



US 20130233331A1

(19) **United States**

(12) **Patent Application Publication**
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(10) **Pub. No.: US 2013/0233331 A1**
(43) **Pub. Date: Sep. 12, 2013**

(54) **COSMETIC COMPOSITION COMPRISING A FATTY-CHAIN ALKOXY-SILANE, AN ANIONIC SURFACTANT AND A NONIONIC, AMPHOTERIC OR ZWITTERIONIC SURFACTANT**

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(21) Appl. No.: **13/821,997**

(22) PCT Filed: **Oct. 24, 2011**

(86) PCT No.: **PCT/EP2011/068525**

§ 371 (c)(1),
(2), (4) Date: **Jun. 3, 2013**

Related U.S. Application Data

(60) Provisional application No. 61/411,065, filed on Nov. 8, 2010.

(30) **Foreign Application Priority Data**

Oct. 26, 2010 (FR) 1058801

Publication Classification

(51) **Int. Cl.**
A61K 8/58 (2006.01)
A61Q 5/02 (2006.01)
A61Q 5/12 (2006.01)
(52) **U.S. Cl.**
CPC . *A61K 8/585* (2013.01); *A61Q 5/12* (2013.01);
A61Q 5/02 (2013.01)
USPC **132/202**; 424/70.19; 424/70.13

(57) **ABSTRACT**

The present invention relates to a cosmetic composition comprising: —at least 0.1% by weight of one or more fatty-chain alkoxy-silanes of formula (I): R₁Si(OR²)₃; in which R₁ represents a linear or branched alkyl or alkenyl group, comprising from 7 to 18 carbon atoms, and R₂ represents a linear or branched alkyl group comprising from 1 to 6 carbon atoms, and—one or more first surfactants chosen from anionic surfactants, and—one or more second surfactants chosen from nonionic surfactants, amphoteric surfactants and zwitterionic surfactants. The invention also relates to a cosmetic treatment process using the said composition. This composition can be used in particular for haircare and skincare.

**COSMETIC COMPOSITION COMPRISING A
FATTY-CHAIN ALKOXY-SILANE, AN
ANIONIC SURFACTANT AND A NONIONIC,
AMPHOTERIC OR ZWITTERIONIC
SURFACTANT**

[0001] The present invention relates to a cosmetic composition comprising one or more fatty-chain alkoxy-silanes, one or more first surfactants chosen from anionic surfactants, and one or more second surfactants chosen from nonionic surfactants, amphoteric surfactants and zwitterionic surfactants.

[0002] The present invention also relates to the use of the said composition for caring for keratin materials, such as the skin and human keratin fibres and in particular the hair, and also to a cosmetic process for treating keratin fibres using such a composition.

[0003] A recurrent problem in the field of cosmetic haircare consists in caring for keratin fibres subjected to various external attacking factors. Specifically, these fibres 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.

[0004] Attack due to chemical and mechanical treatments has consequences especially on the qualities of the keratin fibre 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 fibres, which become non-smooth and irregular at the surface, more particularly when the hair is dry.

[0005] Care products exist that can limit these phenomena. However, these solutions are not always sufficiently effective and are not sufficiently shampoo-resistant.

[0006] The prior-art compositions that can facilitate disentangling by softening the keratin fibre and that afford gloss, softness and uniformity to dry hair essentially comprise cationic surfactants, fatty substances, silicones and cationic polymers.

[0007] After having been applied, these compositions are rinsed out, and the cosmetic agents, which are only lightly deposited on the keratin fibres, are generally removed at the time of the next wash.

[0008] Thus, the application of these compositions must be repeated after each wash, in order to treat the hair and to facilitate its conditioning.

[0009] There is thus a need for compositions that can deposit care active agents uniformly onto and/or into the keratin fibres, in a manner that is resistant to shampooing several times.

[0010] Furthermore, the consumers wish to be able to wash their faces and body without drying their skin, and potentially treating it in order to give a good slip to their skin.

[0011] Products exist, that are called shower gels, based on anionic surfactants. However such compositions often leave an insufficient deposit on the skin. It is possible to improve the treating effect of such compositions by adding cationic compounds. However, this solution is not always fully satisfying considering the eco-toxicity of the materials used.

[0012] International patent application WO 2004/012 691 discloses the cosmetic use of silanes for improving the condition of the hair.

[0013] Patent application EP 0 159 628 proposes compositions for reinforcing the elasticity of the hair, comprising an alkyltrialkoxysilane.

[0014] Moreover, patent application EP 1 736 139 describes a hair treatment composition comprising an alkoxy-silane, an organic acid and water, the pH of the composition being between 2 and 5.

[0015] Finally, patent application EP 0 877 027 discloses a composition comprising an organosilane and a particular polyol.

[0016] The Applicant has now discovered, surprisingly, that the combination of a particular fatty-chain alkoxy-silane with at least one first surfactant chosen from anionic surfactants and at least one second surfactant chosen from nonionic surfactants, amphoteric surfactants and zwitterionic surfactants affords effective and long-lasting treatment of the keratin materials, and thus facilitates their conditioning.

[0017] In particular, such a composition can, firstly, treat the hair and the skin, and, secondly, give cosmetic effects that are resistant to shampooing several times.

[0018] Furthermore, the compositions according to the invention have excellent detergent properties and can be used most particularly as treating shampoos and shower gels.

[0019] One subject of the present invention is thus a cosmetic composition comprising:

[0020] at least 0.1% by weight, relative to the total weight of the composition, of one or more fatty-chain alkoxy-silane(s) of formula (I):



in which R_1 represents a linear or branched alkyl or alkenyl group comprising from 7 to 18 carbon atoms, and R_2 represents a linear or branched alkyl group comprising from 1 to 6 carbon atoms, and

[0021] one or more first surfactant(s) chosen from anionic surfactants, and

[0022] one or more second surfactant(s) chosen from nonionic surfactants, amphoteric surfactants and zwitterionic surfactants.

[0023] The present invention further concerns a cosmetic composition, obtainable by mixing the following ingredients:

[0024] at least 0.1% by weight, relative to the total weight of the composition, of one or more fatty-chain alkoxy-silane(s) of formula (I):



in which R_1 represents a linear or branched alkyl or alkenyl group comprising from 7 to 18 carbon atoms, and R_2 represents a linear or branched alkyl group comprising from 1 to 6 carbon atoms, and

[0025] one or more first surfactant(s) chosen from anionic surfactants, and

[0026] one or more second surfactant(s) chosen from nonionic surfactants, amphoteric surfactants and zwitterionic surfactants.

[0027] The composition of the present invention proves to be particularly suitable for caring for the hair and the skin and also makes it possible to obtain very good working qualities such as particularly easy application, good foam quality and good rinseability.

[0028] The composition according to the invention gives the hair excellent cosmetic properties, and in particular promotes the disentangling, suppleness and smoothness of the hair.

[0029] In addition to its cosmetic properties, the composition according to the invention also has excellent detergent properties.

[0030] In addition, the feel of the hair and the skin after treatment using the composition according to the invention is particularly pleasant.

[0031] Finally, the conditioning properties obtained using the composition according to the invention are shampoo- and washing-resistant.

[0032] Another subject of the invention consists of a cosmetic process for treating keratin materials, especially human skin and human keratin fibres such as the hair, which consists in applying to said materials an effective amount of a composition according to the invention.

[0033] In particular, the composition according to the invention may be rinsed out or left in, optionally applied under the effect of heat, and optionally combined with chemical and/or mechanical hair treatments.

[0034] A subject of the invention is also the use of the composition according to the invention for caring for keratin materials, such as human skin and human keratin fibres such as in particular the hair.

[0035] Other subjects, characteristics, aspects and advantages of the invention will emerge even more clearly on reading the description and the examples that follow.

[0036] According to the invention, the composition comprises one or more fatty-chain alkoxy silanes, one or more first surfactants chosen from anionic surfactants, and one or more second surfactants chosen from nonionic surfactants, amphoteric surfactants and zwitterionic surfactants.

[0037] The fatty-chain alkoxy silane(s) that may be used in the composition according to the invention are those corresponding to formula (I) below:



in which R^1 represents a linear or branched alkyl or alkenyl group comprising from 7 to 18 carbon atoms, and R_2 represents a linear or branched alkyl group comprising from 1 to 6 carbon atoms and preferably from 1 to 4 carbon atoms, and even more preferentially the ethyl group.

[0038] Said fatty-chain alkoxy silane can be present in the composition under the form of a compound of formula (I) above, and/or under the form of one or more oligomer(s) of such a compound.

[0039] In formula (I) above, R_1 being an alkyl or alkenyl group and R_2 being an alkyl group, these groups comprise only carbon and hydrogen atoms.

[0040] 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.

[0041] Preferably, R_1 represents an alkyl group and even more preferentially a linear alkyl group.

[0042] Preferably, the fatty-chain alkoxy silane is chosen from octyltriethoxysilane, dodecyltriethoxysilane, octadecyltriethoxysilane and hexadecyltriethoxysilane.

[0043] More particularly, the fatty-chain alkoxy silane according to the invention is octyltriethoxysilane (OTES).

[0044] The alkoxy silane(s) of formula (I) are present in the composition according to the invention in proportions of at least 0.1% by weight, preferably ranging from 0.1% to 20% by weight, more preferably from 0.5% to 18% by weight and better still from 2% to 15% by weight, relative to the total weight of the composition.

[0045] According to the invention, the composition comprises one or more second surfactants chosen from anionic surfactants.

[0046] The term "anionic surfactant" means a surfactant comprising, as ionic or ionizable groups, only anionic groups. These anionic groups are preferably chosen from $-CO_2H$, $-CO_2^-$, $-SO_3H$, $-SO_3^-$, $-OSO_3H$, $-OSO_3^-$, $-H_2PO_3$, $-HPO_3^-$, $-PO_3^{2-}$, $-H_2PO_2$, $=HPO_2$, $-HPO_2^-$, $=PO_2^-$, $=POH$ and $=PO^-$ groups.

[0047] Mention may be made, as examples of anionic surfactants that may be used in the composition according to the invention, of alkyl sulfates, alkyl ether sulfates, alkylamido ether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, alkylsulfonates, alkylamidesulfonates, alkylarylsulfonates, α -olefin sulfonates, paraffin sulfonates, alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl sulfoacetates, acylsarcosinates, acylglutamates, alkyl polyfosuccinates, acylisethionates and N-acyltaurates, polyglycoside polycarboxylic acid and alkyl monoester salts, acyl lactylates, salts of D-galactoside uronic acids, salts of alkyl ether carboxylic acids, salts of alkylaryl ether carboxylic acids, salts of alkylamido ether carboxylic acids; and the corresponding non-salified forms of all these compounds; the alkyl and acyl groups of all these compounds comprising from 6 to 24 carbon atoms and the aryl group denoting a phenyl group.

[0048] These compounds may be oxyethylenated and then preferably comprise from 1 to 50 ethylene oxide units.

[0049] The salts of C_6 - C_{24} alkyl monoesters of polyglycoside-polycarboxylic acids can be selected from C_6 - C_{24} alkyl polyglycoside-citrate, C_6 - C_{24} alkyl polyglycoside-tartrate and C_6 - C_{24} alkyl polyglycoside-sulfosuccinates.

[0050] When the anionic surfactant(s) are in salt form, they may be chosen from alkali metal salts such as the sodium or potassium salt and preferably the sodium salt, the ammonium salts, the amine salts and in particular amino alcohol salts or the alkaline-earth metal salts such as the magnesium salts.

[0051] Examples of amino alcohol salts that may especially 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.

[0052] Alkali metal or alkaline-earth metal salts, and in particular sodium or magnesium salts, are preferably used.

[0053] Among the anionic surfactants mentioned, use is preferably made of (C_6 - C_{24})alkyl sulfates, (C_6 - C_{24})alkyl ether sulfates comprising from 2 to 50 ethylene oxide units, especially in the form of alkali metal, ammonium, amino alcohol and alkaline-earth metal salts, or a mixture of these compounds.

[0054] It is particularly preferred to use (C_{12} - C_{20})alkyl sulfates, (C_{12} - C_{20})alkyl ether sulfates comprising from 2 to 20 ethylene oxide units, especially in the form of alkali metal, ammonium, amino alcohol and alkaline-earth metal salts, or a mixture of these compounds. Better still, use is made of sodium lauryl ether sulfate containing 2.2 mol of ethylene oxide.

