

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property

Organization

International Bureau

(43) International Publication Date

07 December 2017 (07.12.2017)



(10) International Publication Number

WO 2017/207270 A1

(51) International Patent Classification:

A61K 8/39 (2006.01) A61Q 5/12 (2006.01)
A61K 8/46 (2006.01) A61K 8/898 (2006.01)
A61K 8/58 (2006.01) A61K 8/90 (2006.01)
A61Q 5/02 (2006.01) A61K 8/73 (2006.01)

Published:

— with international search report (Art. 21(3))

(21) International Application Number:

PCT/EP2017/061802

(22) International Filing Date:

17 May 2017 (17.05.2017)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

1655034 02 June 2016 (02.06.2016) FR

(71) Applicant: L'OREAL [FR/FR]; 14, rue Royale, 75008 PARIS (FR).

(72) Inventors: MINOU, Patrick; L'OREAL, 11-13 rue Dora Maar, 93400 SAINT-OUEN (FR). CHESNEAU, Laurent; L'OREAL, 11-13 rue Dora Maar, 93400 SAINT-OUEN (FR). ALVES, Diego; L'OREAL, 11-13 rue Dora Maar, 93400 SAINT-OUEN (FR).

(74) Agent: DODIN, Catherine; L'OREAL-Service DIPI, 9, Rue Pierre Dreyfus, 92110 Clichy (FR).

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

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

(54) Title: COMPOSITION COMPRISING AN ANIONIC SURFACTANT, AN ORGANOSILANE, AN AMINO SILICONE AND AN ASSOCIATIVE CATIONIC POLYMER, AND COSMETIC TREATMENT PROCESS

(57) Abstract: The invention relates to compositions, in particular cosmetic compositions, in particular cosmetic hair compositions, comprising anionic surfactants, organosilanes, amino silicones and associative cationic polymers. The invention also relates to a cosmetic process for treating, and more particularly for washing and/or conditioning, the hair, using said composition.



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Composition comprising an anionic surfactant, an organosilane, an amino silicone and an associative cationic polymer, and cosmetic treatment process

5 The present invention relates to a composition, in particular a cosmetic composition, in particular a cosmetic hair composition, comprising at least one anionic surfactant, at least one organosilane, at least one amino silicone and at least one associative cationic polymer, and also to a cosmetic treatment process for keratin materials using this composition. These compositions are more particularly intended
10 for cleansing and/or conditioning keratin materials, in particular the hair.

It is common practice to use detergent compositions (such as shampoos) based essentially on standard surfactants in particular of anionic, non-ionic and/or amphoteric type, but more particularly of anionic type, for cleansing and/or washing
15 keratin materials such as the hair. These compositions are applied to wet hair and the foam generated by massaging or rubbing with the hands makes it possible, after rinsing with water, to remove the diverse types of soiling initially present on the hair or the skin.

These base compositions do, admittedly, have good washing power, but their intrinsic cosmetic properties however remain quite poor, in particular due to the fact
20 that the relatively aggressive nature of such a cleansing treatment may in the long term give rise to more or less pronounced damage on the hair fibres, associated in particular with the gradual removal of the fats or proteins contained in them or at their surface.

Thus, to improve the cosmetic properties of the above detergent compositions, and more particularly of those that are required to be applied to sensitized hair (i.e. hair that is generally damaged or embrittled by the action of external atmospheric agents such as light and bad weather, and/or mechanical or chemical treatments such as brushing, combing, dyeing, bleaching, permanent-waving and/or relaxing),
25 it is now common practice to introduce into these compositions additional cosmetic agents known as conditioning agents, which are intended mainly to repair or limit the harmful or undesirable effects caused by the various treatments or attacking factors to which keratin materials, in particular keratin fibres and in particular the hair are more or less repeatedly subjected. These conditioning agents may, of
30 course, also improve the cosmetic behaviour of natural hair.

It is thus known practice to use cationic polymers and silicones as conditioning agents in detergent cosmetic compositions such as shampoos, to give the hair satisfactory cosmetic properties, in particular in terms of sheen, softness, lightness, a natural feel and improved disentangling ability.
35

However, the use of these conditioning agents in cosmetic washing and conditioning compositions does not give the hair satisfactory and long-lasting styling properties. This is because the styling effects, such as the provision of form retention, of body and/or of manageability to the hair often remain insufficient and have a ten-
40

dency to fade away after washing the hair with a standard shampoo. In point of fact, consumers are increasingly in search of washing compositions that are not only capable of appropriately conditioning the hair, but also capable of affording satisfactory and long-lasting styling effects.

5 In order to be able to meet these requirements, compositions intended for washing and conditioning the hair comprising organosilanes, such as 3-aminopropyltriethoxysilane, have been developed. Mention may in particular be made of patent application EP 2 343 039 which describes shampoos comprising anionic, amphoteric and non-ionic surfactants, silicones, cationic polymers and
10 organosilanes, in particular 3-aminopropyltriethoxysilane. These clear and stable washing compositions make it possible to confer satisfactory styling effects, in particular volume and body, and also a soft feel, to the hair.

However, it has been noted that these compositions do not make it possible to
15 achieve optimal styling effects while at the same time having high conditioning performance levels, in particular in terms of softness, straightening and lightness, in particular on fine hair.

Moreover, the qualities regarding use of these compositions, such as for example the initiation, the abundance and the quality of the foam generated, do not yet give
20 entire satisfaction.

There is thus a real need to develop clear cosmetic compositions intended for cleansing and conditioning keratin materials containing organosilanes which do not have all the drawbacks described above, and which make it possible to condi-
25 tion the hair satisfactorily while at the same time providing long-lasting styling effects.

The applicant has discovered, surprisingly, that it is possible to formulate detergent and conditioning compositions for keratin materials, which have the desired
30 properties, by combining anionic surfactants, organosilanes, amino silicones and particular cationic polymers.

Thus, a subject of the invention is a composition, in particular a cosmetic composition, in particular a cosmetic hair composition, comprising:

- 35
- at least one anionic surfactant,
 - at least one organosilane,
 - at least one amino silicone and
 - at least one associative cationic polymer.

40 It has been noted that, with the compositions according to the invention, the hair, and more particularly fine hair, exhibits improved softness, suppleness and straightening; it disentangles easily and it remains light.

The hair also appears to be more coated, which is most particularly pleasing in the

case of fine hair which then appears to be denser, healthy and in good condition. Moreover, the compositions in accordance with the present invention provide long-lasting styling effects, in particular in terms of providing volume, body and manageability, these being effects that become stronger with increased application.

5 Furthermore, the compositions according to the invention make it possible to facilitate the shaping of the hair, in particular of fine hair.

Finally, the compositions according to the invention have optimal qualities regarding use, in particular in terms of foam initiation, foam abundance and quality, and foam persistence.

10

In addition, by virtue of the invention, it is possible to obtain clear compositions.

The term "clear composition" is intended to mean a composition through which it is possible to see distinctly with the naked eye.

15 The clarity of the composition can be characterized by a measurement of turbidity according to the NTU method, using a 2100P turbidimeter from the company HACH, at ambient temperature (25°C). The turbidity of the compositions according to the invention is preferably less than 100 NTU units, preferentially less than 50 NTU units, in particular less than 20 NTU units and even more particularly less than 10 NTU units.

20

In the present description, the expression "at least one" is equivalent to the expression "one or more" and can substitute for said expression; the expression "between" is equivalent to the expression "ranging from" and can substitute for said expression, which implies that the limits are included.

25

Anionic surfactants

The composition according to the invention comprises at least one anionic surfactant.

30 The term "anionic surfactant" is intended to mean a surfactant comprising, as ionic or ionizable groups, only anionic groups.

In the present description, a species is termed as being "anionic" when it bears at least one permanent negative charge or when it can be ionized as a negatively charged species, under the conditions of use of the composition of the invention
35 (for example the medium or the pH) and not comprising any cationic charge.

The anionic surfactants may be sulfate, sulfonate and/or carboxylic (or carboxylate) surfactants. Needless to say, a mixture of these surfactants may be used.

40 It is understood in the present description that:

- the carboxylate anionic surfactants comprise at least one carboxylic or carboxylate function (-COOH or -COO⁻) and may optionally also comprise one or more sulfate and/or sulfonate functions;

- the sulfonate anionic surfactants comprise at least one sulfonate function ($-\text{SO}_3\text{H}$ or $-\text{SO}_3^-$) and may optionally also comprise one or more sulfate functions, but do not comprise any carboxylate functions; and
 - the sulfate anionic surfactants comprise at least one sulfate function but do not
- 5 comprise any carboxylate or sulfonate functions.

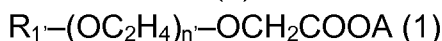
The carboxylic anionic surfactants that may be used thus comprise at least one carboxylic or carboxylate function ($-\text{COOH}$ or $-\text{COO}^-$).

- They can be chosen from the following compounds: acylglycinates, acyllactylates,
- 10 acylsarcosinates, acylglutamates, alkyl ether carboxylic acids, alkyl(C_6 - C_{30} aryl) ether carboxylic acids, alkyl-D-galactoside-uronic acids, alkylamido ether carboxylic acids; and also the salts of these compounds; the alkyl and/or acyl groups of these compounds comprising from 6 to 30 carbon atoms, in particular from 12 to 28, better still from 14 to 24 or even from 16 to 22 carbon atoms; the aryl group
- 15 preferably denoting a phenyl or benzyl group; these compounds possibly being polyoxyalkylenated, in particular polyoxyethylenated, and then preferably comprising from 1 to 50 ethylene oxide units, better still from 2 to 10 ethylene oxide units;

- Use may also be made of the C_6 - C_{24} alkyl monoesters of polyglycoside-polycarboxylic acids, such as C_6 - C_{24} alkyl polyglycoside-citrates, C_6 - C_{24} alkyl polyglycoside-tartrates and C_6 - C_{24} alkyl polyglycoside-sulfosuccinates, and salts thereof.
- 20

- Among the above carboxylic surfactants, mention may be made most particularly of polyoxyalkylenated alkyl(amido) ether carboxylic acids and salts thereof, in particular those comprising from 2 to 50 alkylene oxide and in particular ethylene oxide groups, such as the compounds sold by the company Kao under the name Akypo.
- 25

- The polyoxyalkylenated alkyl(amido) ether carboxylic acids that may be used are preferably chosen from those of formula (1):
- 30



in which:

- R_1 represents a linear or branched C_6 - C_{24} alkyl or alkenyl radical, a (C_8 - C_9)alkylphenyl radical, an $\text{R}_2'\text{CONH-CH}_2\text{-CH}_2\text{-}$ radical with R_2' denoting a linear or branched C_9 - C_{21} alkyl or alkenyl radical; preferably R_1 is a C_8 - C_{20} , preferably C_8 - C_{18} , alkyl radical and aryl preferably denotes phenyl,
 - n is an integer or decimal number (average value) ranging from 2 to 24 and preferably from 2 to 10,
 - A denotes H, ammonium, Na, K, Li, Mg or a monoethanolamine or triethanolamine residue.
- 35
- 40

It is also possible to use mixtures of compounds of formula (1), in particular mixtures of compounds containing different R_1 groups.

The polyoxyalkylenated alkyl(amido) ether carboxylic acids that are particularly preferred are those of formula (1) in which:

- R_1 denotes a linear or branched C_8 - C_{22} , in particular C_{10} - C_{16} or even C_{12} - C_{14} alkyl radical, or alternatively a (C_8-C_9) alkylphenyl radical;
- A denotes a hydrogen or sodium atom, and
- n' ranges from 2 to 20, preferably from 2 to 10.

Even more preferentially, use is made of compounds of formula (1) in which R_1 denotes a C_{12} alkyl radical, A denotes a hydrogen or sodium atom and n' ranges from 2 to 10.

Preferentially, the carboxylic anionic surfactants are chosen, alone or as a mixture, from:

- acylglutamates, in particular of C_6 - C_{24} or even C_{12} - C_{20} , such as stearylglutamates, and in particular disodium stearylglutamate;
 - acylsarcosinates, in particular of C_6 - C_{24} or even C_{12} - C_{20} , such as palmitoylsarcosinates, and in particular sodium palmitoylsarcosinate;
 - acyllactylates, in particular of C_{12} - C_{28} or even C_{14} - C_{24} , such as behenoyllactylates, and in particular sodium behenoyllactylate;
 - C_6 - C_{24} and in particular C_{12} - C_{20} acylglycinates;
 - (C_6-C_{24}) alkyl ether carboxylates, and in particular $(C_{12}-C_{20})$ alkyl ether carboxylates; in particular those comprising from 2 to 50 ethylene oxide groups;
 - polyoxyalkylenated (C_6-C_{24}) alkylamido ether carboxylic acids, in particular those comprising from 2 to 50 ethylene oxide groups;
- in particular in acid form or in the form of alkali metal or alkaline-earth metal, ammonium or amino alcohol salts.

The sulfonate anionic surfactants that may be used comprise at least one sulfonate function ($-SO_3H$ or $-SO_3^-$). They may be chosen from the following compounds: alkylsulfonates, alkyl ether sulfonates, alkylamidesulfonates, alkylarylsulfonates, α -olefin sulfonates, paraffin sulfonates, alkylsulfosuccinates, alkyl ether sulfosuccinates, alkylamidesulfosuccinates, alkylsulfoacetates, N-acyltaurates, acylisethionates; alkylsulfolaurates; and also the salts of these compounds; the alkyl groups of these compounds comprising from 6 to 30 carbon atoms, in particular from 12 to 28, better still from 14 to 24 or even from 16 to 22 carbon atoms; the aryl group preferably denoting a phenyl or benzyl group; these compounds possibly being polyoxyalkylenated, in particular polyoxyethylene, and then preferably comprising from 1 to 50 ethylene oxide units and better still from 2 to 10 ethylene oxide units.

Preferentially, the sulfonate anionic surfactants are chosen, alone or as a mixture, from:

- C_6 - C_{24} and in particular C_{12} - C_{20} alkylsulfosuccinates, in particular laurylsulfosuc-

cinates;

- C₆-C₂₄ and in particular C₁₂-C₂₀ alkyl ether sulfosuccinates;

- (C₆-C₂₄)acylisethionates and preferably (C₁₂-C₁₈)acylisethionates;

in particular in the form of alkali metal or alkaline-earth metal, ammonium or amino alcohol salts.

5

The sulfate anionic surfactants that may be used comprise at least one sulfate function (-OSO₃H or -OSO₃⁻).

They may be chosen from the following compounds: alkyl sulfates, alkyl ether sulfates, alkylamido ether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates; and also the salts of these compounds;

10

the alkyl groups of these compounds comprising from 6 to 30 carbon atoms, in particular from 12 to 28, better still from 14 to 24 or even from 16 to 22 carbon atoms; the aryl group preferably denoting a phenyl or benzyl group;

15

these compounds possibly being polyoxyalkylenated, in particular polyoxyethylenated, and then preferably comprising from 1 to 50 ethylene oxide units and better still from 2 to 10 ethylene oxide units.

Preferentially, the sulfate anionic surfactants are chosen, alone or as a mixture, from:

20

- alkyl sulfates, in particular of C₆-C₂₄ or even C₁₂-C₂₀,

- alkyl ether sulfates, in particular of C₆-C₂₄ or even C₁₂-C₂₀, preferably comprising from 2 to 20 ethylene oxide units;

in particular in the form of alkali metal or alkaline-earth metal, ammonium or amino alcohol salts.

25

When the anionic surfactant is in salt form, said salt may be chosen from alkali metal salts, such as the sodium or potassium salt, ammonium salts, amine salts and in particular amino alcohol salts, and alkaline-earth metal salts, such as the magnesium salt.

30

Examples of amino alcohol salts that may 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.

35

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

Preferentially, the anionic surfactants are chosen, alone or as a mixture, from:

- C₆-C₂₄ and in particular C₁₂-C₂₀ alkyl sulfates;

40

- C₆-C₂₄ and in particular C₁₂-C₂₀ alkyl ether sulfates; preferably comprising from 2 to 20 ethylene oxide units;

- C₆-C₂₄ and in particular C₁₂-C₂₀ alkylsulfosuccinates, in particular laurylsulfosuccinates;

- C₆-C₂₄ and in particular C₁₂-C₂₀ alkyl ether sulfosuccinates;
- (C₆-C₂₄)acylisethionates and preferably (C₁₂-C₁₈)acylisethionates;
- C₆-C₂₄ and in particular C₁₂-C₂₀ acylsarcosinates; in particular palmitoylsarcosinates;
- 5 - (C₆-C₂₄)alkyl ether carboxylates, preferably (C₁₂-C₂₀)alkyl ether carboxylates; in particular those comprising from 2 to 50 ethylene oxide groups;
- polyoxyalkylenated (C₆-C₂₄)alkylamido ether carboxylic acids and salts thereof, in particular those comprising from 2 to 50 alkylene oxide and in particular ethylene oxide groups;
- 10 - C₆-C₂₄ and in particular C₁₂-C₂₀ acylglutamates;
- C₆-C₂₄ and in particular C₁₂-C₂₀ acylglycinates;
- in particular in acid form or in the form of alkali metal or alkaline-earth metal, ammonium or amino alcohol salts.
- 15 In one particular embodiment of the invention, the composition comprises one or more carboxylic anionic surfactants.
- Preferably, it comprises one or more anionic surfactants chosen from anionic surfactants of the type polyoxyalkylenated alkyl(amido) ether carboxylic acid of formula (1) above; particularly in acid form or in the form of alkali metal or alkaline-earth
- 20 metal, ammonium or amino alcohol salts; preferentially in acid form.

- In a second particular embodiment of the invention, the composition comprises:
- one or more carboxylic anionic surfactants; preferably of the type polyoxyalkylenated alkyl(amido) ether carboxylic acid of formula (1) above; particularly in acid
 - 25 form or in the form of alkali metal or alkaline-earth metal, ammonium or amino alcohol salts; and
 - one or more sulfate anionic surfactants; preferably of C₆-C₂₄, in particular C₁₂-C₂₀, alkyl sulfate type, and/or of C₆-C₂₄, in particular C₁₂-C₂₀, alkyl ether sulfate type; preferably comprising from 2 to 20 ethylene oxide units; particularly in the
 - 30 form of alkali metal or alkaline-earth metal, ammonium or amino alcohol salts.

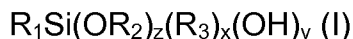
- The anionic surfactant(s) are preferably present in the composition according to the invention in a total amount ranging from 1% to 35% by weight, in particular from 3% to 25% by weight and better still from 5% to 22% by weight relative to the
- 35 total weight of the composition.

