polydialkylsiloxane gums and resins, polyorganosiloxanes modified with the organofunctional groups above, and mixtures thereof.

These silicones are more particularly chosen from polydialkylsiloxanes, among which mention may be made mainly of polydimethylsiloxanes having trimethylsilyl end groups. The viscosity of the silicones is measured at 25°C according to Standard ASTM 445 Appendix C.

Mention may be made, among these polydialkylsiloxanes, without implied limitation, of the following commercial products:

- the Silbione® oils of the 47 and 70 047 series or the Mirasil® oils sold by Rhodia, such as, for example, the oil 70 047 V 500 000;
- the oils of the Mirasil® series sold by the company Rhodia;
- the oils of the 200 series from the company Dow Corning, such as DC200 with a viscosity of 60 000 mm^2/s;
- the Viscasil® oils from General Electric and certain oils of the SF series (SF 96, SF 18) from General Electric.

Mention may also be made of polydimethylsiloxanes having dimethylsilanol end groups known under the name dimethiconol (CTFA), such as the oils of series 48 from the company Rhodia.

In this category of polydialkylsiloxanes, mention may also be made of the products sold under the names Abil Wax® 9800 and 9801 by the company Goldschmidt, which are polydi(C_1-C_{20})alkylsiloxanes.

The silicone gums that may be used in accordance with the invention are in particular polydialkylsiloxanes and preferably polydimethylsiloxanes with high number-average molecular weights of between 200 000 and 1 000 000, used alone or as a mixture in a solvent. This solvent can be chosen from volatile silicones, polydimethylsiloxane (PDMS) oils, polyphenylmethylsiloxane (PPMS) oils, isoparaffins, polyisobutylenes, methylene chloride, pentane, dodecane, tridecane or their mixtures.

Products which can be used more particularly in accordance with the invention are mixtures such as:

- the mixtures formed from a polydimethylsiloxane hydroxylated at the chain end, or dimethiconol (CTFA), and from a cyclic polydimethylsiloxane, also known as cyclomethicone (CTFA), such as the product Q2 1401 sold by the company Dow Corning;

- the mixtures of a polydimethylsiloxane gum and of a cyclic silicone, such as the product SF 1214 Silicone Fluid from General Electric; this product is an SF 30 gum corresponding to a dimethicone, having a number-average molecular weight of 500 000, dissolved in the oil SF 1202 Silicone Fluid corresponding to decamethylcyclopentasiloxane;

- the mixtures of two PDMSs with different viscosities, and more particularly of a PDMS gum and a PDMS oil, such as the product SF 1236 from General Electric. The product SF 1236 is a mixture of a gum SE 30 defined above, with a viscosity of 20 m²/s, and of an oil SF 96 with a viscosity of 5×10^{-6} m²/s. This product preferably comprises 15% of gum SE 30 and 85% of an oil SF 96.

The organopolysiloxane resins that may be used in accordance with the invention are crosslinked siloxane systems containing the following units:

$R_2SiO_{2/2}$, $R_3SiO_{1/2}$, $RSiO_{3/2}$ and $SiO_{4/2}$

in which R represents an alkyl containing 1 to 16 carbon atoms. Among these products, those that are particularly preferred are those in which R denotes a C_1-C_4 lower alkyl group, more particularly methyl.

Mention may be made, among these resins, of the product sold under the name Dow Corning 593 or those sold under the names Silicone Fluid SS 4230 and SS 4267 by the company General Electric, which are silicones of dimethyl/trimethylsiloxane structure.

Mention may also be made of the resins of the trimethyl siloxysilicate type, sold in particular under the names X22-4914, X21-5034 and X21-5037 by the company Shin-Etsu.

The organomodified silicones that can be used in accordance with the invention are silicones as defined above and comprising in their structure one or more organofunctional groups attached via a hydrocarbon-based group.

In addition to the silicones described above, the organomodified silicones can be polydiarylsiloxanes, in particular polydiphenylsiloxanes, and polyalkylarylsiloxanes functionalized by the abovementioned organofunctional groups.