[0055] The anionic surfactant(s) are present in the composition according to the invention in preferential proportions of at least 0.1% by weight, preferably ranging from 0.1% to 50% by weight and more preferentially from 5% to 30% by weight relative to the total weight of the composition.

[0056] According to the invention, the composition comprises one or more second surfactants chosen from nonionic surfactants, amphoteric surfactants and zwitterionic surfactants.

[0057] Examples of nonionic surfactants that may be used in the composition used according to the 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 especially chosen from polyethoxylated, polypropoxylated or polyglycerolated alcohols, α -diols and (C_{1-20}) alkylphenols, containing at least one fatty chain comprising, for example, from 8 to 18 carbon atoms, the number of ethylene oxide and/or propylene oxide groups possibly ranging especially from 2 to 50, and the number of glycerol groups possibly ranging especially from 2 to 30.

[0058] Mention may also be made of copolymers of ethylene oxide and propylene oxide, optionally oxyethylenated fatty acid esters of sorbitan, fatty acid esters of sucrose, polyoxyalkylenated fatty acid esters, optionally oxyalkylenated alkylpolyglycosides, alkylglucoside esters, derivatives of N-alkylglucamine and of N-acylmethylglucamine, aldobionamides and amine oxides.

[0059] Unless otherwise mentioned, the term "fatty" compound (for example a fatty acid) denotes a compound comprising, in its main chain, at least one saturated or unsaturated hydrocarbon-based chain, such as alkyl or alkenyl, containing at least 8 carbon atoms, preferably from 8 to 30 carbon atoms, and even better still from 10 to 22 carbon atoms.

[0060] The mono- or polyglycosides that may be used in the invention are well known and may be represented more particularly by the general formula (II) below:



[0061] in which:

[0062] R_1 represents a linear or branched alkyl and/or alkenyl group, comprising from about 8 to 24 carbon atoms, or an alkylphenyl group whose linear or branched alkyl group comprises from 8 to 24 carbon atoms,

[0063] R_2 represents an alkylene group comprising from about 2 to 4 carbon atoms,

[0064] G represents a sugar unit comprising from 5 to 6 carbon atoms,

[0065] t denotes a value ranging from 0 to 10 and preferably 0 to 4, and

[0066] v denotes an integer ranging from 1 to 15.

[0067] Mono- or polyglycosides that are preferred in the present invention are (C_8-C_{18}) alkyl mono- or polyglycosides and are compounds of formula (II) in which:

[0068] R_1 more particularly denotes a saturated or unsaturated, linear or branched alkyl group comprising from 8 to 18 carbon atoms,

[0069] t denotes a value ranging from 0 to 3 and even more particularly is equal to 0,

[0070] G may denote glucose, fructose or galactose, preferably glucose.

[0071] The degree of polymerization, i.e. the value of v in formula (II), may range from 1 to 15 and preferably from 1 to 4. The average degree of polymerization is more particularly between 1 and 2 and even more preferentially from 1.1 to 1.5.

[0072] The glycoside bonds between the sugar units are of 1-6 or 1-4 type and preferably of 1-4 type.

[0073] Examples of compounds of formula (II) are especially caprylylglucoside, decylglucoside or caprylglucoside, laurylglucoside, cetearylglucoside and cocoglucoside, and mixtures thereof. These preferred compounds of formula (II) are especially represented by the products sold by the company Cognis under the names Plantaren® (600 CS/U, 1200

and 2000) or Plantacare® (818, 1200 and 2000). It is also possible to use the products sold by the company SEPPIC under the names Triton CG 110 or Oramix CG 110 and Triton CG 312 or Oramix® NS 10, the products sold by the company BASF under the name Lutensol GD 70 or those sold by the company Chem Y under the name AG10 LK.

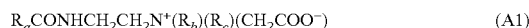
[0074] It is also possible to use, for example, (C_8-C_{16}) alkyl-1,4-polyglucoside as an aqueous 53% solution, sold by the company Cognis under the reference Plantacare® 818 UP.

[0075] Among the cited nonionic surfactants, optionally oxyalkylenated alkylpolyglycosides are preferably used.

[0076] The nonionic surfactant(s) may be present in the composition according to the invention in preferential proportions of at least 0.1% by weight, preferably ranging from 0.1% to 20% by weight and more preferentially from 1% to 15% by weight relative to the total weight of the composition.

[0077] The amphoteric or zwitterionic surfactant(s), which are preferably nonsilicone, that may be used in the present invention may especially be derivatives of optionally quaternized aliphatic secondary or tertiary amines, in which derivatives the aliphatic group is a linear or branched chain comprising 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}) alkylbetaines, sulfobetaines, (C_8-C_{20}) alkylamido (C_3-C_8) alkylbetaines and (C_8-C_{20}) alkyl amido (C_6-C_8) alkyl sulfobetaines.

[0078] 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 (A1) and (A2) below:



[0079] in which:

[0080] R_a represents a $C_{10}-C_{30}$ alkyl or alkenyl group derived from an acid $R_a\text{-COOH}$ preferably present in hydrolysed coconut oil, or a heptyl, nonyl or undecyl group;

[0081] R_b represents a β -hydroxyethyl group, and

[0082] R_c represents a carboxymethyl group;

[0083] and



[0084] in which:

[0085] B represents the group $-\text{CH}_2\text{CH}_2\text{OX}'$,

[0086] B' represents the group $-(\text{CH}_2)_z\text{Y}'$, with $z=1$ or 2 ,

[0087] X' represents the group $-\text{CH}_2\text{COOH}$, $\text{CH}_2\text{COOZ}'$,

[0088] $-\text{CH}_2\text{CH}_2\text{COOH}$, $-\text{CH}_2\text{CH}_2\text{COOZ}'$, or a hydrogen atom,

[0089] Y' represents the group $-\text{COOH}$, $-\text{COOZ}'$, the group

[0090] $-\text{CH}_2\text{CHOHSO}_3\text{H}$ or the group $-\text{CH}_2\text{CHOHSO}_3\text{Z}'$,

[0091] Z' represents an ion resulting from an alkali metal or alkaline earth metal, such as sodium, an ammonium ion or an ion resulting from an organic amine,

[0092] R_a represents a $C_{10}-C_{30}$ alkyl or alkenyl group of an acid $R_a\text{COOH}$ preferably present in coconut oil or in hydrolysed linseed oil, an alkyl group, especially of C_{17} and its iso form, or an unsaturated C_{17} group.

[0093] These compounds are classified in the CTFA dictionary, 5th edition, 1993, under the names disodium cocoamphodiacetate, disodium lauroamphodiacetate, disodium caprylamphodiacetate, disodium capryloamphodiacetate, disodium cocoamphodipropionate, disodium lauroamphod-

ipropionate, disodium caprylamphodipropionate, disodium capryloamphodipropionate, lauroamphodipropionic acid and cocoamphodipropionic acid.

[0094] By way of example, mention may be made of the cocoamphodiacetate sold by the company Rhodia under the trade name Miranol® C2M Concentrate.

[0095] Among the amphoteric or zwitterionic surfactants mentioned above, use is preferably made of (C₈-C₂₀)alkylbetaines such as cocoylbetaine, and (C₈-C₂₀)alkylamido(C₃-C₈)alkylbetaines such as cocamidopropylbetaine, and mixtures thereof. More preferentially, the amphoteric or zwitterionic surfactant(s) are chosen from cocamidopropylbetaine and cocoylbetaine.

[0096] The amphoteric or zwitterionic surfactant(s) may be present in the composition according to the invention in preferential proportions of at least 0.1% by weight, preferably ranging from 0.1% to 20% by weight and more preferentially from 1% to 15% by weight relative to the total weight of the composition.

[0097] The surfactant(s) are present in the compositions according to the invention such that the weight ratio between the total amount of the said surfactant(s), on the one hand, and the amount of fatty-chain alkoxysilane(s), on the other hand, is preferably greater than or equal to 0.1.

[0098] In one preferred embodiment, the weight ratio between the total amount of the said first and second surfactant(s), on the one hand, and the amount of fatty-chain alkoxysilane(s), on the other hand, ranges from 0.1 to 50, even more preferentially from 1 to 30 and better still from 1 to 10.

[0099] The composition according to the invention may also comprise one or more thickeners.

[0100] For the purposes of the present invention, the term "thickener" means an agent which, when introduced at 1% by weight in an aqueous solution or an aqueous-alcoholic solution containing 30% ethanol, and at pH 7, makes it possible to achieve a viscosity of at least 100 mPa·s (100 cPs) and preferably of at least 500 mPa·s (500 cPs), at 25° C. and at a shear rate of 1 s⁻¹. This viscosity may be measured using a cone/plate viscometer (Haake R600 rheometer or the like).

[0101] The thickener or thickeners may be selected from fatty acid amides obtained from C₁₀-C₃₀ carboxylic acid such as monoisopropanolamide, diethanolamide or monoethanolamide of coconut acids, monoethanolamide of ethoxylated carboxylic alkyl ether acid, preferably nonionic cellulose-based thickeners (hydroxyethylcellulose, hydroxypropylcellulose, carboxymethylcellulose), guar gum and its nonionic derivatives such as hydroxypropyl guar, gums of microbial origin such as xanthan gum, scleroglucan gum, crosslinked or non-crosslinked homopolymers and copolymers based on acrylic acid, methacrylic acid or acrylamidopropanesulfonic acid, and associative polymers, especially acrylic associative polymers or polyurethanes, as described below.

[0102] The associative polymer(s) that can be used according to the invention are water-soluble polymers which, in an aqueous medium, are capable of reversible association with one another or with other molecules.

[0103] Their chemical structure comprises hydrophilic zones and hydrophobic zones characterized by at least one fatty chain preferably comprising from 10 to 30 carbon atoms.

[0104] The associative polymer(s) that may be used according to the invention may be of anionic, cationic, amphoteric or nonionic type, for instance the polymers sold under the names Pemulen TR1 or TR2 by the company Goodrich, the INCI

name of which is Acrylates/C10-30 Alkyl Acrylate Cross-polymer, Salcare SC90 by the company Ciba, Aculyn 22, 28, 33, 44 or 46 by the company Röhm & Haas, and Elfacos T210 and T212 by the company Akzo.

[0105] Among the cited thickeners, use is preferably made of nonionic cellulose-based thickeners, such as hydroxyethylcellulose, associative polyurethanes and xanthan gum.

[0106] Preferably, the composition according to the invention comprises from 0.1% to 20% by weight and better still from 0.2% to 10% by weight of thickener(s) relative to the total weight of the composition.

[0107] In one particularly advantageous embodiment, the cosmetic composition according to the invention also comprises one or more organic acids.

[0108] The term "organic acid" means any non-polymeric organic compound comprising two or more than two carbon atoms and one or more acid functions chosen from carboxylic acid, sulfonic acid and phosphoric acid functions.

[0109] Preferentially, the organic acid is not a surfactant.

[0110] Even more preferentially, the molecular weight of the organic acid is less than 250 and better still less than 200.

[0111] Even more preferentially, the organic acids according to the invention are carboxylic acids and α-hydroxylated carboxylic acids or AHAs.

[0112] The organic acids may be amino acids.

[0113] The organic acid(s) are preferably chosen from acetic acid, propanoic acid, butanoic acid, lactic acid, malic acid, glycolic acid, ascorbic acid, maleic acid, phthalic acid, succinic acid, taurine, tartaric acid, glycine, glucuronic acid, gluconic acid and citric acid.

[0114] Even more preferentially still, the organic acid used in the composition according to the invention is chosen from acetic acid, citric acid and lactic acid, and is preferably lactic acid.

[0115] In the composition, the organic acid(s) may be in free or saltified form.

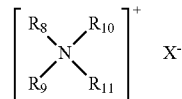
[0116] The organic acid(s) that may be used in the composition according to the present invention may be present in a content, expressed as free acids, ranging from 0.01% to 10% by weight, preferably in a content ranging from 0.1% to 8% by weight and even more preferentially in a content ranging from 0.2% to 5% by weight relative to the total weight of the composition.

[0117] The composition according to the invention may also comprise one or more additional surfactants chosen from cationic surfactants.