- In one preferred embodiment, the composition according to the invention comprises at least one carboxylic anionic surfactant, preferably at least one anionic surfactant chosen from anionic surfactants of the type polyoxyalkylenated alkyl(amido)
- 40 ether carboxylic acid of formula (1) above; particularly in acid form or in the form of alkali metal or alkaline-earth metal, ammonium or amino alcohol salts, in a content preferably ranging from 1% to 15% by weight, in particular from 1.5% to 10% by weight, better still from 2% to 5% by weight relative to the total weight of the com-

position.

Organosilanes

The composition according to the invention comprises at least one organosilane,
5 preferably chosen from the compounds of formula (I) and/or oligomers thereof:



in which:

- 10 - R_1 is a cyclic or acyclic, linear or branched, saturated or unsaturated C_1 - C_{22} , in particular C_2 - C_{20} , hydrocarbon-based chain, which may be substituted with a group chosen from amine groups NH_2 or NHR (R being a linear or branched C_1 - C_{20} , in particular C_1 - C_6 , alkyl, a C_3 - C_{40} cycloalkyl or a C_6 - C_{30} aromatic radical); the hydroxyl group (OH), a thiol group, an aryl group (more particularly benzyl), which
- 15 is possibly substituted with a group NH_2 or NHR ; it being possible for R_1 to be interrupted with a heteroatom (O , S or NH) or a carbonyl group (CO),
- R_2 and R_3 , which may be identical or different, represent a linear or branched alkyl group comprising from 1 to 6 carbon atoms,
- y denotes an integer ranging from 0 to 3,
- 20 - z denotes an integer ranging from 0 to 3, and
- x denotes an integer ranging from 0 to 2,
- with $z + x + y = 3$.

The term "oligomer" is intended to mean the polymerization products of the com-
25 pounds having formula (I) including from 2 to 10 silicon atoms.

Preferably, R_1 is a linear or branched, preferably linear, saturated C_1 - C_{22} , in particular C_2 - C_{12} , hydrocarbon-based chain, which may be substituted with an amine group NH_2 or NHR ($R = C_1$ - C_{20} , in particular C_1 - C_6 , alkyl).

30 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 methyl or ethyl group.

Preferably, R_3 represents an alkyl group comprising from 1 to 4 carbon atoms, better still a linear alkyl group comprising from 1 to 4 carbon atoms, and preferably
35 the methyl or ethyl group.

Preferably, z ranges from 1 to 3.

Preferably, $y=0$.

Preferentially, $z = 3$ and thus $x = y = 0$, or else $z = 2$, $x = 1$ and $y = 0$.

40 In one embodiment of the invention, R_1 represents a C_1 - C_6 , preferably C_2 - C_4 , amino alcohol group, $z = 3$ and $x = y = 0$.

Preferably, the composition according to the invention comprises one or more or-

ganosilanes chosen from octyltriethoxysilane (OTES), dodecyltriethoxysilane, octadecyltriethoxysilane, hexadecyltriethoxysilane, 3-aminopropyltriethoxysilane (APTES), methyltriethoxysilane (MTES), 2-aminoethyltriethoxysilane (AETES), 3-aminopropylmethyldiethoxysilane, N-(2-aminoethyl)-3-aminopropyltriethoxysilane, 5 3-(m-aminophenoxy)propyltrimethoxysilane, p-aminophenyltrimethoxysilane, N-(2-aminoethylaminomethyl)phenethyltrimethoxysilane, and oligomers thereof; and more particularly chosen from 3-aminopropyltriethoxysilane (APTES) and oligomers thereof.

- 10 The organosilanes used in the composition of the invention, in particular those comprising a basic function, may be partially or totally neutralized in order to improve the water-solubility thereof. In particular, the neutralizing agent can be chosen from organic or mineral acids, more particularly from carboxylic organic acids, in particular those which are C₂-C₈, optionally comprising one or more hydroxyl 15 functions. Mention may be made in particular of citric acid, tartaric acid, lactic acid, acetic acid and also hydrochloric acid.

When it is present, the concentration of the neutralizing agent, in particular of the acid, can range from 0.01% to 5% by weight, preferably from 0.05% to 3% by weight and better still from 0.1% to 2% by weight relative to the total weight of the 20 composition.

Preferably, the optionally neutralized organosilanes according to the invention are water-soluble and in particular soluble at a concentration of 2%, better still at a concentration of 5% and even better still at a concentration of 10% by weight in 25 water at a temperature of 25°C and at atmospheric pressure (1 atm). The term "soluble" is intended to mean the formation of a single macroscopic phase.

Preferably, the composition according to the invention comprises the organosilane(s) in an amount ranging from 0.01% to 10% by weight, preferably from 30 0.1% to 5% by weight and even better still from 0.2% to 1% by weight, relative to the total weight of the composition.

Amino silicones

The composition according to the invention comprises at least one amino silicone, 35 different from the organosilanes mentioned above.

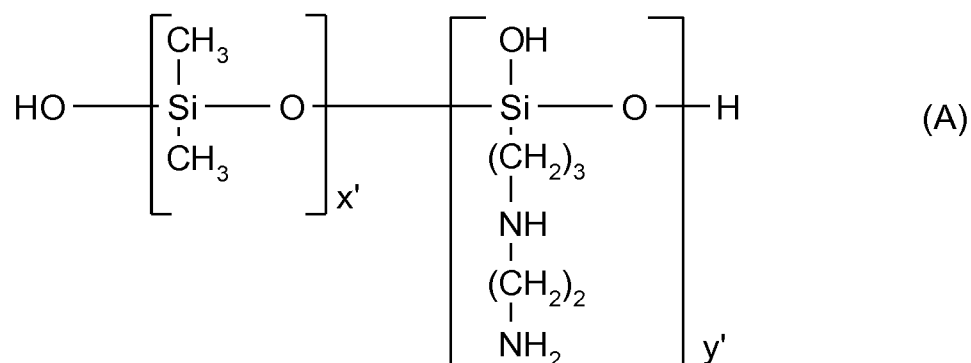
The term "amino silicone" denotes any silicone comprising at least one primary, secondary or tertiary amine or a quaternary ammonium group.

- 40 The weight-average molecular weights (M_w) of these amino silicones may be measured by gel permeation chromatography (GPC) at ambient temperature (25°C), as polystyrene equivalent. The columns used are μ styragel columns. The eluent is THF and the flow rate is 1 ml/min. 200 μ l of a 0.5% by weight solution of

silicone in THF are injected. Detection is performed by refractometry and UV-metry.

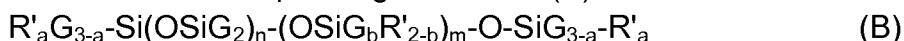
Preferably, the amino silicone(s) that may be used in the context of the invention
5 are chosen from, alone or as a mixture:

a) the polysiloxanes corresponding to formula (A):



in which x' and y' are integers such that the weight-average molecular weight (Mw)
10 is between 5000 and 500 000 approximately;

b) the amino silicones corresponding to formula (B):



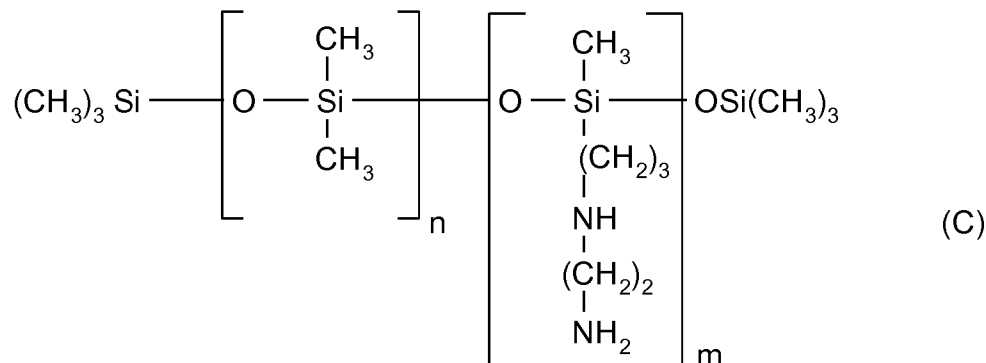
in which:

- 15 - G, which may be identical or different, denote a hydrogen atom or a phenyl, OH or C₁-C₈ alkyl, for example methyl, or C₁-C₈ alkoxy, for example methoxy, group,
- a, which may be identical or different, denote 0 or an integer from 1 to 3, in particular 0,
- b denotes 0 or 1, in particular 1,
- 20 - m and n are numbers such that the sum (n + m) ranges from 1 to 2000 and in particular from 50 to 150, n possibly denoting a number from 0 to 1999 and in particular from 49 to 149, and m possibly denoting a number from 1 to 2000 and in particular from 1 to 10;
- R', which may be identical or different, denote a monovalent radical of formula
- 25 -C_qH_{2q}L in which q is a number ranging from 2 to 8 and L is an optionally quaternized amino group chosen from the following groups:
-N(R'')₂; -N⁺(R'')₃ A⁻; -NR''-Q-N(R'')₂ and -NR''-Q-N⁺(R'')₃ A⁻,
in which R'', which may be identical or different, denote hydrogen, phenyl, benzyl, or a saturated monovalent hydrocarbon-based radical, for example a C₁-C₂₀ alkyl
- 30 radical; Q denotes a linear or branched group of formula C_rH_{2r}, r being an integer ranging from 2 to 6, preferably from 2 to 4; and A⁻ represents a cosmetically acceptable anion, in particular a halide such as fluoride, chloride, bromide or iodide ion.

35 Preferably, the amino silicones are chosen from the amino silicones of formula (B).

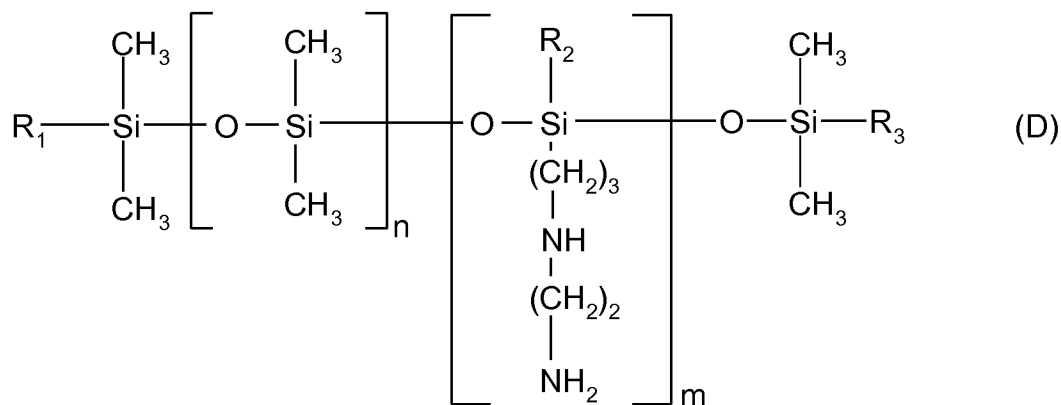
Preferably, the amino silicones of formula (B) are chosen from the amino silicones corresponding to formulae (C), (D), (E), (F) and/or (G) below.

- According to a first embodiment, the amino silicones corresponding to formula (B) are chosen from the silicones known as "trimethylsilyl amodimethicone" corresponding to formula (C):



- in which m and n are numbers such that the sum (n + m) ranges 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.

According to a second embodiment, the amino silicones corresponding to formula (B) are chosen from the silicones of formula (D) below:



15

in which:

- m and n are numbers such that the sum (n + m) ranges from 1 to 1000 and in particular from 50 to 250 and more particularly from 100 to 200; it being possible for n to denote a number from 0 to 999 and in particular from 49 to 249 and more particularly from 125 to 175, and for m to denote a number from 1 to 1000 and in particular from 1 to 10, and more particularly from 1 to 5;
- R₁, R₂ and R₃, which may be identical or different, represent a hydroxyl or C₁-C₄ alkoxy radical, at least one of the radicals R₁ to R₃ denoting an alkoxy radical.

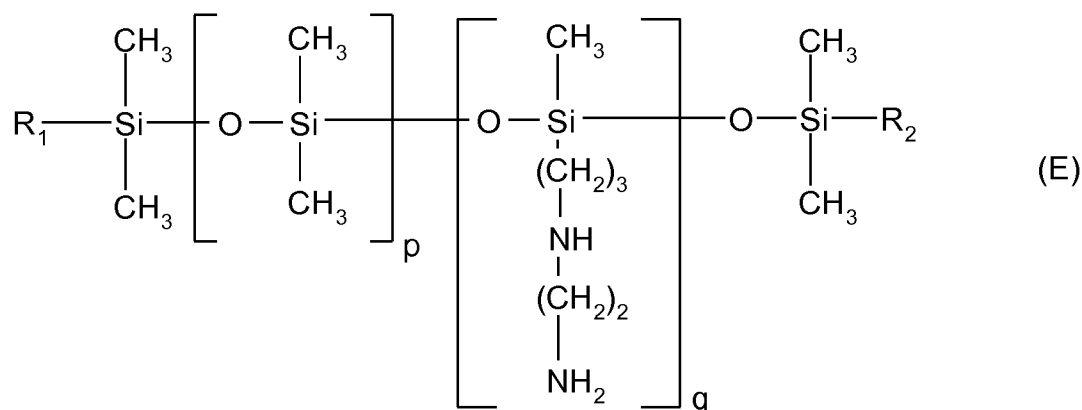
- 25 Preferably, the alkoxy radical is a methoxy radical.

The hydroxy/alkoxy mole ratio ranges preferably from 0.2:1 to 0.4:1 and preferably from 0.25:1 to 0.35:1 and more particularly equals 0.3:1.

The weight-average molecular weight (Mw) of these silicones preferably ranges from 2000 to 1 000 000 and more particularly from 3500 to 200 000.

5

According to a third embodiment, the amino silicones corresponding to formula (B) are chosen from the silicones of formula (E) below:



10 in which:

- p and q are numbers such that the sum (p + q) ranges from 1 to 1000, in particular from 50 to 350 and more particularly from 150 to 250; it being possible for p to denote a number from 0 to 999 and in particular from 49 to 349 and more particularly from 159 to 239, and for q to denote a number from 1 to 1000, in particular from 1 to 10 and more particularly from 1 to 5;

15

- R₁ and R₂, which are different, represent a hydroxyl or C₁-C₄ alkoxy radical, at least one of the radicals R₁ or R₂ denoting an alkoxy radical.

Preferably, the alkoxy radical is a methoxy radical.

The hydroxy/alkoxy mole ratio generally ranges from 1:0.8 to 1:1.1 and preferably from 1:0.9 to 1:1 and more particularly equals 1:0.95.

20

The weight-average molecular weight (Mw) of the silicone preferably ranges from 2000 to 200 000, even more particularly from 5000 to 100 000 and more particularly from 10 000 to 50 000.

25

The commercial products comprising silicones of structure (D) or (E) may include in their composition one or more other amino silicones of which the structure is different from formula (D) or (E).

30

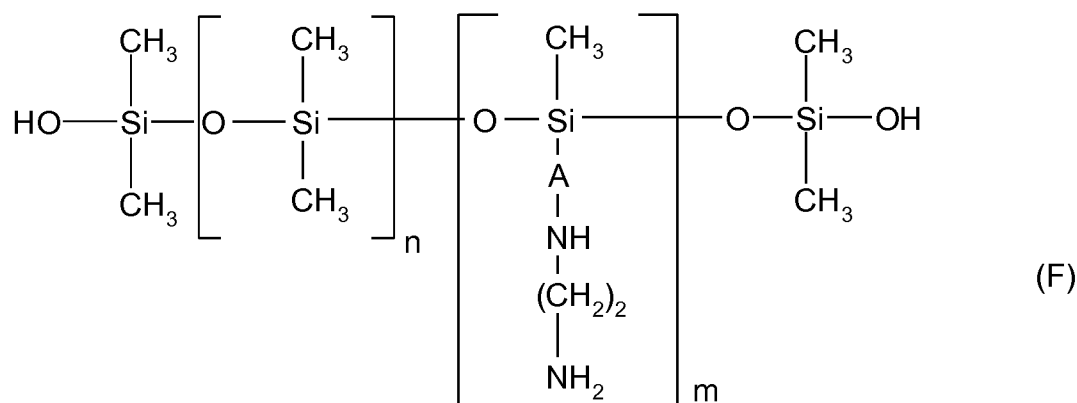
A product containing amino silicones of structure (D) is sold by the company Wacker under the name Belsil® ADM 652.

A product containing amino silicones of structure (E) is sold by Wacker under the name Fluid WR 1300®.

When these amino silicones are used, one particularly advantageous embodiment

consists in using them in the form of an oil-in-water emulsion. The oil-in-water emulsion may comprise one or more surfactants. The surfactants may be of any nature but are preferably cationic and/or non-ionic. The numerical mean size of the silicone particles in the emulsion generally ranges from 3 nm to 500 nm. Preferably, in particular as amino silicones of formula (E), use is made of microemulsions of which the mean particle size ranges from 5 nm to 60 nm (limits included) and more particularly from 10 nm to 50 nm (limits included). Thus, use may be made according to the invention of the amino silicone microemulsions of formula (E) sold under the names Finish CT 96 E® or SLM 28020® by the company Wacker.

According to a fourth embodiment, the amino silicones corresponding to formula (B) are chosen from the silicones of formula (F) below:



in which:

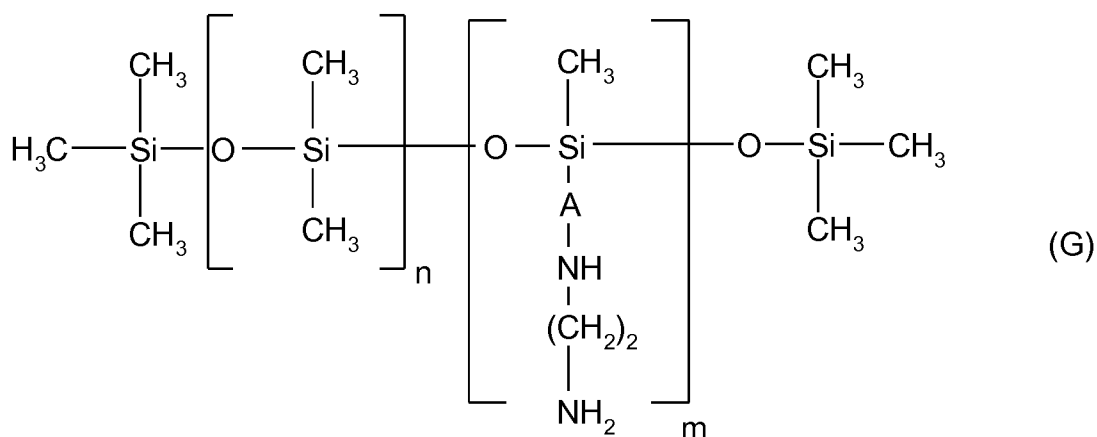
- m and n are numbers such that the sum (n + m) ranges from 1 to 2000 and in particular from 50 to 150, it being possible for n to denote a number from 0 to 1999 and in particular from 49 to 149, and for m to denote a number from 1 to 2000 and in particular from 1 to 10;

- A denotes a linear or branched alkylene radical containing from 4 to 8 carbon atoms and preferably 4 carbon atoms. This radical is preferably linear.