The polyalkylarylsiloxanes are particularly chosen from linear and/or branched polydimethyl/methylphenylsiloxanes and polydimethyl/diphenylsiloxanes with a viscosity ranging from 1×10^{-5} to 5×10^{-2} m^2/s at 25°C.

Mention may be made, among these polyalkylarylsiloxanes, by way of example, of the products sold under the following names:

. the Silbione® oils of the 70 641 series from Rhodia;

. the oils of the Rhodorsil® 70 633 and 763 series from Rhodia;

. the oil Dow Corning 556 Cosmetic Grade Fluid from Dow Corning;

. the silicones of the PK series from Bayer, such as the product PK20;

. the silicones of the PN and PH series from Bayer, such as the products PN1000 and PH1000;

certain oils of the SF series from General Electric, such as SF 1023, SF 1154, SF 1250 and SF 1265.

Mention may be made, among the organomodified silicones, of polyorganosiloxanes comprising:

- substituted or unsubstituted amino groups, such as the products sold under the name GP 4 Silicone Fluid and GP 7100 by the company Genesee or the products sold under the names Q2 8220 and Dow Corning 929 or 939 by the company Dow Corning. The substituted amino groups are, in particular, C_1-C_4 aminoalkyl groups;

- alkoxylated groups, such as the product sold under the name Silicone Copolymer F-755 by SWS Silicones, and Abil Wax® 2428, 2434 and 2440 by the company Goldschmidt.

More particularly, the fatty substances are chosen from compounds that are liquid or pasty at ambient temperature (25°C) and at atmospheric pressure.

Preferably, the fatty substance is a compound that is liquid at a temperature of 25°C and at atmospheric pressure.

The fatty substances are advantageously chosen from C_6-C_{16} alkanes, non-silicone oils of plant, mineral or synthetic origin, fatty alcohols, fatty acid and/or fatty alcohol esters, or mixtures thereof.

Preferably, the fatty substance is chosen from liquid petroleum jelly, C_6-C_{16} alkanes, polydecenes, liquid fatty acid and/or fatty alcohol esters, liquid fatty alcohols, or mixtures thereof.

When they are present, the fatty substances may represent from 0.01% to 95%, preferably from 0.1% to 90% by weight, better still from 0.5% to 80% by weight and even better still from 1% to 30% by weight, relative to the total weight of the composition.

By way of example, the composition comprises one or more additives chosen from cationic, anionic, nonionic, amphoteric and/or zwitterionic surfactants, silanes other than those of formula (I), fatty substances, plasticizers and water-soluble solvents.

The compositions according to the invention can also contain silanes with no fatty chain, such as APTES, phenyl alkoxysilanes, PDMS alkoxysilanes, PEG alkoxysilanes; vitamins and provitamins, including panthenol; water-soluble and liposoluble, silicone or non-silicone sunscreens; pearlescent agents and opacifiers; sequestrants; antifoams; cationic polymers; fixing polymers; silicone gums and resins; chitosans and derivatives; inorganic and organic thickeners; antioxidants; hydroxy acids; antidandruff agents; antiseborrheic agents; hair-loss counteractants and/or hair restorers; penetrating agents; fragrances; peptizers; amino acids and preservatives; or any other additive conventionally used in the cosmetics field.

These additives may be present in the composition according to the invention in an amount ranging from 0 to 20% by weight, relative to the total weight of the composition.

Those skilled in the art will take care to select these optional additives and amounts thereof in such a way that they do not interfere with the properties of the compositions of the present invention.

The composition useful for the invention may be aqueous or anhydrous.

In a first variant, if the composition is aqueous, it comprises less than 50% of water, preferably from 5% to 45% of water, better still from 5% to 25% of water and even better still from 5% to 15% by weight of water, relative to the total weight of the composition.

In a second variant, if the composition is aqueous, it comprises at least 50% of water, preferably from 50% to 95% of water, better still from 55% to 90% of water and even better still from 60% to 85% by weight of water, relative to the total weight of the composition.

The term "anhydrous" is intended to mean a composition not containing any added water, i.e. a composition in which the water possibly present comes only from the water of crystallization or of adsorption of the starting materials. In any event, an anhydrous composition contains less than 5% by weight of water and better still less than 1% by weight of water, relative to the total weight of the composition.