[0118] The cationic surfactant(s) that can be used in the compositions of the present invention comprise, for example, salts of optionally polyoxyalkylenated primary, secondary or tertiary fatty amines, quaternary ammonium salts, and mixtures thereof.

[0119] Examples of quaternary ammonium salts that may especially be mentioned include:

[0120] those corresponding to the general formula (III) below:

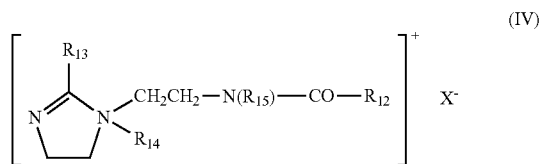


[0121] in which the groups R_8 to R_{11} , which may be identical or different, represent a linear or branched aliphatic group comprising from 1 to 30 carbon atoms or an aromatic group such as aryl or alkylaryl, at least one of the groups R_8 to R_{11} comprising from 8 to 30 carbon atoms and preferably from 12 to 24 carbon atoms. The aliphatic groups may comprise heteroatoms such as, in particular, oxygen, nitrogen, sulfur and halogens.

[0122] The aliphatic groups 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})alkylacetate, C_1 - C_{30} hydroxyalkyl, 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.

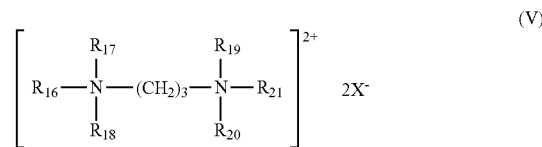
[0123] Preference is given, among the quaternary ammonium salts of formula (III), on the one hand, to tetraalkylammonium chlorides, such as, for example, dialkyldimethylammonium or alkyltrimethylammonium chlorides in which the alkyl group comprises approximately from 12 to 22 carbon atoms, in particular behenyltrimethylammonium chloride, distearyldimethylammonium chloride, cetyltrimethylammonium chloride or benzyldimethylstearyl ammonium chloride, or also, on the other hand, to distearoylethylhydroxyethylmethylammonium methosulfate, dipalmitoylethylhydroxyethylammonium methosulfate or distearoylethylhydroxyethylammonium methosulfate, or also, finally, to palmitylamidopropyltrimethylammonium chloride or stearamidopropyldimethyl(myristyl acetate)ammonium chloride, sold under the name Ceraphyl® 70 by Van Dyk.

[0124] quaternary ammonium salts of imidazoline, such as, for example, those of formula (IV) below:



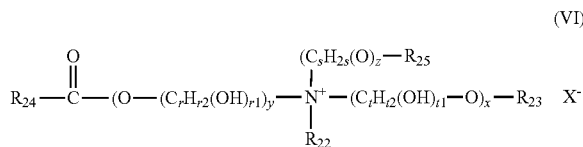
[0125] in which R_{12} represents an alkyl or alkenyl group comprising from 8 to 30 carbon atoms, for example fatty acid derivatives of tallow, R_{13} represents a hydrogen atom, a C_1 - C_4 alkyl group or an alkyl or alkenyl group comprising from 8 to 30 carbon atoms, R_{14} represents a C_1 - C_4 alkyl group, R_{15} represents a hydrogen atom or a C_1 - C_4 alkyl group, X^- is an anion chosen from the group of halides, phosphates, acetates, lactates, (C_1 - C_4)alkyl sulfates and (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 comprising 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, for example, sold under the name Rewoquat® W 75 by the company Rewo,

[0126] quaternary diammonium or triammonium salts, particularly of formula (V) below:



[0127] in which R_{16} denotes an alkyl group comprising for about 16 to 30 carbon atoms, 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 $-(CH_2)_3-N^+(R_{16a})(R_{17a})(R_{18a})$; 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^- is an anion chosen from the group of halides, acetates, phosphates, nitrates, (C_1 - C_4)alkyl sulfates and (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, available from the company Finetex (Quaternium 89), and Finquat CT, available from the company Finetex (Quaternium 75),

[0128] quaternary ammonium salts comprising one or more ester functions, for instance those of formula (VI) below:

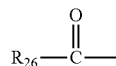


[0129] in which:

[0130] R_{22} is chosen from C_1 - C_6 alkyl and C_1 - C_6 hydroxyalkyl or dihydroxyalkyl groups;

[0131] R_{23} is chosen from:

[0132] the group

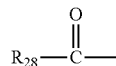


[0133] linear or branched, saturated or unsaturated C_1 - C_{22} hydrocarbon-based groups R_{27} ,

[0134] a hydrogen atom,

[0135] R_{25} is chosen from:

[0136] the group



[0137] linear or branched, saturated or unsaturated C_1 - C_6 hydrocarbon-based groups R_{29} ,

[0138] a hydrogen atom,

[0139] 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;

[0140] r , s and t , which may be identical or different, are integers ranging from 2 to 6,

[0141] r_1 and t_1 , which may be identical or different, are equal to 0 or 1,

[0142] $r_2+r_1=2r$ and $t_1+t_2=2t$,

[0143] y is an integer ranging from 1 to 10,

[0144] x and z , which may be identical or different, are integers ranging from 0 to 10,

[0145] X^- is a simple or complex, organic or mineral anion,

[0146] with the proviso that the sum $x+y+z$ is 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} .

[0147] The alkyl groups R_{22} may be linear or branched, and more particularly linear.

[0148] Preferably, R_{22} denotes a methyl, ethyl, hydroxyethyl or dihydroxypropyl group, and more particularly a methyl or ethyl group.

[0149] Advantageously, the sum $x+y+z$ is from 1 to 10.

[0150] When R_{23} is a hydrocarbon-based group R_{27} , it may be long and contain from 12 to 22 carbon atoms, or may be short and contain from 1 to 3 carbon atoms.

[0151] When R_{25} is a hydrocarbon-based group R_{29} , it preferably contains 1 to 3 carbon atoms.

[0152] Advantageously, R_{24} , R_{26} and R_{28} , which may be identical or different, are chosen from linear or branched, saturated or unsaturated C_{11} - C_{21} hydrocarbon-based groups, and more particularly from linear or branched, saturated or unsaturated C_{11} - C_{21} alkyl and alkenyl groups.

[0153] Preferably, x and z , which may be identical or different, have values of 0 or 1.

[0154] Advantageously, y is equal to 1.

[0155] 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.

[0156] The anion X^- is preferably a halide, preferably chloride, bromide or iodide, a $(C_1$ - $C_4)$ alkyl sulfate or a $(C_1$ - $C_4)$ alkyl- or $(C_1$ - $C_4)$ alkylaryl-sulfonate. However, 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 containing an ester function, may be used.

[0157] The anion X^- is even more particularly chloride, methyl sulfate or ethyl sulfate.

[0158] Use is made more particularly, in the composition according to the invention, of the ammonium salts of formula (VI) in which:

[0159] R_{22} denotes a methyl or ethyl group,

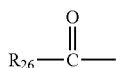
[0160] x and y are equal to 1,

[0161] z is equal to 0 or 1,

[0162] r , s and t are equal to 2,

[0163] R_{23} is chosen from:

[0164] the group

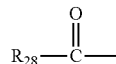


[0165] methyl, ethyl or C_{14} - C_{22} hydrocarbon-based groups,

[0166] a hydrogen atom,

[0167] R_{25} is chosen from:

[0168] the group



[0169] a hydrogen atom,

[0170] 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 more particularly from linear or branched, saturated or unsaturated C_{13} - C_{17} alkyl and alkenyl groups.

[0171] The hydrocarbon-based groups are advantageously linear.

[0172] Among the compounds of formula (VI), examples that may be mentioned include salts, especially the chloride or methyl sulfate, of diacyloxyethylmethylammonium, diacyloxyethylhydroxyethylmethylammonium, monoacyloxyethylhydroxyethylmethylammonium, triacyloxyethylmethylammonium or monoacyloxyethylhydroxyethylmethylammonium, and mixtures thereof. The acyl groups preferably contain 14 to 18 carbon atoms and are obtained more particularly from a plant oil such as palm oil or sunflower oil. When the compound contains several acyl groups, these groups may be identical or different.

[0173] 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 methyl or ethyl sulfate, methyl methanesulfonate, methyl para-toluenesulfonate, glycol chlorohydrin or glycerol chlorohydrin.

[0174] Such compounds are, for example, sold under the names Dehyquat® by Henkel, Stepanquat® by Stepan, Noxamium® by Ceca or Rewoquat® WE 18 by Rewo-Witco.

[0175] The composition according to the invention may contain, for example, a mixture of quaternary ammonium monoester, diester and triester salts with a weight majority of diester salts.

[0176] Mixtures of ammonium salts that may be used include, for example, the mixture containing 15% to 30% by weight of acyloxy-ethylhydroxyethylmethylammonium methyl sulfate, 45% to 60% of diacyloxyethylhydroxyethylmethylammonium methyl sulfate and 15% to 30% of triacyloxyethylmethylammonium methyl sulfate, the acyl groups having from 14 to 18 carbon atoms and originating from palm oil, which is optionally partially hydrogenated.

[0177] It is also possible to use the ammonium salts containing at least one ester function that are described in U.S. Pat. No. 4,874,554 and U.S. Pat. No. 4,137,180.

[0178] Use may be made of behenoylhydroxypropyltrimethylammonium chloride sold by KAO under the name Quar-tamin BTC 131.

[0179] Preferably, the ammonium salts containing at least one ester function contain two ester functions.

[0180] Among the cationic surfactants 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.

[0181] When they are present, the amount of the cationic surfactant(s) preferably ranges from 0.01% to 20% by weight and better still from 0.2% to 10% by weight, relative to the total weight of the composition.

[0182] Other alkoxysilanes, other than those of formula (I), may be used in the composition and are preferably compounds of formula $(G)_{4-x}Si(OR)_x$, with x denoting an integer ranging from 1 to 3, G denoting identical or different monovalent groups and R denoting a monovalent hydrocarbon-based group comprising one or more carbon atoms and optionally one or more heteroatoms.

[0183] Preferably, the alkoxysilane(s), other than the alkoxysilanes of the invention, contain two or three alkoxy functions.

[0184] Preferably, the alkoxy function(s) are chosen from methoxy and ethoxy functions.

[0185] According to one particular embodiment, the additional alkoxysilane(s) comprise one or more solubilizing functional groups.

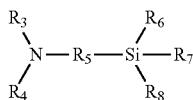
[0186] For the purposes of the present invention, the term "solubilizing functional group" means any chemical functional group that facilitates the dissolution of the alkoxysilane in the medium of the composition, i.e. in the solvent or the solvent mixture of the composition, in particular in water or in aqueous-alcoholic mixtures.

[0187] As solubilizing functional groups that may be used according to the present invention, mention may be made of primary, secondary and tertiary amine, aromatic amine, alcohol, carboxylic acid, sulfonic acid, anhydride, carbamate, urea, guanidine, aldehyde, ester, amide, epoxy, pyrrole, glucanamide, pyridyl and polyether groups.

[0188] This or these alkoxysilane(s) containing one or more solubilizing functional groups may contain one or more silicon atoms.

[0189] The alkoxysilane(s) containing one or more solubilizing functional groups generally contain two or three alkoxy functions. Preferably, the alkoxy functions are methoxy or ethoxy functions.

[0190] According to one particular embodiment, the alkoxysilane(s), other than the alkoxysilanes of the invention, are chosen from the compounds of formula (VII) below:



(VII)

[0191] in which:

[0192] R_6 represents a halogen or a group OR' or R'_6 ,

[0193] R_7 represents a halogen or a group OR'' or R'_7 ,

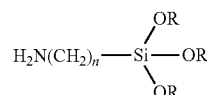
[0194] R_8 represents a halogen or a group OR''' or R'_8 ,

[0195] $R_3, R_4, R_5, R', R'', R''', R'_6, R'_7$ and R'_8 represent, independently of each other, a saturated or unsaturated, linear or branched hydrocarbon-based group, optionally bearing additional chemical groups, R_3, R_4, R', R'' and R''' also possibly denoting hydrogen, at least two of the groups R_6, R_7 and

R_8 being different from the groups R'_6, R'_7 and R'_8 , at least two of the groups R', R'' and R''' being other than hydrogen.