The weight-average molecular weight (Mw) of these amino silicones preferably ranges from 2000 to 1 000 000 and even more particularly from 3500 to 200 000.

A silicone corresponding to this formula is, for example, the Xiameter MEM 8299 Emulsion from Dow Corning;

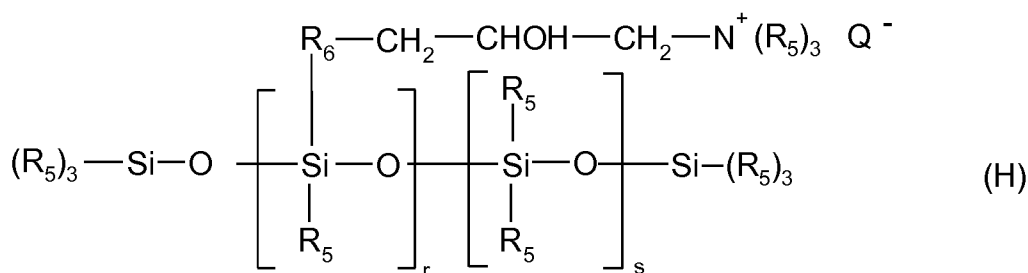
According to a fifth embodiment, the amino silicones corresponding to the formula (B) are chosen from the silicones of formula (G) below:



in which:

- m and n are numbers such that the sum (n + m) ranges 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;
 - A denotes a linear or branched alkylene radical containing from 4 to 8 carbon atoms and preferably 4 carbon atoms. This radical is preferably branched.
- The weight-average molecular weight (Mw) of these amino silicones preferably ranges from 500 to 1 000 000 and even more particularly from 1000 to 200 000.
- A silicone corresponding to this formula is, for example, DC2-8566 Amino Fluid from Dow Corning;

c) the amino silicones corresponding to formula (H):

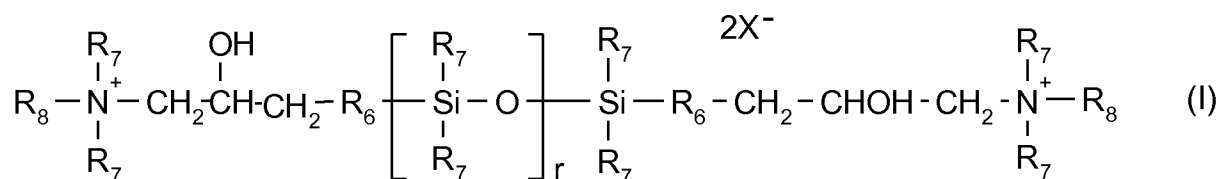


in which:

- R₅ represents a monovalent hydrocarbon-based radical containing from 1 to 18 carbon atoms, and in particular a C₁-C₁₈ alkyl or C₂-C₁₈ alkenyl, for example methyl radical;
- R₆ represents a divalent hydrocarbon-based radical, in particular a C₁-C₁₈ alkylene radical or a divalent C₁-C₁₈, for example C₁-C₈, alkyleneoxy radical linked to the Si via an SiC bond;
- Q⁻ is an anion such as a halide, in particular chloride, ion or an organic acid salt, in particular acetate;
- r represents a mean statistical value from 2 to 20 and in particular from 2 to 8;
- s represents a mean statistical value from 20 to 200 and in particular from 20 to 50.

Such amino silicones are in particular described in patent US 4 185 087;

d) the silicones comprising a quaternary ammonium group, of formula (I):



5 in which:

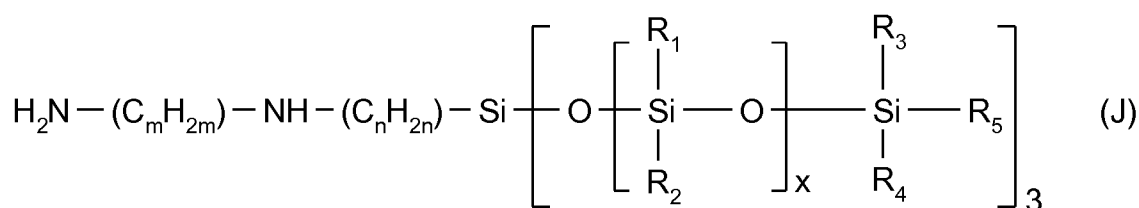
- R₇, which may be identical or different, represent a monovalent hydrocarbon-based radical containing from 1 to 18 carbon atoms, and in particular a C₁-C₁₈ alkyl radical, a C₂-C₁₈ alkenyl radical or a ring comprising 5 or 6 carbon atoms, for example a methyl radical;
- 10 - R₆ represents a divalent hydrocarbon-based radical, in particular a C₁-C₁₈ alkylene radical or a divalent C₁-C₁₈, for example C₁-C₈, alkyleneoxy radical linked to the Si via an SiC bond;
- R₈, which may be identical or different, represent a hydrogen atom, or a monovalent hydrocarbon-based radical having from 1 to 18 carbon atoms, and in particular
- 15 a C₁-C₁₈ alkyl radical, a C₂-C₁₈ alkenyl radical, or a radical -R₆-NHCOR₇; with R₆ as defined above and R₇ representing a monovalent hydrocarbon-based radical having from 1 to 18 carbon atoms, and in particular a C₁-C₁₈ alkyl radical or a C₂-C₁₈ alkenyl radical;
- X⁻ is an anion such as a halide, in particular chloride, ion or an organic acid salt,
- 20 in particular acetate;
- r represents a mean statistical value ranging from 2 to 200 and in particular from 5 to 100.

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

Mention may in particular be made of the silicone Quaternium-80, for instance the

25 commercial products Abil Quat 3474 or 3272 provided by the company Evonik Goldschmidt.

e) the amino silicones of formula (J):



30

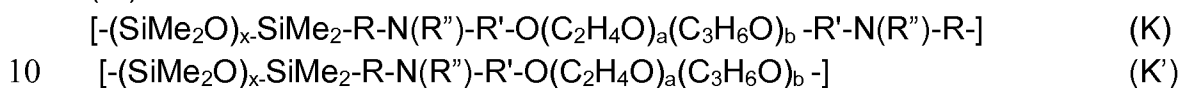
in which:

- R₁, R₂, R₃ and R₄, which may be identical or different, denote a C₁-C₄ alkyl radical or a phenyl group,
- R₅ denotes a C₁-C₄ alkyl radical or a hydroxyl group,
- 35 - n is an integer ranging from 1 to 5,

- m is an integer ranging from 1 to 5, and
- x is chosen such that the amine number ranges from 0.01 to 1 meq/g;

5 f) the polyoxyalkylenated amino silicones, in particular of multiblock type (AB)_n, A being a polysiloxane block and B being a polyoxyalkylene block comprising at least one amine group.

Said silicones are preferably constituted of repeating units of formula (K) and/or (K') below:



in which:

- a is an integer greater than or equal to 1, preferably ranging from 5 to 200, or even from 60 to 100, and more particularly ranging from 10 to 100;
- b is an integer between 0 and 200, preferably ranging from 4 to 100, or even 15 from 5 to 50, and more particularly between 5 and 30;
- x is an integer ranging from 1 to 10 000 and more particularly from 10 to 5000;
- R'', which may be identical or different, are a hydrogen atom or a methyl, preferably methyl;
- R, which may be identical or different, represent a linear or branched divalent C₂- 20 C₁₂ hydrocarbon-based radical, optionally comprising one or more heteroatoms such as oxygen; preferably, R denotes an ethylene radical, a linear or branched propylene radical, a linear or branched butylene radical or a -CH₂CH₂CH₂OCH(OH)CH₂- or -CH₂CH₂CH₂OCH₂CH(OH)CH₂- radical; preferentially, R represents a -CH₂CH₂CH₂OCH(OH)CH₂- or 25 -CH₂CH₂CH₂OCH₂CH(OH)CH₂- radical;
- R', which may be identical or different, represent a linear or branched C₂-C₁₂ divalent hydrocarbon-based radical, optionally comprising one or more heteroatoms such as oxygen; preferably, R' denotes an ethylene radical, a linear or branched propylene radical, a linear or branched butylene radical, or a 30 -CH₂CH₂CH₂OCH(OH)CH₂- or -CH₂CH₂CH₂OCH₂CH(OH)CH₂- radical; preferentially, R' denotes -CH(CH₃)-CH₂-.

The siloxane blocks preferably represent 50 mol% to 95 mol% of the total weight of the silicone, more particularly from 70 mol% to 85 mol%.

35 The amine content is preferably between 0.02 and 0.5 meq/g of copolymer in a 30% solution in dipropylene glycol, more particularly between 0.05 and 0.2. The weight-average molecular weight (M_w) of the silicone is preferably between 5000 and 1 000 000 and more particularly between 10 000 and 200 000.

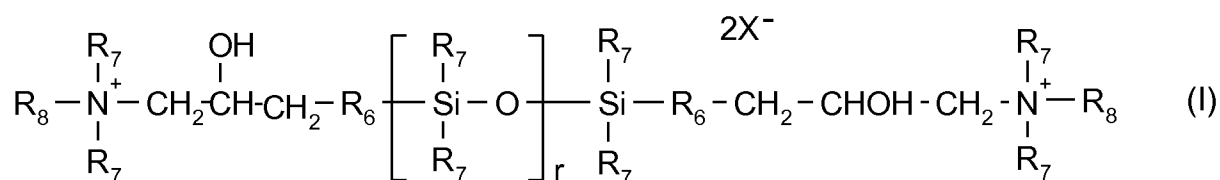
40 Among the polyoxyalkylenated amino silicones, mention may particularly made of the compounds having the INCI name PEG-40/PPG-8 methylaminopropyl/hydroxypropyl dimethicone copolymer such as the compound provided by the company Momentive Performance Materials under the trade name Silsoft A+.

Mention may also be made of the compounds having the INCI name Bisamino PEG/PPG-41/3 aminoethyl PG-propyl dimethicone such as the compound provided by the company Momentive Performance Materials under the trade name Silsoft A843.

- 5 Mention may also be made of the compounds having the INCI name Methoxy PEG/PPG-7/3 aminopropyl dimethicone such as the product provided by the company Evonik under the name AbilSoft AF100.

10 Preferably, the amino silicone(s) that may be used in the context of the invention are chosen from, alone or as a mixture:

- the silicones comprising a quaternary ammonium, of formula (I):



in which R_7 , R_6 , R_8 , X^- and r are defined above; and

- 15 - the polyoxyalkylenated amino silicones, in particular of multiblock type $(\text{AB})_n$, A being a polysiloxane block and B being a polyoxyalkylene block, and comprising at least one amine group constituted of repeating units of formula (K) and/or (K') below:



- 20 $[-(\text{SiMe}_2\text{O})_x - \text{SiMe}_2 - \text{R} - \text{N}(\text{R}'') - \text{R}' - \text{O}(\text{C}_2\text{H}_4\text{O})_a (\text{C}_3\text{H}_6\text{O})_b -] \quad (\text{K}')$

in which R , R' , R'' , x , a and b are defined above.

25 Preferentially, the amino silicones are chosen from the polyoxyalkylenated amino silicones of multiblock type $(\text{AB})_n$, A being a polysiloxane block and B being a polyoxyalkylene block, and comprising at least one amine group, comprising at least repeating units of formula (K') as defined above.

30 Preferentially, the amino silicones are chosen from the compounds having the INCI name PEG-40/PPG-8 methylaminopropyl/hydroxypropyl dimethicone copolymer, Bisamino PEG/PPG-41/3 aminoethyl PG-propyl dimethicone or Quaternium-80.

35 The composition according to the invention preferably comprises the amino silicone(s) in an amount ranging from 0.01% to 5% by weight, preferably from 0.05% to 2% by weight and preferentially from 0.1% to 0.5% by weight, relative to the total weight of the composition.

Associative cationic polymers

The composition according to the invention also comprises one or more associa-

tive cationic polymers.

The term "cationic polymer" is intended to mean any polymer comprising cationic groups and/or groups that can be ionized to cationic groups.

- 5 The term "associative polymer" is intended to mean an amphiphilic polymer that is capable, in an aqueous medium, of reversibly combining with itself or with other molecules. It generally comprises, in its chemical structure, at least one hydrophilic region or group and at least one hydrophobic region or group. In particular, the hydrophobic group may be a fatty hydrocarbon-based chain such as a linear or
- 10 branched alkyl, linear or branched arylalkyl or linear or branched alkylaryl group comprising at least 8 carbon atoms, preferably 8 to 30 carbon atoms, better still from 12 to 24 carbon atoms.

- Among the cationic associative polymers, mention may be made of, alone or as a
- 15 mixture:

- (A) cationic associative polyurethanes, which can be represented by general formula (Ia) below: $R-X-(P)_n-[L-(Y)_m]_r-L'-(P')_p-X'-R'$

in which:

- R and R', which may be identical or different, represent a hydrophobic group or a
- 20 hydrogen atom;

X and X', which may be identical or different, represent a group comprising an amine function optionally bearing a hydrophobic group, or alternatively the group L'';

- L, L' and L'', which may be identical or different, represent a group derived from a
- 25 diisocyanate;

P and P', which may be identical or different, represent a group comprising an amine function optionally bearing a hydrophobic group;

Y represents a hydrophilic group;

- r is an integer between 1 and 100 inclusive, preferably between 1 and 50 inclusive
- 30 and in particular between 1 and 25 inclusive;

n, m and p are each, independently of one another, between 0 and 1000 inclusive; the molecule containing at least one protonated or quaternized amine function and at least one hydrophobic group.

- 35 Preferably, the only hydrophobic groups are the groups R and R' at the chain ends.

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

- 40 R and R' both independently represent a hydrophobic group,

X and X' each represent a group L'',

n and p are integers which are inclusively between 1 and 1000 and L, L', L'', P, P', Y and m have the meaning indicated above.

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

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

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

- R and R' both independently represent a hydrophobic group,
- X and X' both independently represent a group comprising a quaternary amine,
- $n=p=0$, and
- L, L', Y and m have the meaning indicated above.

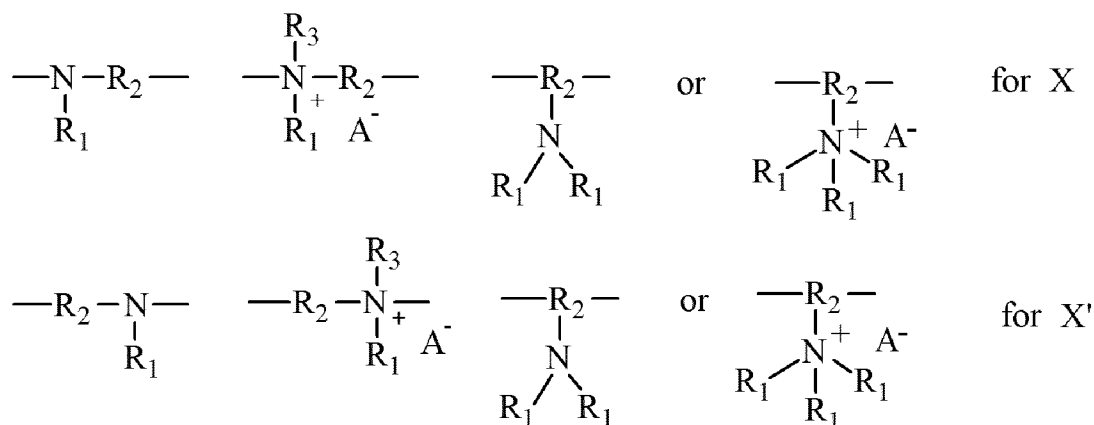
The number-average molecular weight (M_n) of the cationic associative polyurethanes is preferably between 400 and 500 000, in particular between 1000 and 400 000 inclusive and ideally between 1000 and 300 000 inclusive.

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

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

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

When X and/or X' denote(s) a group comprising a tertiary or quaternary amine, X and/or X' may represent one of the following formulae:



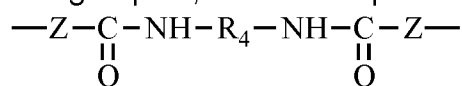
in which:

R_2 represents a linear or branched alkylene radical containing from 1 to 20 carbon atoms, optionally comprising a saturated or unsaturated ring, or an arylene radical, one or more of the carbon atoms possibly being replaced with a heteroatom chosen from N, S, O and P;

R_1 and R_3 , which may be identical or different, denote a linear or branched C_1 - C_{30} alkyl or alkenyl radical or an aryl radical, at least one of the carbon atoms possibly being replaced with a heteroatom chosen from N, S, O and P;

A^- is a physiologically acceptable anionic counterion such as a halide, for instance a chloride or bromide, or a mesylate.