Whether it is anhydrous or aqueous, the composition according to the invention may contain one or more organic solvents that are liquid at ambient temperature (25°C) and at atmospheric pressure (760 mmHg, i.e. 1.013×10^5 Pa). Besides the silicones and the nonsiliceous liquid fatty substances described above, the liquid organic solvent(s) can be chosen from C_1-C_4 lower alcohols, such as ethanol, isopropanol, tert-butanol or n-butanol, polyols and polyol ethers such as propylene glycol, polyethylene glycol or glycerol, C_3-C_4 ketones, for instance acetone and methyl ethyl ketone, C_1-C_4 alkyl acetates, for instance methyl acetate and ethyl acetate, and mixtures thereof. The solvent is preferably ethanol. Advantageously, the composition is aqueous or aqueous-alcoholic. When the alcohol is present, its proportion is in particular between 1% and 99% by weight, preferably between 5% and 90% by weight and even more preferentially between 10% and 85% by weight, relative to the total weight of the composition.

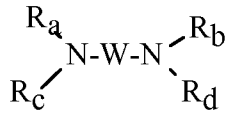
The pH of the composition according to the invention, if it is aqueous, generally ranges from 2 to 9 and in particular from 3 to 8. It may be adjusted to the desired value by means of acidifying or basifying agents normally used in the cosmetics industry for this type of application, or alternatively using standard buffer systems.

Among the acidifying agents, examples that may be mentioned include the organic acids already mentioned previously, or inorganic acids.

The term "inorganic acid" is intended to mean any acid derived from an inorganic compound. Among the inorganic acids, mention may be made of hydrochloric acid, orthophosphoric acid, sulfuric acid, sulfonic acids and nitric acid.

Use may in particular be made of inorganic or organic acids such as hydrochloric acid, orthophosphoric acid, sulfuric acid, carboxylic acids, for instance acetic acid, tartaric acid, citric acid or lactic acid, and sulfonic acids.

Among the basifying agents, examples that may be mentioned include aqueous ammonia, alkali metal carbonates, alkanolamines, such as mono-, di- and triethanolamines and derivatives thereof, sodium hydroxide, potassium hydroxide and the compounds of the following formula:



in which W is a propylene residue optionally substituted with a hydroxyl group or a C_1-C_4 alkyl group; R_a, R_b, R_c and R_d, which may be identical or different, represent a hydrogen atom or a C_1-C_4 alkyl or C_1-C_4 hydroxyalkyl group.

Preferably, the pH modifiers may be chosen from alkaline agents, such as aqueous ammonia, monoethanolamine, diethanolamine, triethanolamine, 1,3-propanediamine or an alkaline hydroxide, such as 2-amino-2-methyl-1-propanol, or else acidifying agents, such as phosphoric acid or hydrochloric acid.

The composition may be in the form of a solution, a dispersion or an emulsion. The emulsion may be an oil-in-water emulsion, a water-in-oil emulsion or a multiple emulsion.

The composition of the invention may be in the form of a foam, a gel, a serum, a cream, a paste, a wax, a liquid lotion or a lacquer.

The composition may be packaged in a pump-dispenser bottle or in an aerosol device.

When it is packaged in an aerosol-type device, the liquid phase/propellant weight ratio of the pressurized composition of the present invention is preferably between 50 and 0.05, and in particular between 50 and 1.

For the aerosol formulations, any liquefiable gas customarily used in aerosol devices will be used as propellant gas. Use will be made in particular of dimethyl ether, C_3-C_5 alkanes, chlorinated and/or fluorinated, halogenated or non-halogenated, volatile hydrocarbons, usually used in aerosol devices. Carbon dioxide, nitrous oxide, nitrogen or compressed air, or mixtures thereof, may also be used as propellant.

Preferably, the compound(s) constituting the propellant gas used are chosen from nonhalogenated C_3-C_5 alkanes, such as propane, n-butane and isobutane, halogenated, and in particular chlorinated and/or fluorinated, C_3-C_5 alkanes, such as 1,1-difluoroethane, and mixtures thereof.