[0196] Preferably, the groups $R_3, R_4, R', R'_6, R'_7, R'_8, R''$ and R''' are chosen from C_1 - C_{12} alkyl, C_6 - C_{14} aryl, $(C_1$ - $C_8)$ alkyl(C_6 - C_{14})aryl and $(C_6$ - C_{14})aryl(C_1 - C_8)alkyl radicals.

[0197] According to one preferred implementation variant of this embodiment, the alkoxysilane(s) comprise a substituent comprising a primary amine function, and are chosen from the compounds of formula (VIII) below:

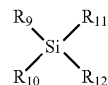


(VIII)

[0198] in which the groups R, which may be identical or different, are chosen from C_1 - C_6 alkyl groups, and n is an integer from 1 to 6 and preferably from 2 to 4.

[0199] Alkoxysilane that is particularly preferred according to this embodiment is γ -aminopropyl triethoxysilane. Such a product is sold, for example, under the name Z-6011 Silane by the company Dow Corning.

[0200] According to another particular embodiment, the alkoxysilane(s), other than the alkoxysilanes of the invention, are chosen from the compounds of formula (IX) below:



(IX)

[0201] in which:

[0202] R_{11} represents a halogen or a group OR'_{11} and R_{12} represents a halogen or a group OR'_{12} , at least one of the groups R_{11} and R_{12} being other than a halogen,

[0203] R'_{11} and R'_{12} represent, independently of each other, hydrogen or a saturated or unsaturated, linear or branched C_1 - C_{14} hydrocarbon-based group, at least one of the groups R'_{11} and R'_{12} being other than hydrogen,

[0204] R_9 is a non-hydrolysable functional group with a cosmetic effect, and

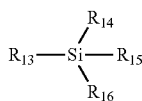
[0205] R_{10} is a non-hydrolysable functional group bearing a function chosen from the following functions: amine, carboxylic acid and salts thereof, sulfonic acid and salts thereof, polyalcohols such as glycol, polyether such as polyalkene ether, and phosphoric acid and salts thereof.

[0206] The term "functional group with a cosmetic effect", means a group chosen from groups derived from a reducing agent, from an oxidizing agent, from a colouring agent, from a polymer, from a surfactant, from an antibacterial agent or from a UV-screening agent.

[0207] Examples of groups derived from a colouring agent are, inter alia, nitroaromatic, anthraquinone, naphthoquinone, benzoquinone, azo, xanthene, triarylmethane, azine, indoaniline, indophenol or indoamine groups. Examples of groups with a reducing effect are, inter alia, thiol or sulfonic acid groups or sulfinic acid salts.

[0208] An example of an alkoxy silane of formula (IX) that may be mentioned is aminopropyl-N-(4,2-dinitrophenyl) aminopropyl diethoxysilane. Such compounds are described, for example, in patent application EP-1 216 023.

[0209] The alkoxysilane(s), other than the alkoxysilanes of the invention, may also be chosen from the compounds of formula (X) below:



[0210] in which:

[0211] R₁₄ represents a halogen or a group OR'₁₄ or R₀,

[0212] R₁₅ represents a halogen or a group OR'₁₅ or R'₀,

[0213] R₁₆ represents a halogen or a group OR'₁₆ or R''₀,

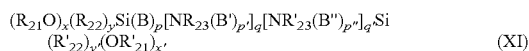
[0214] at least two of the groups R₁₄, R₁₅ and R₁₆ being different from the groups R₀, R'₀ and R''₀,

[0215] R₁₃ is a group chosen from groups bearing at least one function chosen from the following functions: carboxylic acid and salts thereof, sulfonic acid and salts thereof, polyalkyl ethers.

[0216] R₀, R'₀, R''₀, R'₁₄, R'₁₅ and R'₁₆ represent, independently of each other, a saturated or unsaturated, linear or branched C₁-C₁₄ hydrocarbon-based group, optionally bearing additional chemical functions chosen from the following functions: carboxylic acid and salts thereof, sulfonic acid and salts thereof, polyalkyl ethers, R'₁₄, R'₁₅ and R'₁₆ also possibly denoting hydrogen, at least two of the groups R'₁₄, R'₁₅ and R'₁₆ being other than hydrogen.

[0217] Preferably, the groups R'₁₄, R'₁₅ and R'₁₆, R₀, R'₀ and R''₀ represent a C₁-C₁₂ alkyl, C₆-C₁₄ aryl, (C₁-C₈)alkyl (C₆-C₁₄)aryl or (C₆-C₁₄)aryl(C₁-C₈)alkyl group.

[0218] According to another embodiment, the alkoxysilane(s), other than the alkoxysilanes of the invention, are chosen from the compounds of formula (XI) below:



[0219] in which:

[0220] R₂₁, R₂₂, R'₂₁ and R'₂₂ each independently represent a saturated or unsaturated, linear or branched hydrocarbon-based chain, optionally containing one or more heteroatoms, optionally interrupted or substituted with one or more groups chosen from ether, ester, amine, amide, carboxyl, hydroxyl and carbonyl groups,

[0221] x is an integer ranging from 1 to 3, y=3-x, x' is an integer ranging from 1 to 3, y'=3-x', p=0 or 1, p'=0 or 1, p''=0 or 1, q=0 or 1, q'=0 or 1, it being understood that at least q or q' is other than zero,

[0222] B, B' and B'' each independently represent a linear or branched divalent C₁-C₂₀ alkylene radical,

[0223] R₂₃ and R'₂₃ each independently represent a hydrogen atom or a saturated or unsaturated, linear or branched hydrocarbon-based chain, optionally containing one or more heteroatoms, optionally interrupted or substituted with one or more ether, C₁-C₂₀ alcohol ester, amine, carboxyl, C₆-C₃₀ aryl, hydroxyl or carbonyl groups, or a heterocyclic or non-heterocyclic aromatic ring, optionally substituted with one or more C₃-C₂₀ alcohol ester, amine, amide, carboxyl, hydroxyl, carbonyl or acyl groups,

[0224] As explained previously, R₂₁, R₂₂, R'₂₁ and R'₂₂ each independently represent a hydrocarbon-based chain. The term "hydrocarbon-based chain" preferably means a chain comprising from 1 to 10 carbon atoms.

[0225] Similarly, R₂₃ and R'₂₃ may represent a hydrocarbon-based chain. In this case, a chain comprising from 1 to 10 carbon atoms is preferably intended.

[0226] Preferably, the aromatic ring comprises from 6 to 30 carbon atoms. Even more preferentially, it denotes an optionally substituted phenyl radical.

[0227] Preferably, R₂₁=R'₂₁, R₂₂=R'₂₂, x=x', y=y', p=p', A=A', q=1 and q'=0.

[0228] The alkoxysilane(s) of formula (XI) may also have the following characteristics, taken alone or in combination:

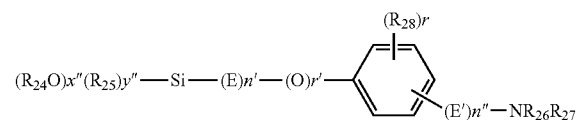
[0229] R₂₁, R₂₂, R'₂₁ and R'₂₂, which may be identical or different, represent a C₁-C₄ alkyl,

[0230] p=p'=1,

[0231] B and B', which may be identical or different, represent a linear C₁-C₄ alkylene.

[0232] R₂₃ is hydrogen.

[0233] According to another embodiment of the invention, the alkoxysilane(s), other than the alkoxysilanes of the invention, are chosen from the compounds of formula (XII) below:



[0234] in which:

[0235] R₂₄ and R₂₅ each independently represent a saturated or unsaturated, linear or branched hydrocarbon-based chain, optionally containing one or more heteroatoms, optionally interrupted or substituted with one or more groups chosen from ether, ester, amine, amide, carboxyl, hydroxyl and carbonyl groups,

[0236] x''=2 or 3,

[0237] y''=3-x'',

[0238] n''=0 or 1,

[0239] n''=0 or 1,

[0240] E and E' each independently represent a linear or branched divalent C₁-C₂₀ alkylene group,

[0241] R₂₆ and R₂₇ each independently represent a hydrogen atom or a saturated or unsaturated, linear or branched hydrocarbon-based chain, optionally containing one or more heteroatoms, optionally interrupted or substituted with one or more ether, C₁-C₂₀ alcohol ester, amine, carboxyl, C₆-C₃₀ aryl, hydroxyl or carbonyl groups, or a heterocyclic or non-heterocyclic aromatic ring, optionally substituted with one or more C₁-C₂₀ alcohol ester, amine, amide, carboxyl, hydroxyl, carbonyl or acyl groups,

[0242] r is an integer ranging from 0 to 4,

[0243] r'=0 or 1,

[0244] the group(s) R₂₈ each independently represent a hydrogen atom or a saturated or unsaturated, linear or branched preferably C₁-C₁₀ hydrocarbon-based chain, optionally containing one or more heteroatoms, optionally interrupted or substituted with one or more ether, C₁-C₂₀ alcohol ester, amine, carboxyl, C₆-C₃₀ aryl, hydroxyl or carbonyl groups, or a heterocyclic or non-heterocyclic aromatic ring, optionally substituted with one or more C₁-C₂₀ alcohol ester, amine, amide, carboxyl, hydroxyl, carbonyl or acyl groups.

[0245] As explained previously, R₂₄ and R₂₅ each independently represent a hydrocarbon-based chain. The term

“hydrocarbon-based chain” preferably means a chain comprising from 1 to 10 carbon atoms.

[0246] Similarly, R_{26} and R_{27} may represent a hydrocarbon-based chain. In this case, a chain comprising from 1 to 10 carbon atoms is preferably intended.

[0247] Preferably, the aromatic ring comprises from 6 to 30 carbon atoms. Even more preferentially, it denotes an optionally substituted phenyl group.

[0248] The alkoxyisilane(s) of formula (XII) may have the following characteristics, taken alone or in combination:

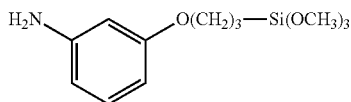
[0249] R_{24} is a C_1 - C_4 alkyl,

[0250] $x''=3$, $n'=n''=1$; $r=r'=0$,

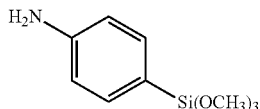
[0251] R_{26} and R_{27} independently represent hydrogen or a group chosen from C_1 - C_4 alkyl, C_1 - C_4 hydroxyalkyl and C_1 - C_4 aminoalkyl groups.

[0252] In particular, the alkoxyisilane(s) of formula (XII) may be chosen from:

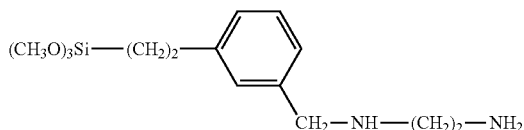
[0253] 3-(*m*-aminophenoxy)propyltrimethoxysilane, of formula:



[0254] *p*-aminophenyltrimethoxysilane, of formula:



[0255] *N*-(2-aminoethylaminomethyl)phenethyltrimethoxysilane, of formula:



[0256] The alkoxyisilane(s), other than those of formula (I), may also be chosen from the compounds of formula (XIII) below:



[0257] in which:

[0258] R_{29} and R_{30} each independently represent a saturated or unsaturated, linear or branched hydrocarbon-based chain, optionally containing one or more heteroatoms, optionally interrupted or substituted with one or more groups chosen from ether, ester, amine, amide, carboxyl, hydroxyl and carbonyl groups,

[0259] $x_{1=2}$ or 3, $y_1=3-x_1$,

[0260] A_1 represents a linear or branched C_1 - C_{20} divalent alkylene group, optionally interrupted or substituted with one

or more C_1 - C_{30} alcohol ester, amine, carboxyl, alkoxyisilane, C_6 - C_{30} aryl, hydroxyl or carbonyl groups,

[0261] $s=0$ or 1,

[0262] As explained previously, R_{29} and R_{30} each independently represent a hydrocarbon-based chain. The term “hydrocarbon-based chain” preferably means a chain comprising from 1 to 10 carbon atoms.