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

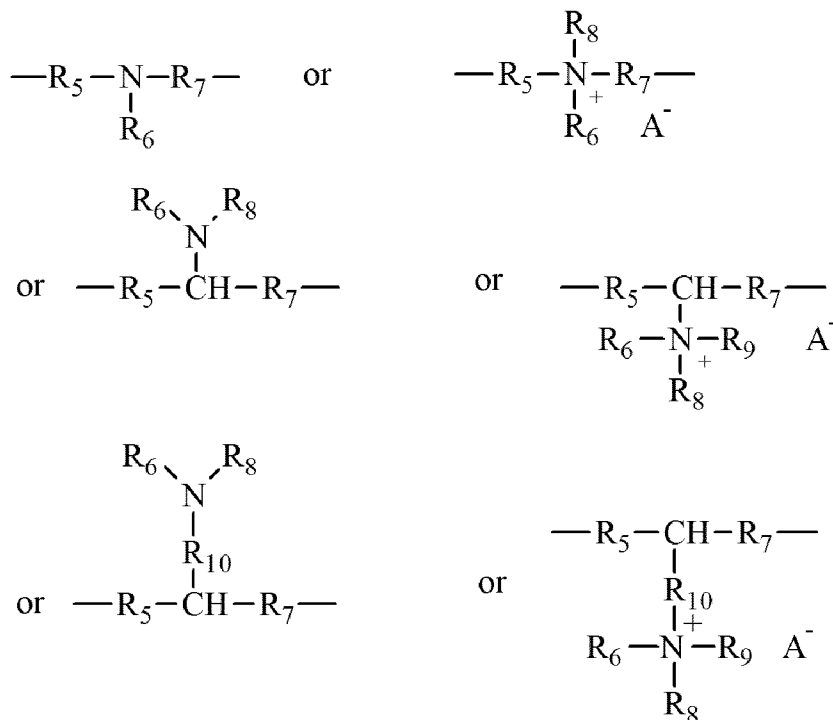


in which:

Z represents -O-, -S- or -NH-; and

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

The groups P and P' comprising an amine function may represent at least one of the following formulae:



in which:

R₅ and R₇ have the same meanings as R₂ defined above;

R₆, R₈ and R₉ have the same meanings as R₁ et R₃ defined above;

- 5 R₁₀ represents a linear or branched, optionally unsaturated alkylene group possibly containing one or more heteroatoms chosen from N, O, S and P; and A⁻ is a physiologically acceptable anionic counterion such as a halide, for instance chloride or bromide, or mesylate.

- 10 As regards the meaning of Y, the term "hydrophilic group" is intended to mean a polymeric or non-polymeric water-soluble group.

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

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

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

A first type of compound involved in the preparation of the polyurethane of formula (Ia) is a compound comprising at least one unit bearing an amine function. This compound may be multifunctional, but the compound is preferentially difunctional, that is to say that, according to one preferential embodiment, this compound comprises two labile hydrogen atoms borne, for example, by a hydroxyl, primary amine, secondary amine or thiol function. A mixture of multifunctional and difunctional compounds in which the percentage of multifunctional compounds is low may also be used.

As mentioned above, this compound may comprise more than one unit containing an amine function. In this case, it is a polymer bearing a repetition of the unit containing an amine function.

This type of compound may be represented by one of the following formulae:

$\text{HZ}-(\text{P})_n-\text{ZH}$, ou $\text{HZ}-(\text{P}')_p-\text{ZH}$, in which Z, P, P', n and p are as defined above.

By way of example, mention may be made of N-methyldiethanolamine, N-tert-butyl-diethanolamine and N-sulfoethyl-diethanolamine.

The second compound included in the preparation of the polyurethane of formula (Ia) is a diisocyanate corresponding to the formula:

$\text{O}=\text{C}=\text{N}-\text{R}_4-\text{N}=\text{C}=\text{O}$ in which R_4 is defined above.

By way of example, mention may be made of methylenediphenyl diisocyanate, methylenecyclohexane diisocyanate, isophorone diisocyanate, tolylene diisocyanate, naphthalene diisocyanate, butane diisocyanate and hexane diisocyanate.

A third compound involved in the preparation of the polyurethane of formula (Ia) is a hydrophobic compound intended to form the terminal hydrophobic groups of the polymer of formula (Ia).

This compound is formed from a hydrophobic group and a function containing a labile hydrogen, for example a hydroxyl, primary or secondary amine, or thiol function.

By way of example, this compound may be a fatty alcohol such as stearyl alcohol, dodecyl alcohol or decyl alcohol. When this compound comprises a polymeric chain, it may be, for example, α -hydroxylated hydrogenated polybutadiene.

The hydrophobic group of the polyurethane of formula (Ia) may also result from the quaternization reaction of the tertiary amine of the compound comprising at least one tertiary amine unit. Thus, the hydrophobic group is introduced via the quaternizing agent. This quaternizing agent is a compound of the type RQ or $\text{R}'\text{Q}$, in which R and R' are as defined above and Q denotes a leaving group such as a halide, a sulfate, etc.

The cationic associative polyurethane may also comprise a hydrophilic block. This block is provided by a fourth type of compound involved in the preparation of the polymer. This compound may be multifunctional. It is preferably difunctional. It is also possible to have a mixture in which the percentage of multifunctional compound is low.

The functions containing a labile hydrogen are alcohol, primary or secondary amine, or thiol functions. This compound may be a polymer terminated at the chain ends with one of these functions containing a labile hydrogen.

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

When it is a hydrophilic polymer, mention may be made, by way of example, of polyethers, sulfonated polyesters and sulfonated polyamides, or a mixture of these polymers. The hydrophilic compound is a polyether and in particular a poly(ethylene oxide) or poly(propylene oxide).

The hydrophilic group termed Y in formula (Ia) is optional. Specifically, the units containing a quaternary amine or protonated function may suffice to provide the solubility or water-dispersibility required for this type of polymer in an aqueous solution.

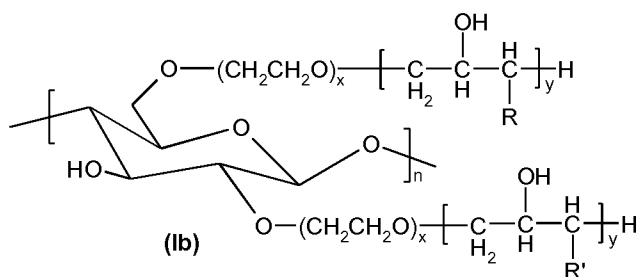
Although the presence of a hydrophilic group Y is optional, cationic associative polyurethanes comprising such a group are, however, preferred.

- (B) quaternized cellulose derivatives, and in particular:

- i) quaternized celluloses modified with groups comprising at least one fatty chain, such as linear or branched alkyl, linear or branched arylalkyl or linear or branched alkylaryl groups comprising at least 8 carbon atoms, or mixtures thereof;

- ii) quaternized hydroxyethylcelluloses modified with groups comprising at least one fatty chain, such as linear or branched alkyl, linear or branched arylalkyl or linear or branched alkylaryl groups comprising at least 8 carbon atoms, or mixtures thereof;

- iii) the hydroxyethylcelluloses of formula (Ib):



in which:

R and R', which may be identical or different, represent an ammonium group $RaR-bRcN^+$, Q^- in which Ra, Rb and Rc, which may be identical or different, represent a hydrogen atom or a linear or branched C_1 - C_{30} and preferentially C_1 - C_{20} alkyl, such as methyl or dodecyl group; and Q^- represents an anionic counterion such as a halide, for instance a chloride or bromide; and

n, x and y, which may be identical or different, represent an integer between 1 and 10 000.

The alkyl radicals borne by the above quaternized celluloses i) or hydroxyethylcelluloses ii) preferably comprise from 8 to 30 carbon atoms. The aryl radicals

preferably denote phenyl, benzyl, naphthyl or anthryl groups.

As examples of alkylhydroxyethylcelluloses that are quaternized with C₈-C₃₀ fatty chains, mention may be made of the product Quatrisoft LM 200®, sold by the company Amerchol/Dow Chemical (INCI name Polyquaternium-24) and the products Crodacel QM® (INCI name PG-Hydroxyethylcellulose cocodimonium chloride), Crodacel QL® (C₁₂ alkyl) (INCI name PG-Hydroxyethylcellulose lauryldimonium chloride) and Crodacel QS® (C₁₈ alkyl) (INCI name PG-Hydroxyethylcellulose stearyldimonium chloride) sold by the company Croda.

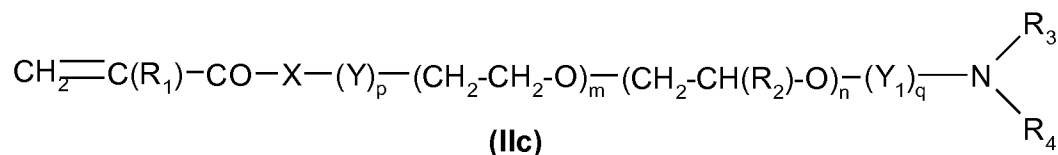
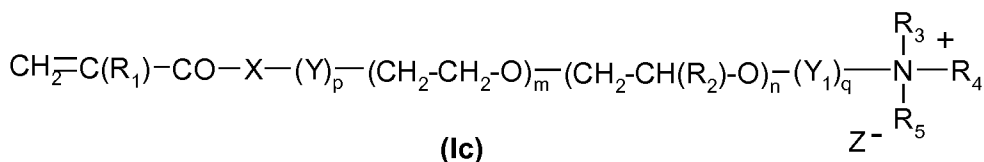
Mention may also be made of the hydroxyethylcelluloses of formula (Ib) in which R represents a trimethylammonium halide and R' represents a dimethyldodecylammonium halide, more preferentially R represents trimethylammonium chloride (CH₃)₃N⁺ Cl⁻ and R' represents dimethyldodecylammonium chloride (CH₃)₂(C₁₂H₂₅)N⁺ Cl⁻. This type of polymer is known under the INCI name Polyquaternium-67; as commercial products, mention may be made of the Softcat Polymer SL® polymers, such as SL-100, SL-60, SL-30 and SL-5, from the company Amerchol/Dow Chemical.

More particularly, the polymers of formula (Ib) are those whose viscosity is between 2000 and 3000 cPs inclusive. Preferentially, the viscosity is between 2700 and 2800 cPs inclusive. Typically, Softcat Polymer SL-5 has a viscosity of 2500 cPs, Softcat Polymer SL-30 has a viscosity of 2700 cPs, Softcat Polymer SL-60 has a viscosity of 2700 cPs and Softcat Polymer SL-100 has a viscosity of 2800 cPs.

- (C) cationic polyvinyl lactams, in particular those having units deriving from the polymerization of:

-a) at least one monomer of vinyl lactam or alkylvinyl lactam type;

-b) at least one monomer of structure (Ic) or (IIc) below:



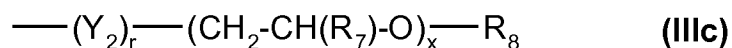
in which:

- X denotes an oxygen atom or an NR₆ radical,

- R₁ and R₂ denote, independently of one another, a hydrogen atom or a linear or branched C₁-C₅ alkyl radical,

- R₂ denotes a linear or branched C₁-C₄ alkyl radical,

- R₃, R₄ and R₅ denote, independently of one another, a hydrogen atom, a linear or branched C₁-C₃₀ alkyl radical or a radical of formula (IIIc):

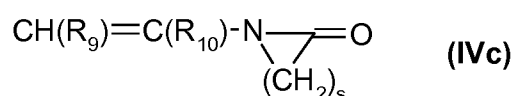


- Y, Y₁ and Y₂ denote, independently of one another, a linear or branched C₂-C₁₆ alkylene radical,
- 5 - R₇ denotes a hydrogen atom, a linear or branched C₁-C₄ alkyl radical or a linear or branched C₁-C₄ hydroxyalkyl radical,
- R₈ denotes a hydrogen atom or a linear or branched C₁-C₃₀ alkyl radical,
- p, q and r denote, independently of one another, 0 or 1,
- m and n denote, independently of one another, an integer ranging from 0 to 100
- 10 inclusive,
- x denotes an integer ranging from 1 to 100 inclusive,
- Z denotes an anionic counterion of an organic or mineral acid, such as a halide, for instance chloride or bromide, or mesylate;
- with the proviso that:
- 15 - at least one of the substituents R₃, R₄, R₅ or R₈ denotes a linear or branched C₉-C₃₀ alkyl radical,
- if m or n is other than zero, then q is equal to 1,
- if m or n is equal to zero, then p or q is equal to 0.
- 20 The cationic poly(vinyl lactam) polymers according to the invention may be cross-linked or noncrosslinked and may also be block polymers.

Preferably, the counterion Z⁻ of the monomers of formula (Ic) is chosen from halide ions, phosphate ions, the methosulfate ion and the tosylate ion.

- 25 Preferably, R₃, R₄ and R₅ denote, independently of one another, a hydrogen atom or a linear or branched C₁-C₃₀ alkyl radical.
- More preferentially, the monomer b) is a monomer of formula (Ic) for which, preferentially, m and n are equal to zero.

- 30 The vinyl lactam or alkylvinyl lactam monomer is preferably a compound of structure (IVc):



- 35 in which:
- s denotes an integer ranging from 3 to 6,
 - R₉ denotes a hydrogen atom or a linear or branched C₁-C₅ alkyl radical,
 - R₁₀ denotes a hydrogen atom or a linear or branched C₁-C₅ alkyl radical,
- with the proviso that at least one of the radicals R₉ and R₁₀ denotes a hydrogen atom.
- 40 Even more preferentially, the monomer (IVc) is vinylpyrrolidone.

The cationic poly(vinyl lactam) polymers according to the invention may also contain units deriving from one or more additional monomers, preferably cationic or non-ionic monomers.

- 5 As compounds that are particularly preferred, mention may be made of the following terpolymers comprising units deriving from at least:
- a)-one monomer of formula (IVc),
 - b)-one monomer of formula (Ic) in which $p=1$, $q=0$, R_3 and R_4 denote, independently of one another, a hydrogen atom or a C_1 - C_5 alkyl radical and R_5 denotes
 - 10 a linear or branched C_9 - C_{24} alkyl radical, and
 - c)-one monomer of formula (IIc) in which R_3 and R_4 denote, independently of one another, a hydrogen atom or a linear or branched C_1 - C_5 alkyl radical.

- 15 Even more preferentially, terpolymers comprising units deriving from, by weight, 40% to 95% of monomer (a), 0.1% to 55% of monomer (c) and 0.25% to 50% of monomer (b) will be used. Such polymers are described, in particular, in patent application WO-00/68282.

20 As cationic poly(vinyl lactam) polymers according to the invention, use is in particular made of:

- vinylpyrrolidone / dimethylaminopropylmethacrylamide / dodecyldimethylmethacrylamidopropylammonium tosylate terpolymers,
- vinylpyrrolidone / dimethylaminopropylmethacrylamide / cocoyldimethylmethacrylamidopropylammonium tosylate terpolymers,
- 25 - vinylpyrrolidone / dimethylaminopropylmethacrylamide / lauryldimethylmethacrylamidopropylammonium tosylate or chloride terpolymers.

The vinylpyrrolidone/dimethylaminopropylmethacrylamide /lauryldimethylmethacrylamidopropylammonium chloride terpolymer is in particular provided by the company ISP under the names Styleze W10® or Styleze W20L® (INCI name

30 Polyquaternium-55).

The weight-average molecular weight (M_w) of the cationic poly(vinyl lactam) polymers is preferably between 500 and 20 000 000, more particularly between 200 000 and 2 000 000 and preferentially between 400 000 and 800 000.

- 35 - (D) the cationic polymers obtained by polymerization of a monomer mixture comprising one or more vinyl monomers substituted with one or more amino groups, one or more hydrophobic non-ionic vinyl monomers, and one or more associative vinyl monomers, as described in patent application WO 2004/024779.

- 40 Among these polymers, mention will more particularly be made of the products from the polymerization of a monomer mixture comprising:
- a di(C_1 - C_4 alkyl)amino(C_1 - C_6 alkyl) methacrylate,
 - one or more C_1 - C_{30} alkyl esters of (meth)acrylic acid,

- a polyethoxylated C₁₀-C₃₀ alkyl methacrylate (20-25 mol of ethylene oxide unit),
- a 30/5 polyethylene glycol/polypropylene glycol allyl ether,
- a hydroxy(C₂-C₆ alkyl) methacrylate, and
- an ethylene glycol dimethacrylate;

5 Such a polymer is for example the compound sold by the company Lubrizol under the name Carbopol Aqua CC® and which corresponds to the INCI name Polyacrylate-1 crosspolymer.

10 Preferably, the composition comprises one or associative cationic polymers chosen from the cationic polymers (B) derived from quaternized cellulose, more particularly from the hydroxyethylcelluloses of formula (Ib) and even better still polyquaternium-67.

15 The composition according to the invention may comprise said associative cationic polymers in an amount of between 0.01% and 2% by weight, in particular from 0.025% to 1% by weight, preferentially from 0.05% to 0.5% by weight and even better still from 0.06% to 0.2% by weight, relative to the total weight of the composition.

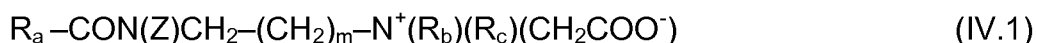
20 **Amphoteric surfactants**

The composition according to the invention may also comprise one or more amphoteric surfactants.

25 The amphoteric surfactants that may be used in the invention may be optionally quaternized secondary or tertiary aliphatic amine derivatives, in which the aliphatic radical is a linear or branched chain comprising from 8 to 22 carbon atoms, said amine derivatives containing at least one hydrosolubilizing anionic group, for instance a carboxylate, sulfonate, sulfate, phosphate or phosphonate group.

30 Mention may be made in particular of (C₈-C₂₀)alkylbetaines, sulfobetaines, (C₈-C₂₀)alkylsulfobetaines, (C₈-C₂₀)alkylamido(C₁-C₆)alkylbetaines, such as cocamidopropylbetaine, (C₈-C₂₀)alkylamido(C₁-C₆)alkylsulfobetaines, and also mixtures thereof.

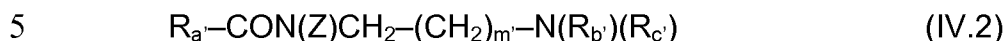
35 Among the derivatives of optionally quaternized secondary or tertiary aliphatic amines that may be used, mention may also be made of the products having respective structures (IV.1) and (IV.2) below:



40 in which:

- R_a represents a C₁₀-C₃₀ alkyl or alkenyl group derived from an acid R_a-COOH preferably present in hydrolysed coconut oil, or a heptyl, nonyl or undecyl group,
- R_b represents a β-hydroxyethyl group,

- R_c represents a carboxymethyl group;
- m is equal to 0, 1 or 2,
- Z represents a hydrogen atom or a hydroxyethyl or carboxymethyl group,



in which:

- R_b' represents -CH₂CH₂OX', with X' representing -CH₂-COOH, CH₂-COOZ', -CH₂CH₂-COOH, -CH₂CH₂-COOZ', or a hydrogen atom,
- R_c' represents -(CH₂)_{z2}-Y', with z2 = 1 or 2, and Y' representing -COOH, -COOZ',
- 10 -CH₂-CHOH-SO₃H or CH₂-CHOH-SO₃Z',
- Z' represents an ion derived from an alkali metal or alkaline-earth metal, such as sodium, potassium or magnesium; an ammonium ion; or an ion derived from an organic amine and in particular from an amino alcohol, such as monoethanolamine, diethanolamine or triethanolamine, monoisopropanolamine, diisopropano-
- 15 lamine or triisopropanolamine, 2-amino-2-methyl-1-propanol, 2-amino-2-methyl-1,3-propanediol and tris(hydroxymethyl)aminomethane;
- m' is equal to 0, 1 or 2,
- Z represents a hydrogen atom or a hydroxyethyl or carboxymethyl group,
- R_a' represents a C₁₀-C₃₀ alkyl or alkenyl group of an acid R_a'COOH preferably
- 20 present in hydrolysed linseed oil or coconut oil, an alkyl group, in particular a C₁₇ alkyl group, and its iso form, or an unsaturated C₁₇ group.