According to a particularly preferred embodiment, the alkane(s) of the propellant gas are nonhalogenated. Even more preferentially, the propellant gas is dimethyl ether or a mixture of propane, n-butane and isobutane.

In the case of aerosol foams, the composition introduced into the aerosol device may, for example, be in the form of a lotion, or dispersions or emulsions which, after dispensing from the aerosol device, form foams to be applied to keratin materials.

These foams must be sufficiently stable not to rapidly liquefy and must also rapidly disappear, either spontaneously or during the massaging which is used to cause the composition to penetrate into keratin materials and/or to distribute the composition over keratin materials and more particularly the head of hair and/or the hair.

In the case of aerosol foams, the composition according to the invention may also contain at least one cationic, nonionic, anionic or amphoteric surfactant as previously described.

The propellant gas is present in the composition according to the invention in proportions preferably ranging from 1% to 99% by weight, more preferentially from 1.5% to 50% by weight and better still from 2% to 30% by weight, relative to the total weight of the composition.

The present invention relates to a cosmetic hair treatment process, which consists in applying to the hair an effective amount of a composition as described above.

This application may or may not be followed by a rinsing operation.

When the application of the composition is followed by rinsing, the leave-on time of the composition on the keratin materials ranges from a few seconds to 60 minutes, better still from 5 seconds to 30 minutes and even better still from 10 seconds to 10 minutes.

Whether in rinsed mode or non-rinsed mode, the application of the composition may take place in the presence of heat. The heating device may be a hairdryer, a hood dryer, a curling iron or a flat iron. The heating temperature may be between 40°C and 220°C, in particular around 200°C when a straightening iron is used.

The application of the composition to the hair may take place on dry hair or on wet hair. It may in particular be carried out after a shampooing operation or after a pretreatment at acidic or basic pH.

The application of the composition may also be followed by a post-treatment at acidic or basic pH, followed in particular by drying at ambient temperature or drying by providing heat, by means of a hairdryer, a hood dryer, a curling iron or a flat iron.

The composition useful for the invention may be applied to the hair in combination with chemical treatments such as oxidations, reductions, buffer solutions or else mechanical treatments.

The examples that follow serve to illustrate the invention without, however, being limiting in nature.

EXAMPLES

- Examples of compositions useful for the invention:

	Composition A	Composition B
Components	% starting material	% starting material
OTES	10	10
Xanthan gum	0.3	0.2
Hydroxyethylcellulose	0.8	0
PEG-150/stearyl alcohol/SMDI copolymer	0.4	0.2
Water	qs 100	qs 100

The pH of these compositions is adjusted to 3.5.

- Composition stability study:

The stability of the formulae is studied with the naked eye. The compositions are placed in an incubator. The temperature of the incubator is set at 45°C. The visualization is carried out every day.

	Stability results
Composition A	Stable after 2 months
Composition B	Stable after 2 months

Compositions A and B are stable and their use qualities are good. In particular, they are not runny when seized. Compositions A and B were applied on hair. Then, the cosmetic evaluation was made on a panel of 10 individuals. The evaluation results show that the performance levels are good in terms of smooth, natural and soft feel after disentangling.

5

CLAIMS

1. A process for treating hair comprising the application of a cosmetic composition comprising:

- one or more fatty-chain silanes of formula (I) below and/or oligomers thereof:

$R_1Si(OR_2)_z(R_3)_x(OH)_y$ (I)

in which formula (I):

- R_1 represents a linear or branched alkyl or alkenyl group comprising from 7 to 18 carbon atoms,
- R_2 and R_3, which may be identical or different, represent a linear or branched alkyl group comprising from 1 to 6 carbon atoms,
- y denotes an integer ranging from 0 to 3, and
- z denotes an integer ranging from 0 to 3; and
- x denotes an integer ranging from 0 to 2,
- with z+x+y=3,

- at least one associative polyurethane polymer and
- at least one polysaccharide.