[0263] The alkoxyisilane(s) of formula (XIII) may also have the following characteristics, taken alone or in combination:

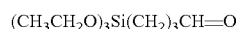
[0264] R_{29} and R_{30} are chosen from C_1 - C_4 alkyls,

[0265] $s=1$,

[0266] A_1 is a linear C_1 - C_4 alkylene,

[0267] In particular, the alkoxyisilane(s) of formula (XIII) may be chosen from:

[0268] triethoxysilylbutylaldehyde, of formula:



[0269] triethoxysilylundecanal, of formula:



[0270] triethoxysilylundecanal ethylene glycol acetal, of formula:



[0271] The preferred compound of formula (XIII) is triethoxysilylbutylaldehyde. Such a product is sold, for example, under the name SIT 8185.3 by the company Gelest.

[0272] According to one particularly preferred embodiment of the invention, the alkoxyisilane(s), other than the alkoxyisilanes of the invention, are chosen from the di- and/or trialkoxyisilanes bearing one or more substituents comprising one or more amine functions.

[0273] According to an even more preferred embodiment, the alkoxyisilane(s), other than the alkoxyisilanes of the invention, are chosen from trialkoxyisilanes bearing a substituent comprising one or more amine functions, more particularly from the compounds of formula (VIII).

[0274] An additional alkoxyisilane that is most particularly preferred is γ -aminopropyltriethoxysilane cited previously.

[0275] The alkoxyisilane(s), other than the alkoxyisilanes of the invention, may be present in the compositions according to the invention in proportions preferably ranging from 0.01% to 25% by weight, more preferentially from 0.05% to 20% by weight and more particularly from 0.1% to 15% by weight relative to the total weight of the composition.

[0276] The composition according to the invention may also comprise one or more non-siliceous fatty substances.

[0277] The term “fatty substance” means an organic compound that is insoluble in water at standard temperature (25° C.) and at atmospheric pressure (760 mmHg, i.e. 1.013×10^5 Pa), i.e. with a solubility of less than 5%, preferably of less than 1% and even more preferably of less than 0.1%. The non-siliceous fatty substances generally have in their structure a hydrocarbon-based chain comprising at least 6 carbon atoms and not comprising any siloxane groups. In addition, the fatty substances are generally soluble in organic solvents under the same temperature and pressure conditions, for instance chloroform, ethanol, benzene, liquid petroleum jelly or decamethylcyclopentasiloxane.

[0278] The term “non-siliceous fatty substance” means a fatty substance whose structure does not comprise any silicon atoms.

[0279] The fatty substances that may be used in the composition according to the invention are generally not oxyalkylenated and preferably do not contain any carboxylic acid COOH functions.

[0280] Preferably, the non-siliceous fatty substances are chosen from hydrocarbons, fatty alcohols, fatty esters, sili-cones and fatty ethers, and mixtures thereof.

[0281] Even more preferentially, they are chosen from hydrocarbons, fatty alcohols, fatty esters and ceramides, and mixtures thereof.

[0282] They may be liquid or non-liquid, at room tempera-ture and at atmospheric pressure.

[0283] The liquid fatty substances of the invention prefer-ably 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.

[0284] The term “liquid hydrocarbon” means a hydrocar-bon composed solely of carbon and hydrogen atoms, which is liquid at standard temperature (25° C.) and at atmospheric pressure (760 mmHg, i.e. 1.013×10⁵ Pa), which is especially of mineral or plant origin, preferably of plant origin.

[0285] More particularly, the liquid hydrocarbons are cho-sen from:

[0286] linear or branched, optionally cyclic, C₆-C₁₆ alkanes. Examples that may be mentioned include hex-ane, undecane, dodecane, tridecane, and isoparaffins, for instance isohexadecane, isododecane and isodecane,

[0287] linear or branched hydrocarbons of mineral, ani-mal or synthetic origin with more than 16 carbon atoms, such as volatile or non-volatile liquid paraffins, petro-leum jelly, liquid petroleum jelly, polydecenes, hydro-genated polyisobutene such as the product sold under the brand name Parleam® by the company NOF Corpo-ration, and squalane.

[0288] In one preferred variant, the liquid hydrocarbon(s) are chosen from volatile or non-volatile liquid paraffins, and liquid petroleum jelly.

[0289] The term “liquid fatty alcohol” means a non-glyc-erolated and non-oxyalkylenated fatty alcohol, which is liq-uid at standard temperature (25° C.) and at atmospheric pres-sure (760 mmHg, i.e. 1.013×10⁵ Pa).

[0290] Preferably, the liquid fatty alcohols of the invention comprise from 8 to 50 carbon atoms.

[0291] The liquid fatty alcohols of the invention may be saturated or unsaturated.

[0292] The saturated liquid fatty alcohols are preferably branched. They may optionally comprise in their structure at least one aromatic or non-aromatic ring. They are preferably acyclic.

[0293] More particularly, the liquid saturated fatty alcohols of the invention are chosen from octyldodecanol, isostearyl alcohol and 2-hexyldecanol.

[0294] Octyldodecanol is most particularly preferred.

[0295] The unsaturated liquid fatty alcohols contain in their structure at least one double or triple bond, and preferably one or more double bonds. When several double bonds are present, there are preferably 2 or 3 of them, and they may be conjugated or unconjugated.

[0296] These unsaturated fatty alcohols may be linear or branched.

[0297] They may optionally comprise in their structure at least one aromatic or non-aromatic ring. They are preferably acyclic.

[0298] More particularly, the unsaturated liquid fatty alco-hols of the invention are chosen from oleyl alcohol, linoleyl alcohol, linolenyl alcohol and undecylenyl alcohol.

[0299] Oleyl alcohol is most particularly preferred.

[0300] The term “liquid fatty esters” means an ester derived from a fatty acid and/or from a fatty alcohol that is liquid at standard temperature (25° C.) and at atmospheric pressure (760 mmHg, i.e. 1.013×10⁵ Pa).

[0301] The esters are preferably liquid esters of saturated or unsaturated, linear or branched C₁-C₂₆ aliphatic monoacids or polyacids and of saturated or unsaturated, linear or branched C₁-C₂₆ aliphatic monoalcohols or polyalcohols, the total number of carbon atoms of the esters being greater than or equal to 10.

[0302] Preferably, for the esters of monoalcohols, at least one from among the alcohol and the acid from which the esters of the invention are derived is branched.

[0303] Among the monoesters of monoacids and of monoalcohols, mention may be made of ethyl palmitate, iso-propyl palmitate, alkyl myristates such as isopropyl myristate or ethyl myristate, isocetyl stearate, 2-ethylhexyl isononanoate, isodecyl neopentanoate, isostearyl neopen-tanoate and isononyl isononanoate.

[0304] Esters of C₄-C₂₂ dicarboxylic or tricarboxylic acids and of C₁-C₂₂ alcohols and esters of monocarboxylic, dicar-boxylic or tricarboxylic acids and of C₄-C₂₆ dihydroxy, tri-hydroxy, tetrahydroxy or penta-hydroxy alcohols may also be used.

[0305] Mention may be made especially of: diethyl seba-cate; diisopropyl sebacate; bis(2-ethylhexyl)sebacate; diiso-propyl adipate; di-n-propyl adipate; dioctyl adipate; bis(2-ethylhexyl)adipate; diisostearyl adipate; bis(2-ethylhexyl) maleate; triisopropyl citrate; triisocetyl citrate; triisostearyl citrate; glyceryl trilactate; glyceryl trioctanoate; trioctyl-dodecyl citrate; trioctyl citrate; neopentyl glycol dihep-tanoate; diethylene glycol diisononanoate.

[0306] The composition may also comprise, as liquid fatty ester, sugar esters and diesters of C₆-C₃₀ and preferably C₁₂-C₂₂ fatty acids. It is recalled that the term “sugar” means oxygen-bearing hydrocarbon-based compounds containing several alcohol functions, with or without aldehyde or ketone functions, and which comprise at least 4 carbon atoms. These sugars may be monosaccharides, oligosaccharides or polysaccharides.

[0307] Examples of suitable sugars that may be mentioned include saccharose, glucose, galactose, ribose, fucose, mal-tose, fructose, mannose, arabinose, xylose and lactose, and derivatives thereof, especially alkyl derivatives, such as methyl derivatives, for instance methylglucose.

[0308] The sugar esters of fatty acids may be chosen espe-cially from the group comprising the esters or mixtures of esters of sugars described previously and of linear or branched, saturated or unsaturated C₆-C₃₀ and preferably C₁₂-C₂₂ fatty acids. If they are unsaturated, these compounds may comprise one to three conjugated or unconjugated car-bon-carbon double bonds.

[0309] The esters according to this variant may also be chosen from mono-, di-, tri- and tetraesters, and polyesters, and mixtures thereof.

[0310] These esters may be chosen, for example, from ole-ates, laurates, palmitates, myristates, behenates, cocoates, stearates, linoleates, linolenates, caprates and arachidonates, or mixtures thereof, such as, in particular, oleopalmitate, oleostearate or palmitostearate mixed esters.

[0311] More particularly, use is made of monoesters and diesters and in particular of sucrose, glucose or methylglu-cose mono- or dioleates, stearates, behenates, oleopalmitates, linoleates, linolenates or oleostearates.

[0312] An example that may be mentioned is the product sold under the name Glucate® DO by the company Amerchol, which is a methylglucose dioleate.

[0313] Finally, use may also be made of natural or synthetic glycerol esters of mono-, di- or triacids.

[0314] Among these, mention may be made of plant oils.

[0315] As oils of plant origin or synthetic triglycerides that may be used in the composition of the invention as liquid fatty esters, examples that may be mentioned include:

[0316] triglyceride oils of plant or synthetic origin, such as 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, castor oil, avocado oil, olive oil, rapeseed oil, coconut oil, wheatgerm oil, sweet almond oil, apricot oil, safflower oil, candlenut oil, camellina oil, tamanu oil, babassu oil and pracaxi oil, caprylic/capric acid triglycerides, for instance those sold by the company Stéarineries Dubois or those sold under the names Miglyol® 810, 812 and 818 by the company Dynamit Nobel, jojoba oil and shea butter oil.

[0317] Liquid fatty esters derived from monoalcohols will preferably be used as esters according to the invention.

[0318] Isopropyl myristate and isopropyl palmitate are particularly preferred.

[0319] The liquid fatty ethers are chosen from liquid dialkyl ethers such as dicaprylyl ether.

[0320] The fatty substances of the invention may be liquid or non-liquid at room temperature (25° C.) and at atmospheric pressure (760 mmHg, i.e. 1.013×10^5 Pa).

[0321] The term "non-liquid" preferably means a solid compound or a compound that has a viscosity of greater than 2 Pa·s at a temperature of 25° C. and at a shear rate of 1 s^{-1} .

[0322] More particularly, the non-liquid fatty substances are chosen from fatty alcohols, fatty acid and/or fatty alcohol esters, non-siliceous waxes and fatty ethers, which are non-liquid and preferably solid.

[0323] The non-liquid fatty alcohols that are suitable for use in the invention are more particularly chosen from saturated or unsaturated, linear or branched alcohols comprising from 8 to 30 carbon atoms. Mention may be made, for example, of cetyl alcohol, stearyl alcohol and a mixture thereof (cetylstearyl alcohol).

[0324] As regards the non-liquid esters of fatty acids and/or of fatty alcohols, mention may be made especially of solid esters derived from C_9 - C_{26} fatty acids and from C_9 - C_{26} fatty alcohols.

[0325] Among these esters, mention may be made of octyl-dodecyl behenate, isocetyl behenate, cetyl lactate, stearyl octanoate, octyl octanoate, cetyl octanoate, decyl oleate, myristyl stearate, octyl palmitate, octyl pelargonate, octyl stearate, alkyl myristates such as cetyl myristate, myristyl myristate and stearyl myristate, and hexyl stearate.

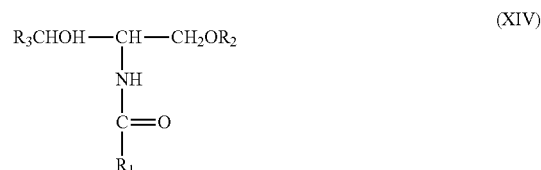
[0326] Still within the context of this variant, esters of C_4 - C_{22} dicarboxylic or tricarboxylic acids and of C_1 - C_{22} alcohols and esters of monocarboxylic, dicarboxylic or tricarboxylic acids and of C_2 - C_{26} dihydroxy, trihydroxy, tetrahydroxy or pentahydroxy alcohols may also be used.