The compounds corresponding to formula (IV.2) are particularly preferred.

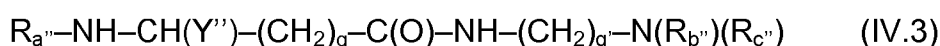
- 25 Among the compounds of formula (IV.2) for which X' represents a hydrogen atom, mention may be made of the compounds known under the (CTFA) names sodium cocoamphoacetate, sodium lauroamphoacetate, sodium caproamphoacetate and sodium capryloamphoacetate.

- Other compounds of formula (IV.2) are known under the (CTFA) names disodium cocoamphodiace-
- 30 tate, disodium lauroamphodiace-
- tate, disodium capryloamphodiace-
- tate, disodium cocoamphodipropionate, disodium lauroamphodipropionate, disodium caproamphodipropionate, disodium capryloamphodipropionate, lauroamphodipropionic acid and cocoamphodipropionic acid.

- 35 As examples of compounds of formula (IV.2), mention may be made of the cocoamphodiace-
- tate sold by the company Rhodia under the trade name Miranol® C2M Concentrate, the sodium cocoamphoacetate sold under the trade name Miranol Ultra C 32 and the product sold by the company Chimex under the trade name Chimexane HA.

40

Use may also be made of the compounds of formula (IV.3):



in which:

- R_a'' represents a C_{10} - C_{30} alkyl or alkenyl group of an acid R_a'' -C(O)OH, which is preferably present in hydrolyzed linseed oil or coconut oil;
- Y'' represents the group -C(O)OH, -C(O)OZ'', -CH₂-CH(OH)-SO₃H or the group
- 5 CH₂-CH(OH)-SO₃-Z'', with Z'' representing a cation resulting from an alkali metal or alkaline-earth metal, such as sodium, an ammonium ion or an ion resulting from an organic amine;
- R_b'' and R_c'' , independently of one another, represent a C_1 - C_4 alkyl or hydroxy-alkyl radical; and
- 10 - q and q' denote, independently one another, an integer ranging from 1 to 3.

Among the compounds of formula (IV.3), mention may in particular be made of the compound classified in the CTFA dictionary under the name sodium diethyla-

minopropyl cocoaspartamide and in particular the product sold by the company

15 Chimex under the name Chimexane HB.

Preferably, the amphoteric surfactants are chosen from (C_8 - C_{20})alkylbetaines, (C_8 - C_{20})alkylamido(C_1 - C_6)alkylbetaines, (C_8 - C_{20})alkylamphoacetates and (C_8 - C_{20})alkylamphodiacetates, and mixtures thereof, and in particular from cocobeta-

20 ine and cocoamidopropylbetaine.

Preferably, when they are present, the composition according to the invention comprises said amphoteric surfactant(s) in an amount ranging from 1% to 15% by weight, in particular ranging from 2% to 10% by weight, preferentially from 3% to

25 8% by weight, relative to the total weight of the composition.

Additional cationic polymers

The composition according to the invention may also comprise one or more additional cationic polymers other than the associative cationic polymers. These additional polymers are thus chosen from non-associative cationic polymers.

30

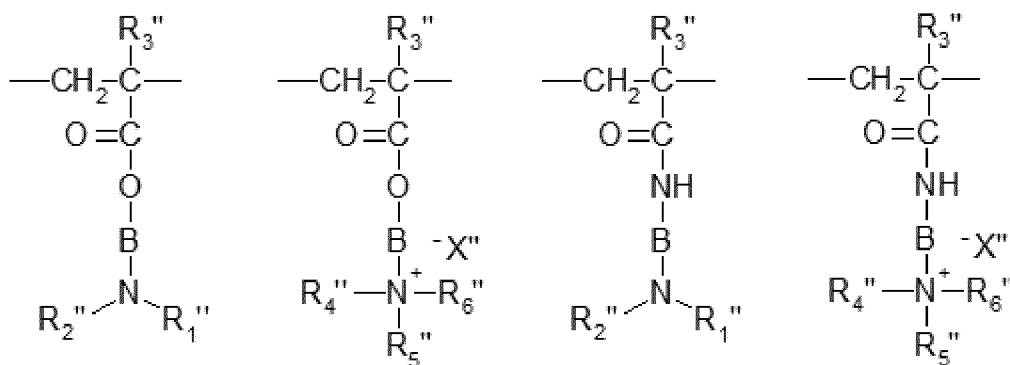
The preferred cationic polymers are chosen from those that contain units comprising primary, secondary, tertiary and/or quaternary amine groups that may either form part of the main polymer chain or may be borne by a side substituent directly

35 connected thereto.

The cationic polymers preferably have a weight-average molar mass (Mw) of between 500 and 5×10^6 approximately and preferably between 10^3 and 3×10^6 approximately.

40 Among the additional cationic polymers, mention may be made more particularly of:

a₁) homopolymers or copolymers derived from acrylic or methacrylic esters or amides and comprising at least one of the units of formula (V.1) below:



in which:

- R_3'' , which may be identical or different, denote a hydrogen atom or a CH_3 radical;
- 5 - B, which may be identical or different, represent a linear or branched divalent alkyl group of 1 to 6 carbon atoms, preferably 2 or 3 carbon atoms, or a hydroxy-alkyl group of 1 to 4 carbon atoms;
- R_4'' , R_5'' and R_6'' , which may be identical or different, represent an alkyl group containing from 1 to 18 carbon atoms or a benzyl radical, preferably an alkyl group
- 10 containing from 1 to 6 carbon atoms;
- R_1'' and R_2'' , which may be identical or different, represent a hydrogen atom or an alkyl group containing from 1 to 6 carbon atoms, and preferably methyl or ethyl;
- X'' denotes an anion derived from a mineral or organic acid, such as a methosulfate anion or a halide such as chloride or bromide.

15

The copolymers of family (V.1) may also contain one or more units derived from comonomers which may be chosen from the family of acrylamides, methacrylamides, diacetone acrylamides, acrylamides and methacrylamides substituted on the nitrogen with lower (C_1 - C_4) alkyls, acrylic or methacrylic acids or esters thereof, vinyl lactams such as vinylpyrrolidone or vinylcaprolactam, and vinyl esters.

20

Among these copolymers of family (V.1), mention may be made of:

- copolymers of acrylamide and of dimethylaminoethyl methacrylate quaternized with dimethyl sulfate or with a dimethyl halide, such as that sold under the name Hercofloc by the company Hercules,
- 25 - copolymers of acrylamide and of methacryloyloxyethyltrimethylammonium chloride, such as those sold under the name Bina Quat P 100 by the company Ciba Geigy,
- the copolymer of acrylamide and of methacryloyloxyethyltrimethylammonium methosulfate, such as that sold under the name Reten by the company Hercules,
- 30 - quaternized or non-quaternized vinylpyrrolidone/dialkylaminoalkyl acrylate or methacrylate copolymers, such as the products sold under the name Gafquat by the company ISP, for instance Gafquat 734 or Gafquat 755, or alternatively the products known as Copolymer 845, 958 and 937. These polymers are described in detail in French patents 2 077 143 and 2 393 573;
- 35 - dimethylaminoethyl methacrylate/vinylcaprolactam/vinylpyrrolidone terpolymers,

such as the product sold under the name Gaffix VC 713 by the company ISP,
- vinylpyrrolidone/methacrylamidopropyl dimethylamine copolymers, such as the
those sold under the name Styleze CC 10 by ISP,
- quaternized vinylpyrrolidone/dimethylaminopropylmethacrylamide copolymers
5 such as the product sold under the name Gafquat HS 100 by the company ISP,
- preferably crosslinked polymers of methacryloyloxy(C₁-C₄)alkyltri(C₁-
C₄)alkylammonium salts, such as the polymers obtained by homopolymerization of
dimethylaminoethyl methacrylate quaternized with methyl chloride, or by copoly-
merization of acrylamide with dimethylaminoethyl methacrylate quaternized with
10 methyl chloride, the homopolymerization or copolymerization being followed by
crosslinking with an olefinically unsaturated compound, in particular meth-
ylenebisacrylamide. Use may be made more particularly of a crosslinked acryla-
mide/methacryloyloxyethyltrimethylammonium chloride copolymer (20/80 by
weight) in the form of a dispersion comprising 50% by weight of said copolymer in
15 mineral oil. This dispersion is sold under the name Salcare® SC 92 by the compa-
ny Ciba. Use may also be made of a crosslinked methacryloyloxyethyltrime-
thylammonium chloride homopolymer comprising approximately 50% by weight of
the homopolymer in mineral oil or in a liquid ester. These dispersions are sold un-
der the names Salcare® SC 95 and Salcare® SC 96 by the company Ciba;

20 a₂) cationic polysaccharides, in particular cationic celluloses and galactomannan
gums. Among the cationic polysaccharides, mention may be made more particu-
larly of cellulose ether derivatives comprising quaternary ammonium groups, cati-
onic cellulose copolymers or cellulose derivatives grafted with a water-soluble qua-
ternary ammonium monomer and cationic galactomannan gums.

25 The cellulose ether derivatives comprising quaternary ammonium groups are in
particular described in FR 1 492 597, and mention may be made of the polymers
sold under the name Ucare Polymer JR (JR 400 LT, JR 125 and JR 30M) or LR
(LR 400 and LR 30M) by the company Amerchol. These polymers are also defined
30 in the CTFA dictionary as quaternary ammoniums of hydroxyethylcellulose that
have reacted with an epoxide substituted with a trimethylammonium group.

Cationic cellulose copolymers or cellulose derivatives grafted with a water-soluble
quaternary ammonium monomer are described in particular in patent US
4 131 576, and mention may be made of hydroxyalkyl celluloses, for instance hy-
droxymethyl-, hydroxyethyl- or hydroxypropylcelluloses grafted, in particular, with a
35 methacryloylethyltrimethylammonium, methacrylamidopropyltrimethylammonium
or dimethyldiallylammonium salt. The commercial products corresponding to this
definition are more particularly the products sold under the names Celquat L 200
and Celquat H 100 by the company National Starch.

40 The cationic galactomannan gums are described more particularly in patents US
3 589 578 and US 4 031 307, and mention may be made of guar gums comprising
cationic trialkylammonium groups. Use is made, for example, of guar gums modi-
fied with a 2,3-epoxypropyltrimethylammonium salt (for example, chloride). Such

products are in particular sold under the names Jaguar C13 S, Jaguar C 15, Jaguar C 17 and Jaguar C162 by the company Rhodia;

5 a₃) polymers formed from piperazinyl units and divalent alkylene or hydroxy-alkylene radicals containing linear or branched chains, optionally interrupted with oxygen, sulfur or nitrogen atoms or with aromatic or heterocyclic rings, and also the oxidation and/or quaternization products of these polymers;

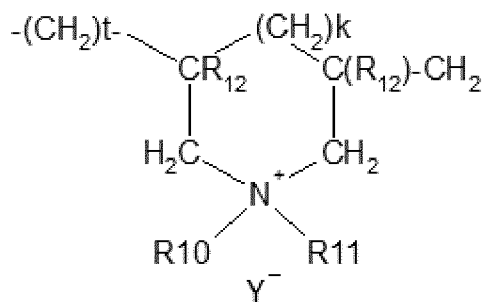
10 a₄) water-soluble polyamino amides prepared in particular by polycondensation of an acidic compound with a polyamine; these polyamino amides can be crosslinked with an epihalohydrin, a diepoxide, a dianhydride, an unsaturated dianhydride, a bis-unsaturated derivative, a bis-halohydrin, a bis-azetidinium, a bis-haloacyldiamine, a bis-alkyl halide or alternatively with an oligomer resulting from the reaction of a difunctional compound which is reactive with a bis-halohydrin, a
15 bis-azetidinium, a bis-haloacyldiamine, a bis-alkyl halide, an epihalohydrin, a diepoxide or a bis-unsaturated derivative; the crosslinking agent being used in proportions ranging from 0.025 to 0.35 mol per amine group of the polyamino amide; these polyamino amides can be alkylated or, if they contain one or more tertiary amine functions, they can be quaternized;

20 a₅) polyaminoamide derivatives resulting from the condensation of polyalkylene polyamines with polycarboxylic acids followed by alkylation with difunctional agents. Mention may be made, for example, of adipic acid/dialkylaminohydroxyalkyldialkylenetriamine polymers in which the alkyl radical
25 comprises from 1 to 4 carbon atoms and preferably denotes methyl, ethyl or propyl. Among these derivatives, mention may be made more particularly of the adipic acid/dimethylaminohydroxypropyl/diethylenetriamine polymers sold under the name Cartaretine F, F4 or F8 by the company Sandoz;

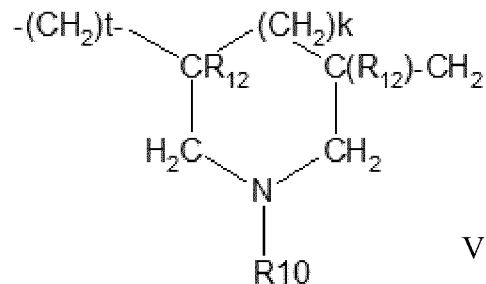
30 a₆) polymers obtained by reacting a polyalkylene polyamine comprising two primary amine groups and at least one secondary amine group with a dicarboxylic acid chosen from diglycolic acid and saturated aliphatic dicarboxylic acids containing from 3 to 8 carbon atoms; the mole ratio between the polyalkylene polyamine and the dicarboxylic acid preferably being between 0.8:1 and 1.4:1; the resulting poly-
35 amino amide being reacted with epichlorohydrin in a mole ratio of epichlorohydrin to the secondary amine group of the polyaminoamide preferably of between 0.5:1 and 1.8:1. Polymers of this type are sold in particular under the name Hercosett 57 by the company Hercules Inc. or else under the name PD 170 or Delsette 101 by the company Hercules in the case of the adipic acid/
40 id/epoxypropyl/diethylenetriamine copolymer;

a₇) alkylallylamine or dialkylallylammonium cyclopolymers, such as homopolymers or copolymers comprising, as the main chain constituent, units correspond-

ing to formula (V.2) or (V.3):



V.2



V.3

in which

k and t are equal to 0 or 1, the sum k + t being equal to 1;

5 R₁₂ denotes a hydrogen atom or a methyl radical;

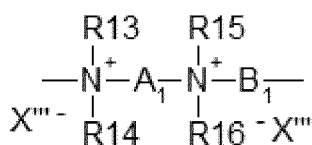
R₁₀ and R₁₁, independently one other, denote a C₁-C₆ alkyl group, a C₁-C₅ hydroxyalkyl group, a C₁-C₄ amidoalkyl group; or alternatively R₁₀ and R₁₁ may denote, together with the nitrogen atom to which they are attached, a heterocyclic group

10 such as piperidyl or morpholinyl; R₁₀ and R₁₁, independently of one another, preferably denote a C₁-C₄ alkyl group;

Y⁻ is an anion such as bromide, chloride, acetate, borate, citrate, tartrate, bisulfate, bisulfite, sulfate or phosphate.

Mention may be made more particularly of the dimethyldiallylammonium salt (for example chloride) homopolymer for example sold under the name Merquat 100 by
15 the company Nalco and the copolymers of diallyldimethylammonium salt (for example chloride) and of acrylamide, sold in particular under the name Merquat 550 or Merquat 7SPR;

a₈) quaternary diammonium polymers comprising repeating units of formula (V.4):



V.4

in which:

- R₁₃, R₁₄, R₁₅ and R₁₆, which may be identical or different, represent aliphatic, alicyclic or arylaliphatic radicals comprising from 1 to 20 carbon atoms or C₁-C₁₂ hydroxyalkyl aliphatic radicals,

25 or else R₁₃, R₁₄, R₁₅ and R₁₆, together or separately, form, with the nitrogen atoms to which they are attached, heterocycles optionally comprising a second non-nitrogen heteroatom;

or else R₁₃, R₁₄, R₁₅ and R₁₆ represent a linear or branched C₁-C₆ alkyl radical substituted with a nitrile, ester, acyl, amide or -CO-O-R₁₇-D or -CO-NH-R₁₇-D group, where R₁₇ is an alkylene and D is a quaternary ammonium group;

30 - A₁ and B₁ represent linear or branched, saturated or unsaturated, divalent polymethylene groups comprising from 2 to 20 carbon atoms, which may contain,

linked to or intercalated in the main chain, one or more aromatic rings or one or more oxygen or sulfur atoms or sulfoxide, sulfone, disulfide, amino, alkylamino, hydroxyl, quaternary ammonium, ureido, amide or ester groups, and

- X'''^- denotes an anion derived from a mineral or organic acid;

- 5 it being understood that A_1 , R_{13} and R_{15} can form, with the two nitrogen atoms to which they are attached, a piperazine ring;

in addition, if A_1 denotes a linear or branched, saturated or unsaturated alkylene or hydroxyalkylene radical, B_1 may also denote a group $(CH_2)_{n_2}-CO-D-OC-(CH_2)_p-$ with n_2 and p , which may be identical or different, being integers ranging from 2 to

- 10 20, and D denoting:

- a glycol residue of formula $-O-V-O-$, in which V denotes a linear or branched hydrocarbon-based radical, or a group corresponding to one of the following formulae: $-(CH_2-CH_2-O)_x-CH_2-CH_2-$ and $-[CH_2-CH(CH_3)-O]_y-CH_2-CH(CH_3)-$, where x'

- 15 and y' denote an integer from 1 to 4, representing a defined and unique degree of polymerization or any number from 1 to 4 representing an average degree of polymerization;

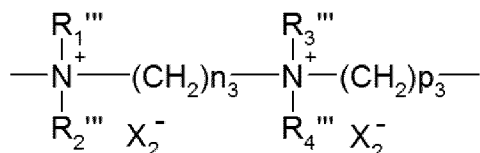
- a bis-secondary diamine residue such as a piperazine derivative;

- a bis-primary diamine residue of formula $-NH-W-NH-$, in which W denotes a linear or branched hydrocarbon-based radical, or else the divalent radical $-CH_2-CH_2-S-S-CH_2-CH_2-$;

- a ureylene group of formula $-NH-CO-NH-$.