2. The process as claimed in claim 1, wherein in the composition, the fatty-chain silanes of formula (I) is such that R_2 represents an alkyl group comprising from 1 to 4 carbon atoms, better still a linear alkyl group comprising from 1 to 4 carbon atoms, and preferably the ethyl group, and wherein R_3 represents an alkyl group comprising from 1 to 4 carbon atoms, better still a linear alkyl group comprising from 1 to 4 carbon atoms, and preferably the methyl or ethyl group.

3. The process as claimed in either one of claims 1 and 2, wherein in the composition, the fatty-chain silanes of formula (I) is such that R_1 represents an alkyl group and even more preferentially a linear alkyl group, preferably n-octyl.

4. The process as claimed in any one of claims 1 to 3, wherein in the composition, the fatty-chain silanes of formula (I) is such that z ranges from 1 to 3, and preferably z is equal to 3.

5. The process as claimed in claims 1 to 4, wherein in the composition, the fatty-chain silane is chosen from octyltriethoxysilane, dodecyltriethoxysilane, octadecyltriethoxysilane and hexadecyltriethoxysilane, preferably octyltriethoxysilane, and oligomers thereof.

6. The process as claimed in any one of the preceding claims, wherein in the composition, the fatty-chain silane(s) of formula (I) are present in proportions ranging from 0.1% to 50% by weight, more preferentially from 0.5% to 20% by weight and better still from 2% to 20% by weight, relative to the total weight of the composition.

7. The process as claimed in any one of the preceding claims, wherein in the composition the associative polyurethane polymer(s) are anionic, cationic or nonionic and preferably nonionic.

8. The process as claimed in any one of the preceding claims, wherein in the composition, the associative polyurethane polymer(s) are chosen from nonionic polymers that may be obtained by polycondensation of at least three compounds comprising:

(i) at least one polyethylene glycol comprising from 150 to 180 mol of ethylene oxide,

(ii) stearyl alcohol or decyl alcohol and

(iii) at least one diisocyanate.

9. The process as claimed in any one of the preceding claims, wherein the associative polyurethane polymer(s) used in the composition is present in an amount ranging from 0.1% to 5%, preferably in an amount of less than 2% and even more preferentially in an amount ranging from 0.2% to 1% by weight, better still from 0.3% to 0.7% by weight, relative to the total weight of the composition.

10. The process as claimed in any one of the preceding claims, wherein in the composition, the polysaccharide(s) are chosen from fructans, glucans, modified or unmodified starches, amylose, amylopectin, glycogen, dextrans, celluloses and derivatives thereof, xylans, arabans, galactans, galacturonans, chitin, chitosans, glucans; pectic acids and pectins, alginic acid and alginates, arabinogalactans, carrageenans, agars, gum arabics, gum tragacanths, ghatti gums, karaya gums, locust bean gums, mannans, galactomannans and xanthan gums, and mixtures thereof.

11. The process as claimed in any one of the preceding claims, wherein in the composition,the polysaccharide(s) are a cellulose-based derivative chosen from hydroxyalkylcelluloses and biopolysaccharides derived from microorganisms, preferably xanthan gum.

12. The process as claimed in any one of the preceding claims, wherein in the composition, the polysaccharide(s) are generally present at a concentration ranging from 0.01% to 5% by weight, relative to the total weight of the composition, preferably from 0.1% to 2% by weight and better still from 0.2% to 1% by weight.

13. The process as claimed in any one of the preceding claims, wherein in the composition, the polyurethane(s)/polysaccharide(s) weight ratio is less than or equal to 2.5 and preferably from 1 to 2.

14. The process as claimed in any one of the preceding claims, wherein the composition comprises one or more additives chosen from cationic, anionic, nonionic, amphoteric and/or zwitterionic surfactants, silanes other than those of formula (I), fatty substances, plasticizers and water-soluble solvents.

15. The process as claimed in any one of the preceding claims, wherein the composition is anhydrous or aqueous.

16 The process as claimed in any one of the preceding claims, carried out in the presence of heat.

17 A composition obtained from at least one associative polyurethane polymer and from at least one polysaccharide and from one or more fatty-chain silanes of formula (I) and/or oligomers thereof as described according to any one of the preceding claims wherein the polyurethane(s)/polysaccharide(s) weight ratio is less than or equal to 2.5 and preferably from 1 to 2 .