[0327] Mention may be made especially of diethyl sebacate, diisopropyl sebacate, diisopropyl adipate, di-n-propyl adipate, dioctyl adipate and dioctyl maleate.

[0328] Among all the esters mentioned above, it is preferred to use myristyl, cetyl or stearyl palmitates, and alkyl myristates such as cetyl myristate, stearyl myristate and myristyl myristate.

[0329] The non-siliceous wax(es) are chosen especially 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 Bertin (France), or animal waxes, such as beeswaxes or modified beeswaxes (cerabellina), and ceramides.

[0330] The ceramides or ceramide analogues, such as glycosceramides, that may be used in the compositions according to the invention are known per se and are natural or synthetic molecules that may correspond to the general formula (XIV) below:



[0331] in which:

[0332] R_1 denotes a linear or branched, saturated or unsaturated alkyl group, derived from C_{14} - C_{30} fatty acids, it being possible for this group to be substituted with a hydroxyl group in the alpha position, or a hydroxyl group in the omega position esterified with a saturated or unsaturated C_{16} - C_{30} fatty acid;

[0333] R_2 denotes a hydrogen atom or a (glycosyl) $_n$, (galactosyl) $_m$ or sulfogalactosyl group, in which n is an integer ranging from 1 to 4 and m is an integer ranging from 1 to 8,

[0334] R_3 denotes a C_{15} - C_{26} hydrocarbon-based group which is saturated or unsaturated in the alpha position, it being possible for this group to be substituted with one or more C_1 - C_{14} alkyl groups;

[0335] it being understood that, in the case of natural ceramides or glycosceramides, R_3 can also denote a C_{15} - C_{26} α -hydroxyalkyl group, the hydroxyl group being optionally esterified with a C_{16} - C_{30} α -hydroxy acid.

[0336] The ceramides that are preferred in the context of the present invention are those described by Downing in Arch. Dermatol., Vol. 123, 1381-1384, 1987, or those described in French patent FR 2 673 179.

[0337] The ceramide(s) that are more particularly preferred according to the invention are the compounds for which R_1 denotes a saturated or unsaturated alkyl derived from C_{16} - C_{22} fatty acids; R_2 denotes a hydrogen atom; and R_3 denotes a saturated linear C_{15} group.

[0338] Such compounds are, for example, N-linoleylidihydrosphingosine, N-oleylidihydrosphingosine, N-palmitylidihydrosphingosine, N-stearylidihydrosphingosine or N-behenylidihydrosphingosine, or mixtures of these compounds.

[0339] Even more preferentially, use is made of ceramides for which R_1 denotes a saturated or unsaturated alkyl group derived from fatty acids, R_2 denotes a galactosyl or sulfogalactosyl group and R_3 denotes a $-\text{CH}=\text{CH}-(\text{CH}_2)_{12}-\text{CH}_3$ group.

[0340] Other waxes or waxy starting materials that may be used according to the invention are especially marine waxes such as those sold by the company Sophim under the reference M82, and waxes of polyethylene or of polyolefins in general.

[0341] The non-liquid fatty ethers are chosen from dialkyl ethers and especially dicetyl ether and distearyl ether, alone or as a mixture.

[0342] Preferably, the non-siliceous fatty substances according to the invention are chosen from hydrocarbons, fatty alcohols, fatty esters and ceramides.

[0343] Even more preferably, the non-siliceous fatty substances are chosen from liquid petroleum jelly, stearyl alcohol, cetyl alcohol and a mixture thereof such as cetylstearyl alcohol, octyldodecanol, oleyl alcohol, isopropyl palmitate, isopropyl myristate, N-oleyldihydrospingosine, N-behenyldihydrospingosine and N-linoleyldihydrospingosine.

[0344] The non-siliceous fatty substance(s) may be present in an amount ranging from 0.01% to 40% by weight and especially from 0.1% to 5% by weight relative to the total weight of the composition.

[0345] The composition according to the invention may also comprise one or more silicones.

[0346] The silicones that may be used in the composition according to the invention are in particular polyorganosiloxanes that may be in the form of aqueous solutions, i.e. dissolved, or optionally in the form of dispersions or microdispersions, or of aqueous emulsions. The polyorganosiloxanes may also be in the form of oils, waxes, resins or gums.

[0347] Organopolysiloxanes are defined in greater detail in Walter Noll's *Chemistry and Technology of Silicones* (1968), Academic Press.

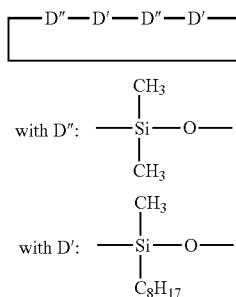
[0348] The silicones may be volatile or non-volatile.

[0349] When they are volatile, the silicones are more particularly chosen from those with a boiling point of between 60° C. and 260° C., and even more particularly from:

[0350] (i) cyclic silicones comprising from 3 to 7 and preferably 4 to 5 silicon atoms.

[0351] These are, for example, octamethylcyclotetrasiloxane sold especially under the name Volatile Silicone 7207 by the company Union Carbide or Silbione 70045 V 2 by the company Rhodia, decamethylcyclopentasiloxane sold under the name Volatile Silicone 7158 by the company Union Carbide, and Silbione 70045 V 5 by the company Rhodia, and mixtures thereof.

[0352] 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 chemical structure:



[0353] Mention may also be made of mixtures of cyclic silicones with organosilicon compounds, such as the mixture of octamethyl-cyclotetrasiloxane and tetrakis(trimethylsilyl)-pentaerythritol (50/50) and the mixture of octamethylcyclo-tetrasiloxane and oxy-1,1'-bis(2,2,2',2',3,3'-hexatrimethyl-silyloxy)neopentane;

[0354] (ii) linear volatile silicones 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 belonging to this category are also described in the article published in *Cosmetics and Toiletries*, Vol. 91, January 76, pp. 27-32, Todd & Byers *Volatile Silicone Fluids for Cosmetics*.

[0355] When the silicones are non-volatile, use is preferably made of polyalkylsiloxanes, polyarylsiloxanes, polyalkylarylsiloxanes, silicone gums and resins, and polyorganosiloxanes modified with organofunctional groups, and mixtures thereof.

[0356] These silicones are more particularly chosen from polyalkylsiloxanes, among which mention may be made mainly of polydimethylsiloxanes containing trimethylsilyl end groups (Dimethicone according to the CTFA name) having a viscosity of from 5×10^{-6} to 2.5 m²/s at 25° C. and preferably 1×10^{-5} to 1 m²/s. The viscosity of the silicones is measured, for example, at 25° C. according to standard ASTM 445 Appendix C.

[0357] Among these polyalkylsiloxanes, mention may be made, in a non-limiting manner, of the following commercial products:

[0358] the Silbione oils of the 47 and 70 047 series or the Mirasil oils sold by the company Rhodia, for instance the oil 70 047 V 500 000,

[0359] the oils of the Mirasil series sold by the company Rhodia,

[0360] the oils of the 200 series from the company Dow Corning, such as, more particularly, DC200 with a viscosity of 60 000 cSt,

[0361] the Viscasil oils from the company General Electric and certain oils of the SF series (SF 96, SF 18) from the company General Electric.

[0362] Mention may also be made of polydimethylsiloxanes containing dimethylsilyl end groups (Dimethiconol according to the CTFA name) such as the oils of the 48 series from the company Rhodia.

[0363] Mention may also be made of polydimethylsiloxanes containing aminoethyl, aminopropyl and α,ω -silyl end groups.

[0364] In this category of polyalkylsiloxanes, mention may also be made of the products sold under the names Abil Wax 9800 and 9801 by the company Goldschmidt, which are poly(C₁-C₂₀)alkylsiloxanes.

[0365] The polyalkylarylsiloxanes are particularly chosen from linear and/or branched polydimethylmethylphenylsiloxanes and polydimethyldiphenylsiloxanes with a viscosity of from 1×10^{-5} to 5×10^{-2} m²/s at 25° C.

[0366] Among these polyalkylarylsiloxanes, examples that may be mentioned include the products sold under the following names:

[0367] Silbione oils of the 70 641 series from the company Rhodia,

[0368] the oils of the Rhodorsil 70 633 and 763 series from the company Rhodia,

- [0369] the oil Dow Corning 556 Cosmetic Grade Fluid from the company Dow Corning,
- [0370] silicones of the PK series from the company Bayer, such as the product PK20,
- [0371] the silicones of the PN and PH series from the company Bayer, such as the products PN1000 and PH1000,
- [0372] certain oils of the SF series from the company General Electric, such as SF 1023, SF 1154, SF 1250 and SF 1265.
- [0373] The silicone gums that may be present in the composition according to the invention are especially polydiorganosiloxanes having high number-average molecular masses 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 and tridecane, or mixtures thereof.
- [0374] Mention may be made more particularly of the following products:
- [0375] polydimethylsiloxane gums,
- [0376] polydimethylsiloxane/methylvinylsiloxane gums,
- [0377] polydimethylsiloxane/diphenylsiloxane gums,
- [0378] polydimethylsiloxane/phenylmethylsiloxane gums,
- [0379] polydimethylsiloxane/diphenylsiloxane/methylvinylsiloxane gums.
- [0380] Products that may be used more particularly are the following mixtures:
- [0381] mixtures formed from a polydimethylsiloxane hydroxylated at the end of the chain (known as dimethiconol according to the nomenclature of the CTFA dictionary) and from a cyclic polydimethylsiloxane (known as cyclomethicone according to the nomenclature of the CTFA dictionary), such as the product Q2 1401 sold by the company Dow Corning,
- [0382] mixtures formed from a polydimethylsiloxane gum with a cyclic silicone, such as the product SF 1214 Silicone Fluid from the company General Electric, this product being 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,
- [0383] 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 the company 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.
- [0384] The organopolysiloxane resins that may be present in the composition according to the invention are crosslinked siloxane systems containing the following units: R₂SiO_{2/2}, R₃SiO_{1/2}, RSiO_{3/2} and SiO_{4/2} in which R represents a hydrocarbon group containing 1 to 16 carbon atoms or a phenyl group. Among these products, the ones that are particularly preferred are those in which R denotes a C₁-C₄ alkyl group, more particularly methyl, or a phenyl group.
- [0385] Among these resins, mention may be made 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.

[0386] Mention may also be made of the trimethyl siloxysilicate type resins sold in particular under the names X22-4914, X21-5034 and X21-5037 by the company Shin-Etsu.

[0387] The organomodified silicones that may be present in the composition according to the invention are silicones as defined above and comprising in their structure one or more organofunctional groups attached via a hydrocarbon-based group.

[0388] Among the organomodified silicones, mention may be made of polyorganosiloxanes comprising:

[0389] polyethyleneoxy and/or polypropyleneoxy groups optionally comprising C₆-C₂₄ alkyl groups, such as the products known as dimethicone copolyol sold by the company Dow Corning under the name DC 1248 or the oils Silwet L 722, L 7500, L 77 and L 711 by the company Union Carbide, and the (C₁₂)alkylmethicone copolyol sold by the company Dow Corning under the name Q2 5200,

[0390] thiol groups, such as the products sold under the names GP 72 A and GP 71 from the company Genesee,

[0391] alkoxyated 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,

[0392] hydroxylated groups, such as the polyorganosiloxanes containing a hydroxyalkyl function, described in French patent application FR 2 589 476,

[0393] acyloxyalkyl groups, for instance the polyorganosiloxanes described in U.S. Pat. No. 4,957,732,

[0394] anionic groups of the carboxylic acid type, for instance in the products described in patent EP 186 507 from the company Chisso Corporation, or of the alkyl-carboxylic type, such as those present in the product X-22-3701E from the company Shin-Etsu; 2-hydroxyalkyl sulfonate; 2-hydroxyalkyl thiosulfate such as the products sold by the company Goldschmidt under the names Abil S201 and Abil S255,

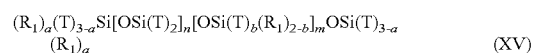
[0395] hydroxyacylamino groups, for instance the polyorganosiloxanes described in patent application EP 342 834. Mention may be made, for example, of the product Q2-8413 from the company Dow Corning.

[0396] Among the organomodified silicones, mention may also be made of amino silicones.