Preferably, X'''^- is an anion, such as chloride or bromide. These polymers have a number-average molar mass (M_n) generally of between 1000 and 100 000.

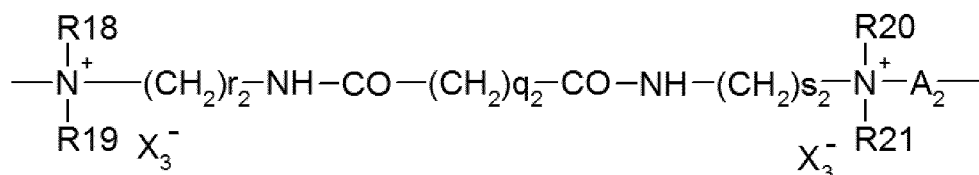
- 25 Mention may be made more particularly of polymers that are composed of repeating units corresponding to the formula (V.5):



- 30 in which R_1''' , R_2''' , R_3''' and R_4''' , which may be identical or different, denote an alkyl or hydroxyalkyl radical containing from 1 to 4 carbon atoms, n_3 and p_3 are integers ranging from 2 to 20, and X_2^- is an anion derived from a mineral or organic acid.

A compound of formula (V.5) that is particularly preferred is the one for which R_1''' , R_2''' , R_3''' and R_4''' represent a methyl radical and $n = 3$, $p = 6$ and $X_2 = Cl$, which is known as Hexadimethrine chloride according to the INCI (CTFA) nomenclature;

- 35 a₉) polyquaternary ammonium polymers comprising units of formula (V.6):



in which:

R₁₈, R₁₉, R₂₀ and R₂₁, which may be identical or different, represent a hydrogen atom or a methyl, ethyl, propyl, β-hydroxyethyl, β-hydroxypropyl or -CH₂CH₂(OCH₂CH₂)_{p₄}OH radical, where p₄ is equal to 0 or to an integer of between 1 and 6, with the proviso that R₁₈, R₁₉, R₂₀ and R₂₁ do not simultaneously represent a hydrogen atom,

r₂ and s₂, which may be identical or different, are integers between 1 and 6,

q₂ is equal to 0 or to an integer between 1 and 34,

X₃⁻ denotes an anion such as a halide,

A₂ denotes a divalent radical of a dihalide or preferably represents -CH₂-CH₂-O-CH₂-CH₂-.

Examples that may be mentioned include the products Mirapol® A 15, Mirapol® AD1, Mirapol® AZ1 and Mirapol® 175 sold by the company Miranol;

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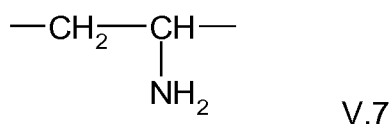
a₁₀) quaternary polymers of vinylpyrrolidone and of vinylimidazole, for instance the products sold under the names Luviquat® FC 905, FC 550 and FC 370 by the company BASF;

20 a₁₁) polyamines such as Polyquart® H sold by Cognis, referred to under the name Polyethylene glycol (15) tallow polyamine in the CTFA dictionary;

a₁₂) polymers comprising in their structure:

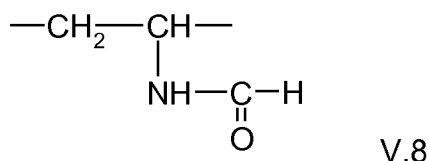
- one or more units corresponding to formula (V.7) below:

25



- optionally one or more units corresponding to formula (V.8) below:

30



In other words, these polymers may be chosen in particular from homopolymers or copolymers comprising one or more units derived from vinylamine and optionally one or more units derived from vinylformamide.

Preferably, these cationic polymers are chosen from polymers comprising, in their

structure, from 5 mol% to 100 mol% of units corresponding to the formula (V.7) and from 0 mol% to 95 mol% of units corresponding to the formula (V.8), preferably from 10 mol% to 100 mol% of units corresponding to the formula (V.7) and from 0 mol% to 90 mol% of units corresponding to the formula (V.8).

5 These polymers may be obtained, for example, by partial hydrolysis of polyvinylformamide. This hydrolysis may take place in acidic or basic medium.

The weight-average molecular weight of said polymer, measured by light scattering, may range from 1000 to 3 000 000 g/mol, preferably from 10 000 to 1 000 000 and more particularly from 100 000 to 500 000 g/mol.

10 The polymers comprising units of formula (V.7) and optionally units of formula (V.8) are sold in particular under the name Lupamin by the company BASF, such as, for example, and in a non-limiting way, the products provided under the names Lupamin 9095, Lupamin 5095, Lupamin 1095, Lupamin 9030 (or Luviquat 9030) and Lupamin 9010.

15

Other cationic polymers which can be used in the context of the invention are cationic proteins or cationic protein hydrolysates, polyalkyleneimines, in particular polyethyleneimines, polymers comprising vinylpyridine or vinylpyridinium units, condensates of polyamines and of epichlorohydrin, quaternary polyureylenes and chitin derivatives.

20

Preferably, the cationic polymers are chosen from those of families a_1), a_2), a_7) et a_{10}) mentioned above.

25 Among the cationic polymers mentioned above, the ones that may preferably be used are cationic polysaccharides, in particular cationic celluloses and cationic galactomannan gums, and in particular quaternary cellulose ether derivatives such as the products sold under the name JR 400 by the company Amerchol, cationic cyclopolymers, in particular dimethyldiallylammonium salt (for example chloride) homopolymers or copolymers, sold under the names Merquat 100, Merquat 550 and Merquat S by the company Nalco, quaternary polymers of vinylpyrrolidone and of vinylimidazole, optionally crosslinked homopolymers or copolymers of methacryloyloxy(C_1 - C_4)alkyltri(C_1 - C_4)alkylammonium salts, and mixtures thereof.

30

35 The composition according to the invention may comprise said additional (non-associative) cationic polymers in an amount of between 0.01% and 2% by weight, in particular from 0.025% to 1% by weight, preferentially from 0.05% to 0.5% by weight and even better still from 0.06% to 0.2% by weight, relative to the total weight of the composition.

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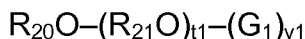
Non-ionic surfactants

The composition according to the invention may also comprise one or more non-ionic surfactants.

The non-ionic surfactants may be chosen from alcohols, α -diols and (C₁₋₂₀)alkylphenols, these compounds being polyethoxylated and/or polypropoxylated and/or polyglycerolated, the number of ethylene oxide and/or propylene oxide groups possibly ranging from 1 to 100, and the number of glycerol groups possibly ranging from 2 to 30; or else these compounds comprising at least one fatty chain comprising from 8 to 30 carbon atoms and in particular from 16 to 30 carbon atoms.

Mention may also be made of condensates of ethylene oxide and of propylene oxide with fatty alcohols; polyethoxylated fatty amides preferably having from 2 to 30 ethylene oxide units, polyglycerolated fatty amides comprising on average from 1 to 5, and in particular from 1.5 to 4, glycerol groups; ethoxylated fatty acid esters of sorbitan preferably containing from 2 to 40 ethylene oxide units, fatty acid esters of sucrose, polyoxyalkylenated and preferably polyoxyethylenated fatty acid esters containing from 2 to 150 mol of ethylene oxide, including oxyethylenated plant oils, N-(C₆₋₂₄ alkyl)glucamine derivatives, amine oxides such as (C₁₀₋₁₄ alkyl)amine oxides or N-(C₁₀₋₁₄ acyl)aminopropylmorpholine oxides.

Mention may also be made of non-ionic surfactants of alkyl(poly)glycoside type, represented in particular by general formula (VI) below:



in which:

R₂₀ represents a linear or branched alkyl or alkenyl radical comprising 6 to 24 carbon atoms and in particular 8 to 18 carbon atoms, or an alkylphenyl radical whose linear or branched alkyl radical comprises 6 to 24 carbon atoms and in particular 8 to 18 carbon atoms;

R₂₁ represents an alkylene radical comprising 2 to 4 carbon atoms,

G₁ represents a sugar unit comprising 5 to 6 carbon atoms,

t₁ denotes a value ranging from 0 to 10 and preferably 0 to 4,

v₁ denotes a value ranging from 1 to 15 and preferably 1 to 4.

Preferably, the alkyl(poly)glycoside surfactants are compounds of the formula described above in which:

R₂₀ denotes a linear or branched, saturated or unsaturated alkyl radical comprising from 8 to 18 carbon atoms,

R₂₁ represents an alkylene radical comprising 2 to 4 carbon atoms,

t₁ denotes a value ranging from 0 to 3, preferably equal to 0,

G₁ denotes glucose, fructose or galactose, preferably glucose;

the degree of polymerization, i.e. the value of v₁, possibly ranging from 1 to 15 and preferably from 1 to 4; the mean degree of polymerization more particularly being between 1 and 2.

The glucoside bonds between the sugar units are generally of 1-6 or 1-4 type and preferably of 1-4 type. Preferably, the alkyl(poly)glycoside surfactant is an al-

kyl(poly)glucoside surfactant. C₈/C₁₆ alkyl(poly)glucosides 1,4, and in particular decyl glucosides and caprylyl/capryl glucosides, are most particularly preferred.

Among the commercial products, mention may be made of the products sold by the company Cognis under the names Plantaren® (600 CS/U, 1200 and 2000) or
5 Plantacare® (818, 1200 and 2000); the products sold by the company SEPPIC under the names Oramix CG 110 and Oramix® NS 10; the products sold by the company BASF under the name Lutensol GD 70, or else the products sold by the company Chem Y under the name AG10 LK.

Preferably, use is made of C₈/C₁₆-alkyl (poly)glycosides 1,4, in particular as an
10 aqueous 53% solution, such as those sold by Cognis under the reference Plantacare® 818 UP.

Preferentially, the non-ionic surfactants are chosen from (C₆₋₂₄ alkyl)(poly)glycosides, and more particularly (C₈₋₁₈ alkyl)(poly)glycosides, ethoxylated
15 C₈-C₃₀ fatty acid esters of sorbitan, polyethoxylated C₈-C₃₀ fatty alcohols and polyoxyethylenated C₈-C₃₀ fatty acid esters, these compounds preferably containing from 2 to 150 mol of ethylene oxide, and mixtures thereof.

Preferably, when they are present, the composition according to the invention
20 comprises said non-ionic surfactant(s) in an amount ranging from 0.01% to 20% by weight, in particular ranging from 0.1% to 15% by weight, preferentially from 0.2% to 10% by weight, in particular between 0.5% and 5% by weight, relative to the total weight of the composition.

25 Other ingredients

Preferably, the composition according to the invention is aqueous and comprises water in a content preferably ranging from 40% to 95% by weight, in particular from 50% to 90% by weight and better still from 60% to 85% by weight, relative to the total weight of the composition.

The composition may also comprise one or more organic solvents that are liquid at
30 25°C and 1 atm., which are in particular water-soluble, such as C₁-C₇ alcohols, and in particular C₁-C₇ aliphatic or aromatic monoalcohols. Advantageously, the organic solvent may be chosen from ethanol and isopropanol, and mixtures thereof.

Advantageously, the composition according to the invention may also comprise
35 one or more polyols comprising from 1 to 7 carbon atoms, in particular from 2 to 6 carbon atoms, and preferably comprising 2 or 3 hydroxyl groups; mention may be made in particular of glycerol, propylene glycol, dipropylene glycol and hexylene glycol, and also mixtures thereof.

When it comprises such polyol(s), the composition comprises it (them) preferably
40 in an amount of between 0.05% and 10% by weight, in particular between 0.1% and 5% by weight.

The pH of the composition, if it is aqueous, is preferably inclusively between 4.5 and 9, in particular between 5 and 9, even better still between 5.5 and 8.5, in particular between 6 and 8, and preferentially between 6.5 and 7.5.

5

The composition according to the invention may also comprise one or more additives chosen from anionic and non-ionic polymers, ceramides, pseudo-ceramides, vitamins and provitamins including panthenol, water-soluble and liposoluble sunscreens, nacreous agents and opacifiers, thickeners, sequestrants, solubilizers, antioxidants, antidandruff agents, anti-seborrhoeic agents, agents for preventing hair loss and/or for promoting hair regrowth, penetrants, fragrances, peptizers and preserving agents, or any other additive conventionally used in the cosmetics field. These additives may be present in the composition according to the invention in an amount ranging from 0 to 20% by weight, relative to the total weight of the composition. Those skilled in the art will take care to select these optional additives and the amounts thereof so that they do not harm the properties of the compositions of the present invention.

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

Preferably, the composition according to the invention is used as a shampoo for washing and/or conditioning the hair, or a haircare product, optionally requiring a rinsing step. Preferentially, the composition according to the invention is used as a shampoo for washing and/or conditioning the hair, followed by a rinsing step.

The compositions according to the invention may thus advantageously be in the form of a hair composition, in particular in the form of a washing hair composition, such as a shampoo, in particular a conditioning shampoo.

The present invention also relates to a cosmetic process for treating, and more particularly for washing and/or conditioning, keratin materials, in particular keratin fibres, in particular the hair, which comprises the application to said keratin materials of a composition as described above, optionally followed by a leave-on time and/or a rinsing step and/or a drying step.

The application may be performed on dry or wet hair.

The leave-on time of the composition on the keratin materials may be from 5 seconds to 10 minutes, better still from 10 seconds to 5 minutes and even better still from 20 seconds to 2 minutes.

The invention is illustrated in greater detail in the examples that follow, in which, unless otherwise mentioned, the amounts indicated are expressed as % by weight of active material (AM) of product relative to the total weight of the composition.

Example 1

The following composition according to the invention is prepared (amounts expressed as % by weight of active material AM)

	% by weight AM
Sodium lauryl ether sulfate	11.76
Sodium lauryl sulfate	3.13
Laureth-5 carboxylic acid	2.7
Cocamidopropyl betaine	4.56
(3-Aminopropyl)triethoxysilane	0.5
Lactic acid	0.16
PEG-40/PPG-8 methylaminopropyl/hydroxypropyl dimethicone copolymer (Silsoft A+)	0.15
Polyquaternium-67	0.1
PEG-60 hydrogenated castor oil	0.5
PEG-55 propylene glycol oleate	0.24
PPG-5 ceteth-20	0.5
pH agent	qs pH 7
Preservatives, fragrances	qs
Water	qs 100%

5

The composition obtained is clear and stable. Its turbidity, measured using a 2100P turbidimeter from the company Hach, at ambient temperature (25°C), is 10 NTU.

- 10 This composition was used as a shampoo on fine hair. It exhibits good foam initiation and generates an abundant and long-lasting foam. After rinsing and drying, the hair is light, soft and easy to style and it is observed that the head of hair has been given body and volume.

15 **Example 2**

The composition according to the invention and the comparative composition below were prepared (amounts expressed as % by weight of active material AM)

	Composition A (invention)	Composition B (comparative)
PPG-5-Ceteth-20	0.5	0.5
PEG-55 propylene glycol oleate	0.48 AM	0.48 AM

Polyquaternium-67	0.1 AM	-
Jaguar C13S	-	0.1 AM
Sodium Lauryl Sulfate	3.13 AM	3.13 AM
Sodium Laureth Sulfate	11.76 AM	11.76 AM
PEG-60 Hydrogenated castor oil	0.5	0.5
PEG-40/PPG-8 Methylaminopropyl/hydroxypropyl dimethicone copolymer (Silsoft A+)	0.15 AM	0.15 AM
Laureth-5 carboxylic acid	2.7 AM	2.7 AM
Cocamidopropyl betaine	4.56 AM	4.56 AM
Aminopropyltriethoxysilane	0.5	0.5
Sodium hydroxide	0.15	0.15
Lactic acid	0.16 AM	0.16 AM
Preservatives, fragrances	qs	qs
Water	qs 100%	qs 100%

The clarity of the compositions was evaluated visually.

It is recalled that the term "clear" is intended to mean a composition through which it is possible to see distinctly with the naked eye.

- 5 A label is placed behind the compositions packaged in transparent bottles, in order to evaluate the ability to read through the compositions with the naked eye.

The following results are obtained:

Composition A (invention)	Composition B (comparative)
Clear appearance Possible to read the label with the naked eye	Appearance more opaque, opalescent Impossible to read the label with the naked eye

10

Composition A according to the invention is clear, whereas comparative composition B has a more opaque and opalescent appearance.

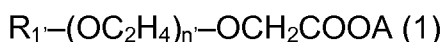
The invention thus results in compositions of which the clarity is improved compared with that of the comparative compositions.

15

CLAIMS

1. Composition, in particular cosmetic composition, in particular cosmetic hair composition, comprising:
- at least one anionic surfactant,
 - at least one organosilane,
 - at least one amino silicone and
 - at least one associative cationic polymer.
2. Composition according to Claim 1, comprising at least one anionic surfactant chosen from sulfate, sulfonate and/or carboxylic (or carboxylate) anionic surfactants; preferably chosen from, alone or as a mixture,
- C₆-C₂₄ and in particular C₁₂-C₂₀ alkyl sulfates;
 - C₆-C₂₄ and in particular C₁₂-C₂₀ alkyl ether sulfates; preferably comprising from 2 to 20 ethylene oxide units;
 - C₆-C₂₄ and in particular C₁₂-C₂₀ alkylsulfosuccinates, in particular laurylsulfosuccinates;
 - C₆-C₂₄ and in particular C₁₂-C₂₀ alkyl ether sulfosuccinates;
 - (C₆-C₂₄)acylisethionates and preferably (C₁₂-C₁₈)acylisethionates;
 - C₆-C₂₄ and in particular C₁₂-C₂₀ acylsarcosinates; in particular palmitoylsarcosinates;
 - (C₆-C₂₄)alkyl ether carboxylates, preferably (C₁₂-C₂₀)alkyl ether carboxylates; in particular those comprising from 2 to 50 ethylene oxide groups;
 - polyoxyalkylenated (C₆-C₂₄)alkyl(amido) ether carboxylic acids and salts thereof, in particular those comprising from 2 to 50 alkylene oxide and in particular ethylene oxide groups;
 - C₆-C₂₄ and in particular C₁₂-C₂₀ acylglutamates;
 - C₆-C₂₄ and in particular C₁₂-C₂₀ acylglycinates;
- in particular in acid form or in the form of alkali metal or alkaline-earth metal, ammonium or amino alcohol salts.