[0397] For the purposes of the present invention, the term "amino silicone" means any silicone comprising at least one primary, secondary or tertiary amine function or a quaternary ammonium group.

[0398] The amino silicones that may be used in the cosmetic composition according to the present invention are chosen from:

[0399] (a) the compounds corresponding to formula (XV) below:



[0400] in which:

[0401] T is a hydrogen atom or a phenyl, hydroxyl (—OH) or C₁-C₈ alkyl group, and preferably methyl, or a C₁-C₈ alkoxy, preferably methoxy,

[0402] a denotes the number 0 or an integer from 1 to 3, and preferably 0,

[0403] b denotes 0 or 1, and in particular 1,

[0404] m and n are numbers such that the sum (n+m) can range especially from 1 to 2000 and in particular from 50 to 150, it being possible for n to denote a number from 0 to 1999 and in particular from 49 to 149, and for m to denote a number from 1 to 2000 and in particular from 1 to 10,

[0405] R¹ is a monovalent group of formula —C_qH_{2q}L in which q is a number from 2 to 8 and L is an optionally quaternized amino group chosen from the following groups:

[0406] —N(R²)—CH₂—CH₂—N(R²)₂;

[0407] —N(R²)₂,

[0408] —N⁺(R²)₃Q⁻,

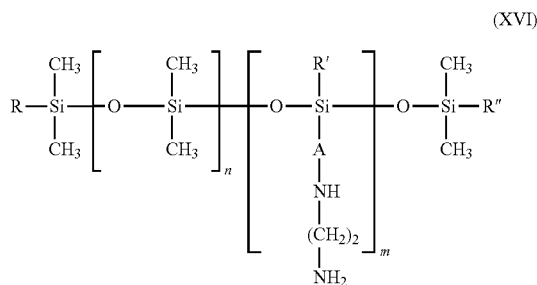
[0409] —N⁺(R²)(H)₂Q⁻,

[0410] —N⁺(R²)₂HQ⁻,

[0411] —N(R²)—CH₂—CH₂—N⁺(R²)(H)₂Q⁻,

[0412] in which R² may denote a hydrogen atom, a phenyl, a benzyl or a saturated monovalent hydrocarbon-based group, for example a C₁-C₂₀ alkyl group, and Q⁻ represents a halide ion, for instance fluoride, chloride, bromide or iodide.

[0413] In particular, the amino silicones corresponding to the definition of formula (XV) are chosen from the compounds corresponding to formula (XVI) below:



[0414] in which R, R' and R'', which may be identical or different, denote a C₁-C₄ alkyl group, preferably CH₃; a C₁-C₄ alkoxy group, preferably methoxy; or OH; A represents a linear or branched, C₃-C₈ and preferably C₃-C₆ alkylene group; m and n are integers dependent on the molecular weight and whose sum is between 1 and 2000.

[0415] According to a first possibility, R, R' and R'', which may be identical or different, represent a C₁-C₄ alkyl or hydroxyl group, A represents a C₃ alkylene group and m and n are such that the weight-average molecular mass of the compound is between 5000 and 500 000 approximately. Compounds of this type are referred to in the CTFA dictionary as "amodimethicones".

[0416] According to a second possibility, R, R' and R'', which may be identical or different, each represent a C₁-C₄ alkoxy or hydroxyl group, at least one of the groups R or R'' is an alkoxy group and A represents a C₃ alkylene group. The hydroxy/alkoxy mole ratio is preferably between 0.2/1 and 0.4/1 and advantageously equal to 0.3/1. Moreover, m and n are such that the weight-average molecular mass of the compound is between 2000 and 10⁶. More particularly, n is between 0 and 999 and m is between 1 and 1000, the sum of n and m being between 1 and 1000.

[0417] In this category of compounds, mention may be made, inter alia, of the product Belsil® ADM 652 sold by the company Wacker.

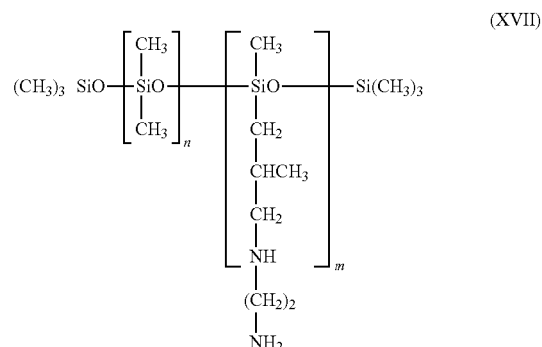
[0418] According to a third possibility, R and R'', which are different, each represent a C₁-C₄ alkoxy or hydroxyl group, at least one of the groups R or R'' being an alkoxy group, R'

representing a methyl group and A representing a C₃ alkylene group. The hydroxy/alkoxy mole ratio is preferably between 1/0.8 and 1/1.1 and advantageously equal to 1/0.95. Moreover, m and n are such that the weight-average molecular mass of the compound is between 2000 and 200 000. More particularly, n is between 0 and 999 and m is between 1 and 1000, the sum of n and m being between 1 and 1000.

[0419] More particularly, mention may be made of the product Fluid WR® 1300 sold by the company Wacker.

[0420] Note that the molecular mass of these silicones is determined by gel permeation chromatography (ambient temperature, polystyrene standard; μ styragem columns; eluent THF; flow rate 1 mm/minute; 200 μl of a solution containing 0.5% by weight of silicone in THF are injected, and detection is performed by refractometry and UV-metry).

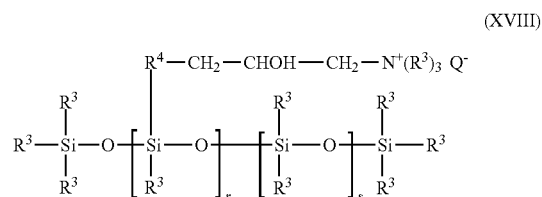
[0421] A product corresponding to the definition of formula (XV) is in particular the polymer known in the CTFA dictionary as Trimethylsilyl Amodimethicone, corresponding to formula (XVII) below:



[0422] in which n and m have the meanings given above in accordance with formula (XV).

[0423] Such compounds are described, for example, in patent EP 95238. A compound of formula (XVII) is sold, for example, under the name Q2-8220 by the company OSI.

[0424] (b) the compounds corresponding to formula (XVIII) below:



[0425] in which:

[0426] R³ represents a C₁-C₁₈ monovalent hydrocarbon-based group, and in particular a C₁-C₁₈ alkyl or C₂-C₁₈ alkenyl group, for example methyl,

[0427] R⁴ represents a divalent hydrocarbon-based group, especially a C₁-C₁₈ alkylene group or a divalent C₁-C₁₈, and for example C₁-C₈, alkyleneoxy group,

[0428] Q⁻ is a halide ion, in particular chloride;

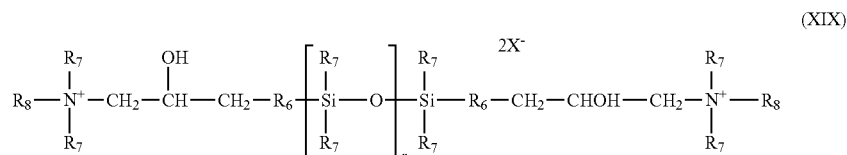
[0429] r represents a mean statistical value from 2 to 20 and in particular from 2 to 8,

[0430] represents a mean statistical value from 20 to 200 and in particular from 20 to 50.

[0431] Such compounds are described more particularly in U.S. Pat. No. 4,185,087.

[0432] A compound falling within this class is the product sold by the company Union Carbide under the name Ucar Silicone ALE 56.

[0433] (c) quaternary ammonium silicones especially of formula (XIX):



[0434] in which:

[0435] R_7 , which may be identical or different, represent a monovalent hydrocarbon-based group containing from 1 to 18 carbon atoms, and in particular a C_1 - C_{18} alkyl group, a C_2 - C_{18} alkenyl group or a ring comprising 5 or 6 carbon atoms, for example methyl,

[0436] R_6 represents a divalent hydrocarbon-based group, especially a C_1 - C_{18} alkylene group or a divalent C_1 - C_{18} , and for example C_1 - C_8 , alkyleneoxy group linked to the Si via an SiC bond,

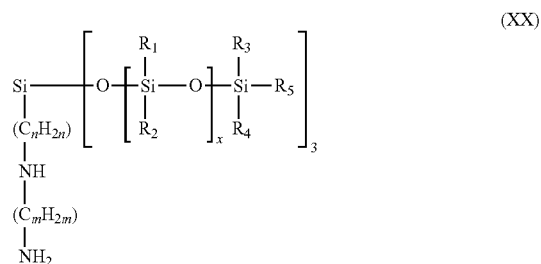
[0437] R_8 , which may be identical or different, represent a hydrogen atom, a monovalent hydrocarbon-based group containing from 1 to 18 carbon atoms, and in particular a C_1 - C_{18} alkyl group, a C_2 - C_{18} alkenyl group or a group $-\text{R}_6-\text{NH}-\text{COR}_7$;

[0438] X^- is an anion such as a halide ion, especially chloride, or an organic acid salt (acetate, etc.);

[0439] r represents a mean statistical value from 2 to 200 and in particular from 5 to 100.

[0440] These silicones are described, for example, in patent application EP-A-0 530 974.

[0441] d) the amino silicones of formula (XX) below:



[0442] in which:

[0443] R_1 , R_2 , R_3 and R_4 , which may be identical or different, denote a C_1 - C_4 alkyl group or a phenyl group,

[0444] R_5 denotes a C_1 - C_4 alkyl group or a hydroxyl group,

[0445] n is an integer ranging from 1 to 5,

[0446] m is an integer ranging from 1 to 5, and

[0447] x is chosen such that the amine number is between 0.01 and 1 meq/g.

[0448] When these compounds are used, one particularly advantageous embodiment involves their combined use with cationic and/or nonionic surfactants.

[0449] By way of example, use may be made of the product sold under the name Cationic Emulsion DC939 by the company Dow Corning, a cationic surfactant, namely trimethylcetylammmonium chloride and a nonionic surfactant of formula $\text{C}_{13}\text{H}_{27}-(\text{OC}_2\text{H}_4)_{12}-\text{OH}$, known under the CTFA name Trideceth-12.

[0450] Another commercial product that may be used according to the invention is the product sold under the name Dow Corning Q2 7224 by the company Dow Corning, comprising, in combination, trimethylsilyl amodimethicone of formula (XVI) described above, a nonionic surfactant of formula $\text{C}_8\text{H}_{17}-\text{C}_6\text{H}_4-(\text{OCH}_2\text{CH}_2)_{40}-\text{OH}$, known under the CTFA name Octoxynol-40, a second nonionic surfactant of formula $\text{C}_{12}\text{H}_{25}-(\text{OCH}_2-\text{CH}_2)_6-\text{OH}$, known under the CTFA name Isolaureth-6, and propylene glycol.

[0451] The silicones of the invention may also be silicones grafted with anionic groups, such as the compounds VS 80 or VS 70 sold by the company 3M.

[0452] In a more preferred embodiment, the silicone is a chemically unmodified polydimethylsiloxane.

[0453] The silicone(s) may be present in contents ranging from 0.01% to 40% by weight and preferably from 0.1% to 5% by weight relative to the total weight of the composition.

[0454] The composition may also comprise one or more solid particles. Among these solid particles, antistatants such as zinc pyridinethione, selenium disulfide and ellagic acid, fillers, and especially silica, titanium dioxide, pigments, dyes, abrasive powders such as pumice and apricot kernel powder may be present in the composition according to the invention.

[0455] The composition according to the present invention may also contain one or more reducing agents, especially such as sulfurous reducing agents. These agents are preferably chosen from organic compounds comprising one or more mercapto groups ($-\text{SH}$), sulfites and sulfite derivatives.

[0456] Among the sulfite derivatives that are essentially denoted are bisulfites and sulfite diesters of formula $\text{ROSO}_2\text{R}'$, with R and R' denoting C_1 - C_{10} alkyl groups.

[0457] The organic compounds comprising a mercapto group are preferably chosen from the following compounds: thioglycolic acid, thiolactic acid, cysteine, homocysteine, glutathione, thioglycerol, thiomalic acid, 2-mercaptopropionic acid, 3-mercaptopropionic acid, thiodiglycol, 2-mercaptoethanol, dithiothreitol, thioxanthine, thiosalicic acid, thiodiglycolic acid, lipoic acid, N-acetylcysteine, and thioglycolic or thiolactic acid esters, and mixtures of these compounds.

[0458] The sulfurous reducing agent(s) may be used especially in the form of salts, in particular alkali metal salts such as sodium and potassium salts, alkaline-earth metal salts, for

example magnesium and calcium salts, ammonium salts, amine salts and amino alcohol salts.

[0459] In a particularly preferred manner, the sulfurous reducing agent(s) are chosen from thioglycolic acid and salts thereof, thiolactic acid and salts thereof, alkali metal sulfites and especially sodium sulfite, alkali metal bisulfites and especially sodium bisulfite, and precursors of these sulfites or bisulfites such as sodium metabisulfite.

[0460] The sulfurous reducing agent(s) may be present in an amount ranging from 0.1% to 5% by weight and especially from 0.3% to 3% by weight relative to the total weight of the composition.

[0461] The composition in accordance with the invention may also comprise at least one oxidizing agent.

[0462] Such an oxidizing agent is preferably chosen from the group formed by hydrogen peroxide, urea peroxide, alkali metal bromates or ferricyanides, and persalts such as perborates and persulfates.

[0463] The use of hydrogen peroxide is particularly preferred.

[0464] According to one preferred embodiment, the composition according to the invention may also comprise one or more cationic polymers.

[0465] The composition according to the invention may be aqueous or anhydrous.

[0466] The term "anhydrous" refers to a composition not containing any added water, i.e. a composition in which the water that may be present comes only from the water of crystallization or of adsorption of the starting materials. In any case, an anhydrous composition contains less than 5% by weight of water and preferably less than 1% by weight of water relative to the total weight of the composition.

[0467] Whether it is anhydrous or aqueous, the composition according to the invention may contain one or more organic solvents that are liquid at room temperature (25° C.) and at atmospheric pressure (760 mmHg, i.e. 1.013×10⁵ Pa). Preferably, the liquid organic solvent(s) are chosen from C₁-C₄ lower alcohols, such as ethanol, isopropanol, tert-butanol or n-butanol, polyols such as propylene glycol, polyol ethers, C₅-C₁₀ alkanes, C₃-C₄ ketones such as acetone and methyl ethyl ketone, C₁-C₄ alkyl acetates such as methyl acetate, ethyl acetate and butyl acetate, dimethoxyethane, diethoxyethane, silicone oils and the non-siliceous liquid fatty substances described above, and mixtures thereof.

[0468] When the composition of the invention is aqueous, its pH is generally between 2 and 9 and in particular between 3 and 8. Preferably, the pH is less than 7. Even more preferentially, it ranges from 3 to 6.

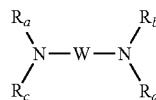
[0469] It may be adjusted to the desired value by means of acidifying or basifying agents usually used in cosmetics for this type of application, or alternatively using standard buffer systems.

[0470] Among the acidifying agents, examples that may be mentioned include the organic acids already mentioned previously, or mineral acids.

[0471] The term "mineral acid" means any acid derived from a mineral compound. Among the mineral acids, mention may be made of hydrochloric acid, orthophosphoric acid, sulfuric acid, sulfonic acids and nitric acid.

[0472] Use may be made especially of mineral 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.

[0473] 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 C₁-C₄ alkyl group; R_a, R_b, R_c and R_d, which may be identical or different, represent a hydrogen atom or a C₁-C₄ alkyl or C₁-C₄ hydroxyalkyl group.

[0474] 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 from acidifying agents such as phosphoric acid or hydrochloric acid.

[0475] The compositions according to the invention may also comprise one or more additives chosen from fixing polymers, pseudoceramides, vitamins and provitamins, including panthenol, water-soluble or liposoluble, silicone or non-silicone sunscreens, nacreous agents and opacifiers, sequestrants, conditioning agents other than the silicones and cationic polymers mentioned previously, solubilizers, antioxidants, antidandruff agents other than those mentioned above, anti-seborrhoeic agents, hair-loss counteractants and/or hair restorers, penetrants, fragrances, peptizers and preserving agents, or any other additive conventionally used in the cosmetics field.

[0476] These additives can be present in the composition according to the invention in an amount ranging from 0 to 20% by weight, with respect to the total weight of the composition.

[0477] A person skilled in the art will take care to select the optional additives and the amounts thereof such that they do not harm the properties of the compositions of the present invention.

[0478] The present invention also relates to a cosmetic treatment process for the care of the keratin materials, which consists in applying to said materials an effective amount of a composition as described above.

[0479] This application may or may not be followed by a rinsing operation.

[0480] 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, even better still from 10 seconds to 10 minutes.

[0481] Whether in rinse-out mode or leave-in mode, the application of the composition may take place in the presence or absence of heat especially in case of haircare. 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.

[0482] The application of the composition according to the invention 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.

[0483] The examples that follow serve to illustrate the invention without, however, being limiting in nature.

EXAMPLES

[0484] In the following examples, all the amounts are shown as percentage by weight of active material, with respect to the total weight of the composition.

Example 1

[0485] Compositions according to the invention were prepared from the compounds indicated in the table below.

	A1	A2
Octyltriethoxysilane (1)	10%	10%
Sodium lauryl ether sulfate (2)	14%	—
Sodium lauryl sulfate (3)	—	14%
Cocoglucoiside (4)	10%	10%
NaCl	1%	1%
Lactic acid	2%	2%
pH agent	qs pH 5.5	qs pH 5.5
Water	qs 100%	qs 100%

(1) sold under the name Dynasylan Octeo by the company Evonik.

(2) sold under the name Empicol ESB 3/VL 3 by the company Huntsman.

(3) sold under the name Texapon LS 35 by the company Cognis.

(4) sold under the name Plantacare 818 UP by the company Cognis.

Example 2

[0486] A composition according to the invention (composition A) is compared with a comparative composition (composition B) not comprising any fatty-chain alkoxyisilane of formula (I).

[0487] Shampoo composition A according to the invention and the comparative shampoo composition B outside the invention were prepared according to the formulations given in the above table.

	A	B
Octyltriethoxysilane (1)	10%	—
Sodium lauryl ether sulfate (2)	14%	14%
Cocoglucoiside (4)	10%	10%
Sodium chloride	1%	1%
Lactic acid	2%	2%
Sodium hydroxide	qs pH 5.5	qs pH 5.5
Water	qs 100%	qs 100%

(1) sold under the name Dynasylan Octeo by the company Evonik.

(2) sold under the name Empicol ESB 3/VL 3 by the company Huntsman.

(4) sold under the name Plantacare 818 UP by the company Cognis.

[0488] When applied to wet hair, followed by rinsing, the shampoo compositions A and B give clean hair. Composition A moreover facilitates the disentangling of wet and dry hair, and gives the hair softness and lightness, in contrast with the comparative composition B. These very good cosmetic properties of composition A persist on shampooing.

1.-15. (canceled)

16. A cosmetic composition comprising:

at least about 0.1% by weight, relative to the total weight of the composition, of at least one fatty-chain alkoxyisilane of formula (I):



(I)

wherein R_1 represents a linear or branched alkyl or alkenyl group comprising from 7 to 18 carbon atoms, and R_2 represents a linear or branched alkyl group comprising from 1 to 6 carbon atoms;

at least one first surfactant chosen from anionic surfactants; and

at least one second surfactant chosen from nonionic surfactants, amphoteric surfactants and zwitterionic surfactants.

17. The composition according to claim 16, wherein R_2 represents an alkyl group comprising from 1 to 4 carbon atoms.

18. The composition according to claim 17, wherein R_2 represents an ethyl group.

19. The composition according to claim 16, wherein R_1 represents an alkyl group.

20. The composition according to claim 16, wherein the alkoxyisilane is chosen from octyltriethoxysilane, dodecyltriethoxysilane, octadecyltriethoxysilane and hexadecyltriethoxysilane.

21. The composition according to claim 16, wherein the at least one alkoxyisilane is present in an amount ranging from about 0.1% to about 20% by weight, relative to the total weight of the composition.

22. The composition according to claim 16, wherein the at least one first surfactant chosen from anionic surfactants is chosen from: alkyl sulfates, alkyl ether sulfates, alkylamido ether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, alkylsulfonates, alkylamidesulfonates, alkylarylsulfonates, α -olefin sulfonates, paraffin sulfonates, alkylsulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkylsulfoacetates, acylsarcosinates, acylglutamates, alkylsulfosuccinamates, acylisethionates and N-acyltaurates, salts of alkyl monoesters and of polyglycoside polycarboxylic acids, acyllactylates, D-galactoside ironic acid salts, alkyl ether carboxylic acid salts, alkylaryl ether carboxylic acid salts, and alkylamido ether carboxylic acid salts.

23. The composition according to claim 16, wherein the at least one first surfactant chosen from anionic surfactants is chosen from sodium lauryl sulfate and sodium lauryl ether sulfate containing 2.2 mol of ethylene oxide.

24. The composition according to claim 16, wherein the at least one first surfactant chosen from anionic surfactants is present in an amount of at least about 0.1% by weight, relative to the total weight of the composition.

25. The composition according to claim 16, wherein the at least one second surfactant is chosen from nonionic surfactants chosen from:

polyethoxylated, polypropoxylated or polyglycerolated α -diols and (C1-C20)alkylphenols, containing at least one fatty chain, the number of ethylene oxide and/or propylene oxide groups optionally ranging from 2 to 50, and the number of glycerol groups optionally ranging from 2 to 30; and

copolymers of ethylene oxide and propylene oxide, optionally oxyethylenated fatty acid esters of sorbitan, fatty acid esters of sucrose, polyoxyalkylenated fatty acid esters, optionally oxyalkylenated alkylpolyglycosides, alkylglucoside esters, derivatives of N-alkylglucamine and of N-acylmethylglucamine, aldobionamides and amine oxides, and from optionally oxyalkylenated alkylpolyglycosides.

26. The composition according to claim 16, wherein the at least one second surfactant is chosen from (C₈-C₂₀)alkylbe-

taines, sulfobetaines, (C₈-C₂₀)alkylamido(C₃-C₈)alkylbetaines and (C₈-C₂₀)alkylamido(C₆-C₈)alkylsulfobetaines.

27. The composition according to claim 16, wherein the at least one second surfactant chosen is chosen from cocoylbetaine and cocamidopropylbetaine.

28. The composition according to claim 16, wherein the at least one second surfactant is present in an amount of at least about 0.1% by weight, relative to the total weight of the composition.

29. The composition according to claim 16, wherein the weight ratio of the total amount of the at least one first surfactant and the at least one second surfactant to the amount of the at least one fatty-chain alkoxysilane is greater than or equal to about 0.1.

30. The composition according to claim 29, wherein the weight ratio of the total amount of the at least one first surfactant and the at least one second surfactant to the amount of the at least one fatty-chain alkoxysilane ranges from 1 to 10.

31. The composition according to claim 16, further comprising at least one organic acid chosen from acetic acid, propanoic acid, butanoic acid, lactic acid, malic acid, glycolic acid, ascorbic acid, maleic acid, phthalic acid, succinic acid, taurine, tartaric acid, glycine, glucuronic acid, gluconic acid and citric acid.

32. The composition according to claim 31, wherein the at least one organic acid is present in an acid content expressed

as free acids ranging from about 0.01% to about 10% by weight, relative to the total weight of the composition.

33. The composition according to claim 16, wherein the composition is anhydrous.

34. The composition according to claim 16, wherein the composition is aqueous.

35. A cosmetic process for treating keratin materials comprising:

applying to the materials an effective amount of a cosmetic composition comprising:

at least about 0.1% by weight, relative to the total weight of the composition, of at least one fatty-chain alkoxysilane of formula (I):



wherein R₁ represents a linear or branched alkyl or alkenyl group comprising from 7 to 18 carbon atoms, and R₂ represents a linear or branched alkyl group comprising from 1 to 6 carbon atoms;

at least one first surfactant chosen from anionic surfactants; and

at least one second surfactant chosen from nonionic surfactants, amphoteric surfactants and zwitterionic surfactants; and

optionally rinsing the composition out after an optional leave-on time, in the presence or absence of heat.

* * * * *