3. Composition according to either of the preceding claims, comprising at least one anionic surfactant chosen from carboxylic (or carboxylate) anionic surfactants; preferably chosen from the polyoxyalkylenated alkyl(amido) ether carboxylic acids of formula (1):



in which:

- R₁' represents a linear or branched C₆-C₂₄ alkyl or alkenyl radical, a (C₈-C₉)alkylphenyl radical, an R₂'CONH-CH₂-CH₂- radical with R₂' denoting a linear or branched C₉-C₂₁ alkyl or alkenyl radical; preferably R₁' is a C₈-C₂₀, preferably C₈-C₁₈, alkyl radical and aryl preferably denotes phenyl,
- n' is an integer or decimal number (average value) ranging from 2 to 24 and

preferably from 2 to 10,

- A denotes H, ammonium, Na, K, Li, Mg or a monoethanolamine or triethanolamine residue;

preferentially the polyoxyalkylenated alkyl(amido) ether carboxylic acids of formula (1) in which:

- R_1' denotes a linear or branched C_8 - C_{22} , in particular C_{10} - C_{16} or even C_{12} - C_{14} alkyl radical, or alternatively a (C_8-C_9) alkylphenyl radical;

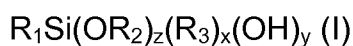
- A denotes a hydrogen or sodium atom, and

- n' ranges from 2 to 20, preferably from 2 to 10;

more preferentially, the polyoxyalkylenated alkyl(amido) ether carboxylic acids of formula (1) in which R_1' denotes a C_{12} alkyl radical, A denotes a hydrogen or sodium atom and n' ranges from 2 to 10.

4. Composition according to any one of the preceding claims, in which the total content of anionic surfactants ranges from 1% to 35% by weight, in particular from 3% to 25% by weight, better still from 5% to 22% by weight, relative to the total weight of the composition.

5. Composition according to any one of the preceding claims, in which the organosilane is chosen from the compounds of formula (I) and/or oligomers thereof:



in which:

- R_1 is a cyclic or acyclic, linear or branched, saturated or unsaturated C_1 - C_{22} , in particular C_2 - C_{20} , hydrocarbon-based chain, which may be substituted with a group chosen from amine groups NH_2 or NHR (R being a linear or branched C_1 - C_{20} , in particular C_1 - C_6 , alkyl, a C_3 - C_{40} cycloalkyl or a C_6 - C_{30} aromatic radical); the hydroxyl group (OH), a thiol group, an aryl group (more particularly benzyl), which is possibly substituted with a group NH_2 or NHR ; it being possible for R_1 to be interrupted with a heteroatom (O, S or NH) or a carbonyl group (CO),

- R_2 and R_3 , which may be identical or different, represent a linear or branched alkyl group comprising from 1 to 6 carbon atoms,

- y denotes an integer ranging from 0 to 3,

- z denotes an integer ranging from 0 to 3, and

- x denotes an integer ranging from 0 to 2,

- with $z + x + y = 3$;

preferably, the compounds of formula (I) in which:

- R_1 is a linear or branched, preferably linear, saturated C_1 - C_{22} , in particular C_2 - C_{12} , hydrocarbon-based chain, which may be substituted with an amine group NH_2 or NHR ($R = C_1$ - C_{20} , in particular C_1 - C_6 , alkyl); and/or

- 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 methyl or ethyl group; and/or

- R_3 represents an alkyl group comprising from 1 to 4 carbon atoms, better still a

linear alkyl group comprising from 1 to 4 carbon atoms, and preferably the methyl or ethyl group; and/or

- z ranges from 1 to 3 and/or y = 0; and preferentially, z = 3 and thus x = y = 0, or else z = 2, x = 1 and y = 0;

- 5 preferentially, R₁ represents a C₁-C₆, preferably C₂-C₄, amino alcohol group, z = 3 and x = y = 0.

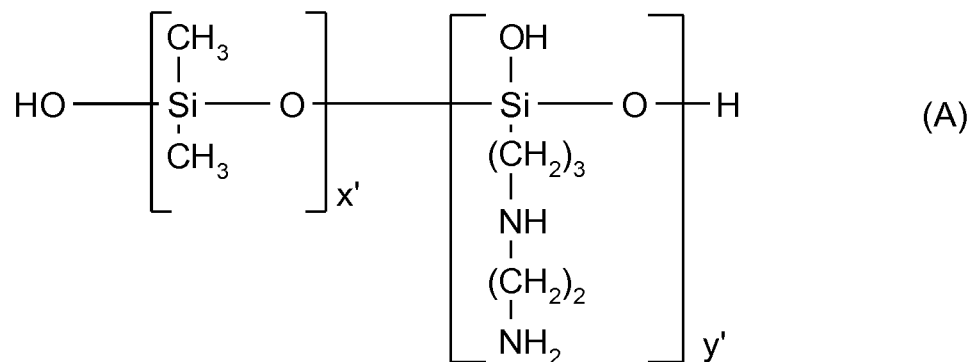
6. Composition according to any one of the preceding claims, in which the organosilane is chosen from octyltriethoxysilane (OTES), dodecyltriethoxysilane, octadecyltriethoxysilane, hexadecyltriethoxysilane, 3-aminopropyltriethoxysilane (APTES), methyltriethoxysilane (MTES), 2-aminoethyltriethoxysilane (AETES), 3-aminopropylmethyldiethoxysilane, N-(2-aminoethyl)-3-aminopropyltriethoxysilane, 3-(m-aminophenoxy)propyltrimethoxysilane, p-aminophenyltrimethoxysilane, N-(2-aminoethylaminomethyl)phenethyltrimethoxysilane, and oligomers thereof; and
10 more particularly chosen from 3-aminopropyltriethoxysilane (APTES) and oligomers thereof.

7. Composition according to any one of the preceding claims, comprising the organosilane(s) in an amount ranging from 0.01% to 10% by weight, preferably from 0.1% to 5% by weight, even better still from 0.2% to 1% by weight, relative to the
20 total weight of the composition.

8. Composition according to any one of the preceding claims, in which the amino silicone is chosen from, alone or as a mixture:

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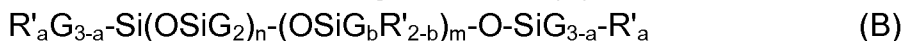
a) the polysiloxanes corresponding to formula (A):



in which x' and y' are integers such that the weight-average molecular weight (Mw) is between 5000 and 500 000 approximately;

30

b) the amino silicones corresponding to formula (B):

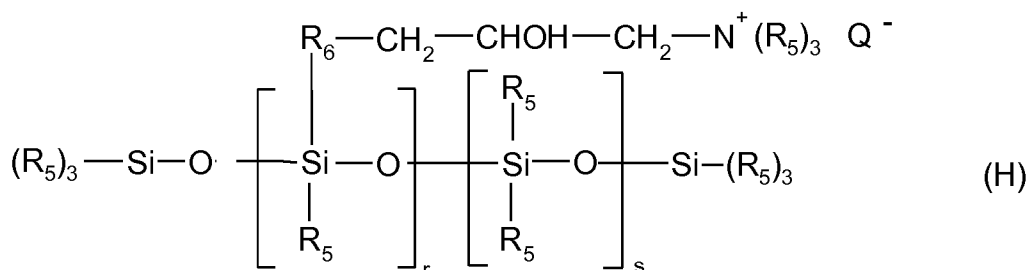


in which:

- G, which may be identical or different, denote a hydrogen atom or a phenyl, OH
35 or C₁-C₈ alkyl, for example methyl, or C₁-C₈ alkoxy, for example methoxy, group,

- a, which may be identical or different, denote 0 or an integer from 1 to 3, in particular 0,
- b denotes 0 or 1, in particular 1,
- m and n are numbers such that the sum (n + m) ranges from 1 to 2000 and in particular from 50 to 150, n possibly denoting a number from 0 to 1999 and in particular from 49 to 149, and m possibly denoting a number from 1 to 2000 and in particular from 1 to 10;
- R', which may be identical or different, denote a monovalent radical of formula -C_qH_{2q}L in which q is a number ranging from 2 to 8 and L is an optionally quaternized amino group chosen from the following groups:
 $-N(R'')_2$; $-N^+(R'')_3 A^-$; $-NR''-Q-N(R'')_2$ and $-NR''-Q-N^+(R'')_3 A^-$,
 in which R'', which may be identical or different, denotes hydrogen, phenyl, benzyl, or a saturated monovalent hydrocarbon-based radical, for example a C₁-C₂₀ alkyl radical; Q denotes a linear or branched group of formula C_rH_{2r}, r being an integer ranging from 2 to 6, preferably from 2 to 4; and A⁻ represents a cosmetically acceptable anion, in particular a halide such as fluoride, chloride, bromide or iodide ion;

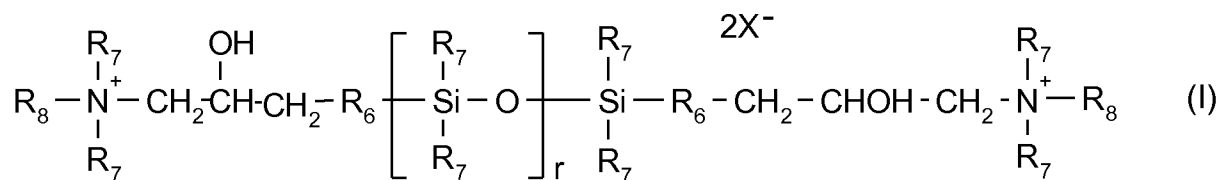
c) the amino silicones corresponding to formula (H):



in which:

- R₅ represents a monovalent hydrocarbon-based radical containing from 1 to 18 carbon atoms, and in particular a C₁-C₁₈ alkyl or C₂-C₁₈ alkenyl, for example methyl radical;
- R₆ represents a divalent hydrocarbon-based radical, in particular a C₁-C₁₈ alkylene radical or a divalent C₁-C₁₈, for example C₁-C₈, alkyleneoxy radical linked to the Si via an SiC bond;
- Q⁻ is an anion such as a halide, in particular chloride, ion or an organic acid salt, in particular acetate;
- r represents a mean statistical value from 2 to 20 and in particular from 2 to 8;
- s represents a mean statistical value from 20 to 200 and in particular from 20 to 50;

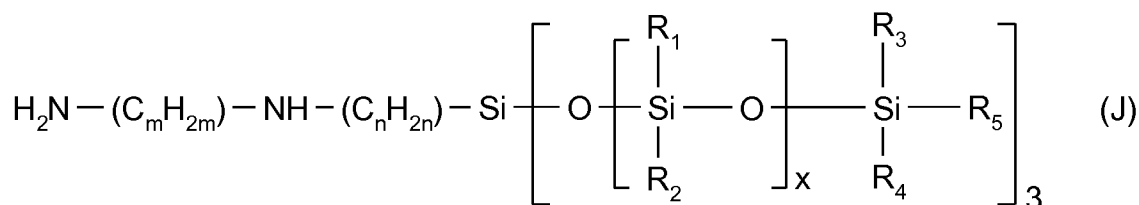
d) the silicones comprising a quaternary ammonium group, of formula (I):



in which:

- R₇, which may be identical or different, represent a monovalent hydrocarbon-based radical containing from 1 to 18 carbon atoms, and in particular a C₁-C₁₈ alkyl radical, a C₂-C₁₈ alkenyl radical or a ring comprising 5 or 6 carbon atoms, for example a methyl radical;
- R₆ represents a divalent hydrocarbon-based radical, in particular a C₁-C₁₈ alkylene radical or a divalent C₁-C₁₈, for example C₁-C₈, alkyleneoxy radical linked to the Si via an SiC bond;
- R₈, which may be identical or different, represent a hydrogen atom, or a monovalent hydrocarbon-based radical having from 1 to 18 carbon atoms, and in particular a C₁-C₁₈ alkyl radical, a C₂-C₁₈ alkenyl radical, or a radical -R₆-NHCOR₇; with R₆ as defined above and R₇ representing a monovalent hydrocarbon-based radical having from 1 to 18 carbon atoms, and in particular a C₁-C₁₈ alkyl radical or a C₂-C₁₈ alkenyl radical;
- X⁻ is an anion such as a halide, in particular chloride, ion or an organic acid salt, in particular acetate;
- r represents a mean statistical value ranging from 2 to 200 and in particular from 5 to 100;

e) the amino silicones of formula (J):



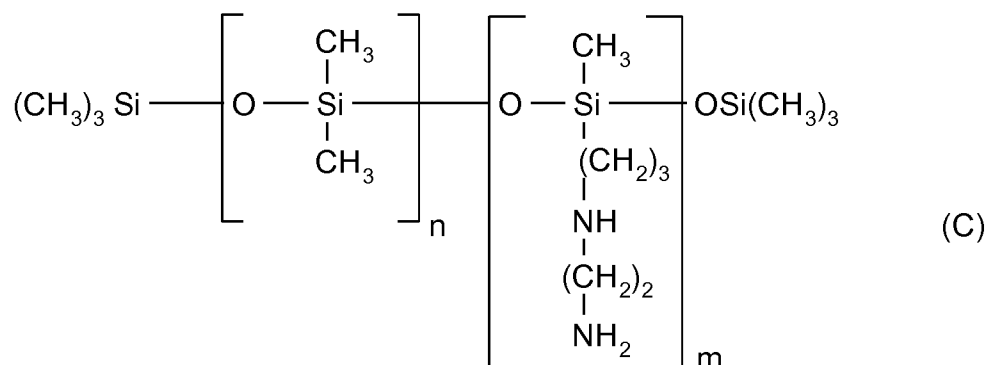
in which:

- R₁, R₂, R₃ and R₄, which may be identical or different, denote a C₁-C₄ alkyl radical or a phenyl group,
- R₅ denotes a C₁-C₄ alkyl radical or a hydroxyl group,
- n is an integer ranging from 1 to 5,
- m is an integer ranging from 1 to 5, and
- x is chosen such that the amine number ranges from 0.01 to 1 meq/g;

f) the polyoxyalkylenated amino silicones, in particular of multiblock type (AB)_n, A being a polysiloxane block and B being a polyoxyalkylene block comprising at least one amine group.

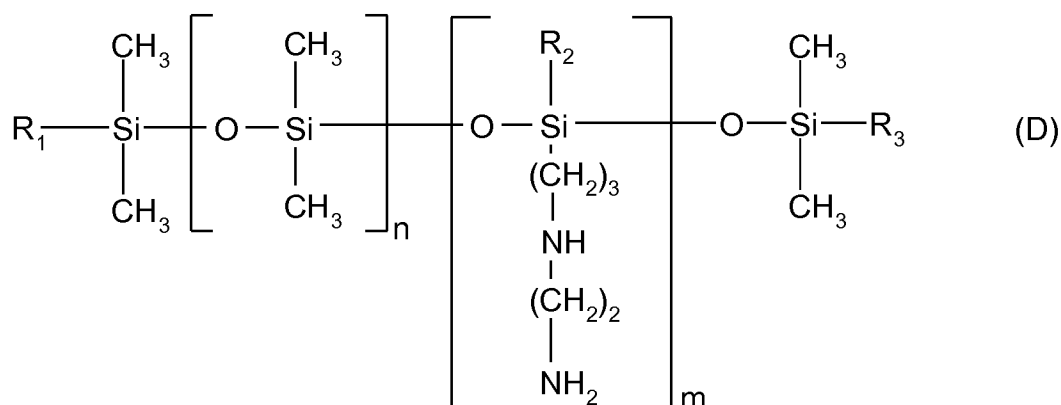
9. Composition according to any one of the preceding claims, in which the amino silicone is chosen from, alone or as a mixture:

- the silicones correspond to formula (C):



5 in which m and n are numbers such that the sum (n + m) ranges 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;

10 - the silicones of formula (D) below:



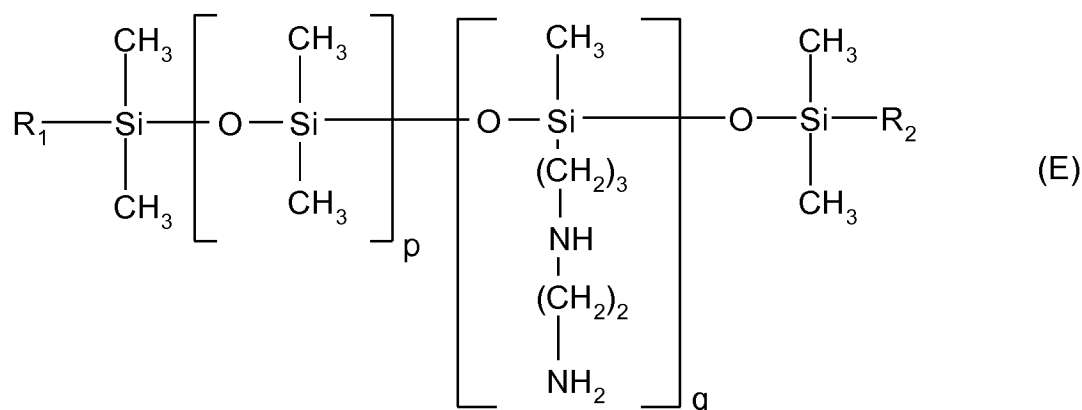
in which:

- m and n are numbers such that the sum (n + m) ranges from 1 to 1000 and in particular from 50 to 250 and more particularly from 100 to 200; it being possible for n to denote a number from 0 to 999 and in particular from 49 to 249 and more particularly from 125 to 175, and for m to denote a number from 1 to 1000 and in particular from 1 to 10, and more particularly from 1 to 5;

- R₁, R₂ and R₃, which may be identical or different, represent a hydroxyl or C₁-C₄ alkoxy radical, at least one of the radicals R₁ to R₃ denoting an alkoxy radical;

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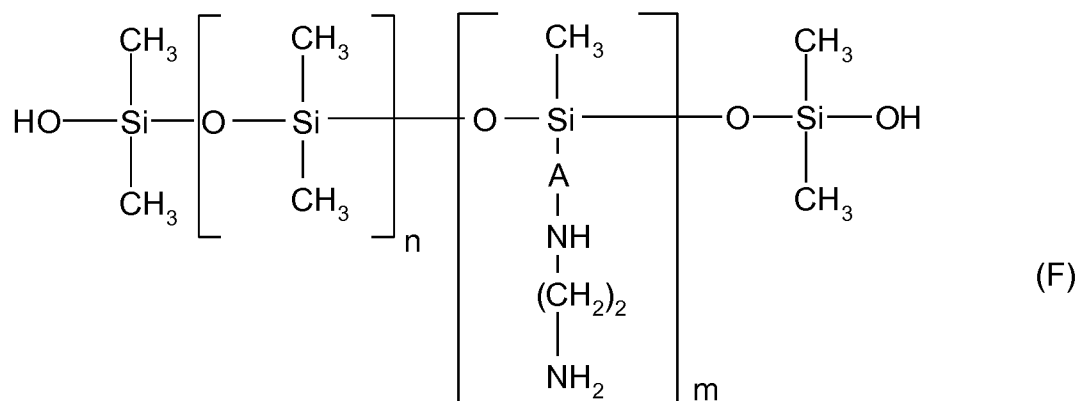
- the silicones of formula (E) below:



in which:

- p and q are numbers such that the sum (p + q) ranges from 1 to 1000, in particular from 50 to 350 and more particularly from 150 to 250; it being possible for p to denote a number from 0 to 999 and in particular from 49 to 349 and more particularly from 159 to 239, and for q to denote a number from 1 to 1000, in particular from 1 to 10 and more particularly from 1 to 5;
- R₁ and R₂, which are different, represent a hydroxyl or C₁-C₄ alkoxy radical, at least one of the radicals R₁ or R₂ denoting an alkoxy radical;

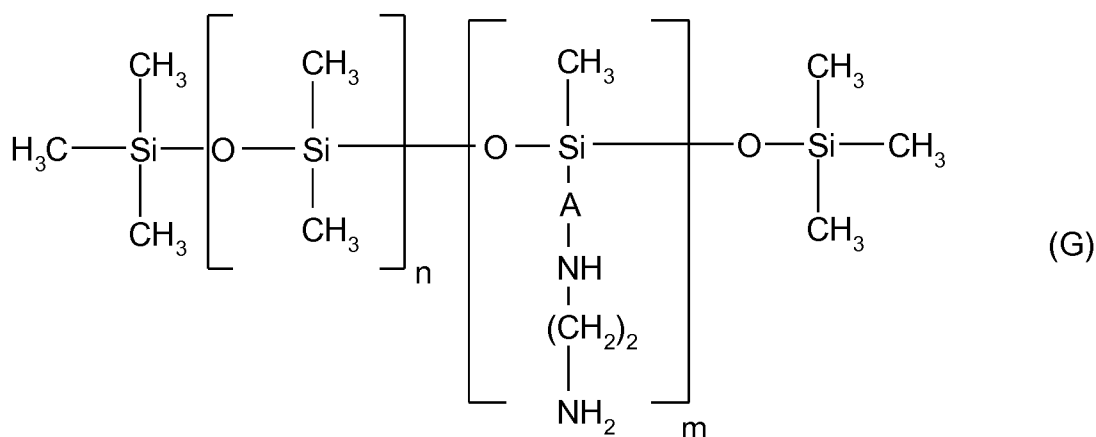
- the silicones of formula (F) below:



in which:

- m and n are numbers such that the sum (n + m) ranges 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;
- A denotes a linear or branched alkylene radical containing from 4 to 8 carbon atoms and preferably 4 carbon atoms, this radical preferably being linear.

- the silicones of formula (G) below:



in which:

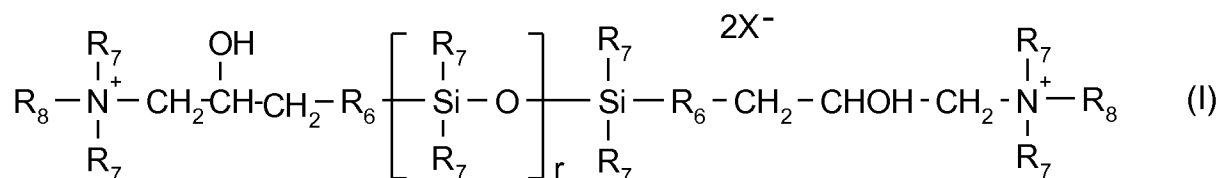
- m and n are numbers such that the sum (n + m) ranges from 1 to 2000 and in particular from 50 to 150, it being possible for n to denote a number from 0 to 1999 and in particular from 49 to 149, and for m to denote a number from 1 to 2000 and in particular from 1 to 10;
 - A denotes a linear or branched alkylene radical containing from 4 to 8 carbon atoms and preferably 4 carbon atoms, this radical preferably being branched.
10. Composition according to any one of Claims 1 to 8, in which the amino silicone is chosen from, alone or as a mixture, polyoxyalkylenated amino silicones, in particular of (AB)_n multiblock type, A being a polysiloxane block and B being a polyoxyalkylene block comprising at least one amine group, said silicones being constituted of repeating units of formula (K) and/or (K') below:
- 15 $[-(\text{SiMe}_2\text{O})_x\text{SiMe}_2\text{-R-N(R'')-R'-O(C}_2\text{H}_4\text{O)}_a(\text{C}_3\text{H}_6\text{O)}_b\text{-R'-N(R'')-R-}]$ (K)
 $[-(\text{SiMe}_2\text{O})_x\text{SiMe}_2\text{-R-N(R'')-R'-O(C}_2\text{H}_4\text{O)}_a(\text{C}_3\text{H}_6\text{O)}_b\text{-}]$ (K')
- in which:
- a is an integer greater than or equal to 1, preferably ranging from 5 to 200, or even from 60 to 100, and more particularly ranging from 10 to 100;
 - 20 - b is an integer between 0 and 200, preferably ranging from 4 to 100, or even from 5 to 50, and more particularly between 5 and 30;
 - x is an integer ranging from 1 to 10 000 and more particularly from 10 to 5000;
 - R'', which may be identical or different, are a hydrogen atom or a methyl, preferably methyl;
 - 25 - R, which may be identical or different, represent a linear or branched divalent C₂-C₁₂ hydrocarbon-based radical, optionally comprising one or more heteroatoms such as oxygen; preferably, R denotes an ethylene radical, a linear or branched propylene radical, a linear or branched butylene radical or a -CH₂CH₂CH₂OCH(OH)CH₂- or -CH₂CH₂CH₂OCH₂CH(OH)CH₂- radical; preferentially, R represents a -CH₂CH₂CH₂OCH(OH)CH₂- or
 - 30 -CH₂CH₂CH₂OCH₂CH(OH)CH₂- radical;
 - R', which may be identical or different, represent a linear or branched C₂-C₁₂ divalent hydrocarbon-based radical, optionally comprising one or more heteroatoms

such as oxygen; preferably, R' denotes an ethylene radical, a linear or branched propylene radical, a linear or branched butylene radical, or a -CH₂CH₂CH₂OCH(OH)CH₂- or -CH₂CH₂CH₂OCH₂CH(OH)CH₂- radical; preferentially, R' denotes -CH(CH₃)-CH₂-;

- 5 the siloxane blocks preferably representing 50 mol% to 95 mol% of the total weight of the silicone, more particularly from 70 mol% to 85 mol%.

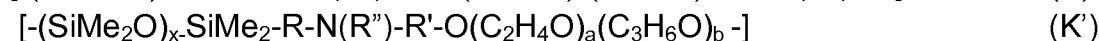
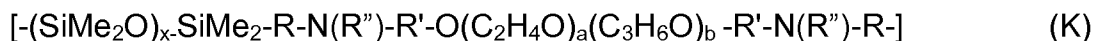
11. Composition according to any one of the preceding claims, in which the amino silicone is chosen from, alone or as a mixture:

- 10 - the silicones comprising a quaternary ammonium, of formula (I):



in which R₇, R₆, R₈, X⁻ and r are as defined in Claim 8; and

- 15 - the polyoxyalkylenated amino silicones, in particular of multiblock type (AB)_n, A being a polysiloxane block and B being a polyoxyalkylene block, and comprising at least one amine group constituted of repeating units of formula (K) and/or (K') below:



- 20 in which R, R', R'', x, a and b are as defined in Claim 10.

12. Composition according to any one of the preceding claims, comprising the amino silicone(s) in an amount ranging from 0.01% to 5% by weight, preferably from 0.05% to 2% by weight and preferentially from 0.1% to 0.5% by weight, relative to the total weight of the composition.

13. Composition according to any one of the preceding claims, comprising one or more associative cationic polymers chosen from, alone or as a mixture:

- 30 - (A) the cationic associative polyurethanes of general formula (Ia) below: R-X-(P)_n-[L-(Y)_m]_r-L'-(P')_p-X'-R'

in which:

R and R', which may be identical or different, represent a hydrophobic group or a hydrogen atom;

- 35 X and X', which may be identical or different, represent a group comprising an amine function optionally bearing a hydrophobic group, or alternatively the group L'';

L, L' and L'', which may be identical or different, represent a group derived from a diisocyanate;

P and P', which may be identical or different, represent a group comprising an

amine function optionally bearing a hydrophobic group;

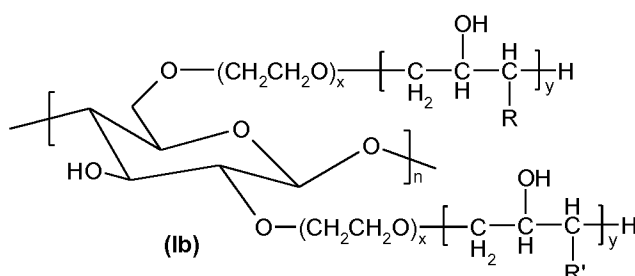
Y represents a hydrophilic group;

r is an integer between 1 and 100 inclusive, preferably between 1 and 50 inclusive and in particular between 1 and 25 inclusive;

- 5 n, m and p are each, independently of one another, between 0 and 1000 inclusive; the molecule containing at least one protonated or quaternized amine function and at least one hydrophobic group;

- (B) quaternized cellulose derivatives, and in particular:

- 10 - i) quaternized celluloses modified with groups comprising at least one fatty chain, such as linear or branched alkyl, linear or branched arylalkyl or linear or branched alkylaryl groups comprising at least 8 carbon atoms, or mixtures thereof;
- ii) quaternized hydroxyethylcelluloses modified with groups comprising at least one fatty chain, such as linear or branched alkyl, linear or branched arylalkyl or
- 15 linear or branched alkylaryl groups comprising at least 8 carbon atoms, or mixtures thereof;
- iii) the hydroxyethylcelluloses of formula (Ib):



20

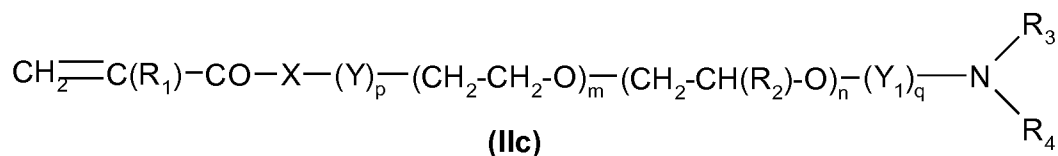
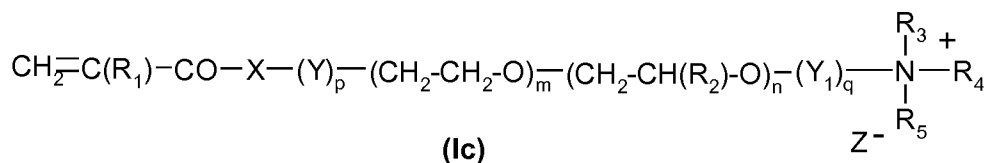
in which:

- R and R', which may be identical or different, represent an ammonium group $R_aR_bR_cN^+$, Q^- in which R_a , R_b and R_c , which may be identical or different, represent a hydrogen atom or a linear or branched C_1 - C_{30} and preferentially C_1 - C_{20} alkyl,
- 25 such as methyl or dodecyl group; and Q^- represents an anionic counterion such as a halide, for instance a chloride or bromide; and
- n, x and y, which may be identical or different, represent an integer between 1 and 10 000;

- in particular, the hydroxyethylcelluloses of formula (Ib) in which R represents a trimethylammonium halide and R' represents a dimethyldodecylammonium halide, more preferentially R represents trimethylammonium chloride $(CH_3)_3N^+ Cl^-$ and R' represents dimethyldodecylammonium chloride $(CH_3)_2(C_{12}H_{25})N^+ Cl^-$.
- 30

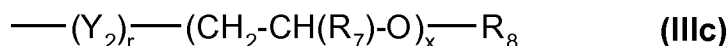
- (C) cationic polyvinyl lactams, in particular those having units deriving from:

- 35 -a) at least one monomer of vinyl lactam or alkylvinyl lactam type;
- b) at least one monomer of structure (Ic) or (IIc) below:



in which:

- 5 - X denotes an oxygen atom or an NR₆ radical,
 - R₁ and R₆ denote, independently of one another, a hydrogen atom or a linear or branched C₁-C₅ alkyl radical,
 - R₂ denotes a linear or branched C₁-C₄ alkyl radical,
 - R₃, R₄ and R₅ denote, independently of one another, a hydrogen atom, a linear or
 10 branched C₁-C₃₀ alkyl radical or a radical of formula (IIIc):

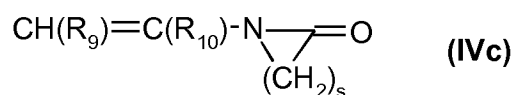


- Y, Y₁ and Y₂ denote, independently of one another, a linear or branched C₂-C₁₆ alkylene radical,
 15 - R₇ denotes a hydrogen atom, or a linear or branched C₁-C₄ alkyl radical or a linear or branched C₁-C₄ hydroxyalkyl radical,
 - R₈ denotes a hydrogen atom or a linear or branched C₁-C₃₀ alkyl radical,
 - p, q and r denote, independently of one another, either the value zero or the value 1,
 20 - m and n denote, independently of one another, an integer ranging from 0 to 100 inclusive,
 - x denotes an integer ranging from 1 to 100 inclusive,
 - Z denotes an anionic counterion of an organic or mineral acid, such as a halide, for instance chloride or bromide, or mesylate;
 25 with the proviso that:
 - at least one of the substituents R₃, R₄, R₅ or R₈ denotes a linear or branched C₉-C₃₀ alkyl radical,
 - if m or n is other than zero, then q is equal to 1,
 - if m or n is equal to zero, then p or q is equal to 0;

30

in particular the terpolymers comprising units deriving from at least:

a) one vinyl lactam or alkylvinyl lactam monomer of formula (IVc):



35

in which:

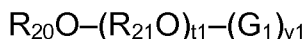
- s denotes an integer ranging from 3 to 6,

- R₉ denotes a hydrogen atom or a linear or branched C₁-C₅ alkyl radical,
- R₁₀ denotes a hydrogen atom or a linear or branched C₁-C₅ alkyl radical, with the proviso that at least one of the radicals R₉ and R₁₀ denotes a hydrogen atom;
- 5 the monomer (IVc) preferentially being vinylpyrrolidone;
- b) one monomer of formula (Ic) in which p=1, q=0, R₃ and R₄ denote, independently of one another, a hydrogen atom or a C₁-C₅ alkyl radical and R₅ denotes a linear or branched C₉-C₂₄ alkyl radical, and
- c) one monomer of formula (IIc) in which R₃ and R₄ denote, independently of one another, a hydrogen atom or a linear or branched C₁-C₅ alkyl radical;
- 10
- (D) the cationic polymers obtained by polymerization of a monomer mixture comprising one or more vinyl monomers substituted with one or more amino groups, one or more hydrophobic non-ionic vinyl monomers, and one or more associative
- 15 vinyl monomers;
- and in particular the products of the polymerization of a monomer mixture comprising:
- a di(C₁-C₄ alkyl)amino(C₁-C₆ alkyl) methacrylate,
- one or more C₁-C₃₀ alkyl esters of (meth)acrylic acid,
- 20 - a polyethoxylated C₁₀-C₃₀ alkyl methacrylate (20-25 mol of ethylene oxide unit),
- a 30/5 polyethylene glycol/polypropylene glycol allyl ether,
- a hydroxy(C₂-C₆ alkyl) methacrylate, and
- an ethylene glycol dimethacrylate.
- 25 14. Composition according to any one of the preceding claims, comprising one or more associative cationic polymers in an amount of between 0.01% and 2% by weight, in particular from 0.025% to 1% by weight, preferentially from 0.05% to 0.5% by weight and even better still from 0.06% to 0.2% by weight, relative to the total weight of the composition.
- 30 15. Composition according to any one of the preceding claims, comprising one or more amphoteric surfactants, preferably chosen from (C₈-C₂₀)alkylbetaines, (C₈-C₂₀)alkylamido(C₁-C₆)alkylbetaines, (C₈-C₂₀)alkyl amphoacetates and (C₈-C₂₀)alkylamphodiacétates, and mixtures thereof, and in particular from cocobetaine and cocoamidopropylbetaine, preferably in an amount ranging from 1% to 15%
- 35 by weight, in particular ranging from 2% to 10% by weight, preferentially from 3% to 8% by weight, relative to the total weight of the composition.
- 40 16. Composition according to any one of the preceding claims, comprising one or more additional cationic polymers, other than the associative cationic polymers, in particular in an amount of between 0.01% and 2% by weight, in particular from 0.025% to 1% by weight, preferentially from 0.05% to 0.5% by weight and even better still from 0.06% to 0.2% by weight, relative to the total weight of the compo-

sition.

17. Composition according to any one of the preceding claims, comprising one or more non-ionic surfactants, preferably chosen from:

- 5 - alcohols, α -diols and (C₁₋₂₀)alkylphenols, these compounds being polyethoxylated and/or polypropoxylated and/or polyglycerolated, the number of ethylene oxide and/or propylene oxide groups possibly ranging from 1 to 100, and the number of glycerol groups possibly ranging from 2 to 30; or else these compounds comprising at least one fatty chain comprising from 8 to 30 carbon atoms and in particular
- 10 from 16 to 30 carbon atoms;
- condensates of ethylene oxide and of propylene oxide with fatty alcohols; polyethoxylated fatty amides preferably having from 2 to 30 ethylene oxide units, polyglycerolated fatty amides comprising on average from 1 to 5, and in particular from 1.5 to 4, glycerol groups; ethoxylated fatty acid esters of sorbitan preferably containing
- 15 from 2 to 40 ethylene oxide units, fatty acid esters of sucrose, polyoxyalkylenated and preferably polyoxyethylenated fatty acid esters containing from 2 to 150 mol of ethylene oxide, including oxyethylenated plant oils, N-(C₆₋₂₄ alkyl)glucamine derivatives, amine oxides such as (C₁₀₋₁₄ alkyl)amine oxides or N-(C₁₀₋₁₄ acyl)aminopropylmorpholine oxides;
- 20 - non-ionic surfactants of alkyl(poly)glycoside type, represented in particular by general formula (VI) below:



in which:

25 R_{20} represents a linear or branched alkyl or alkenyl radical comprising 6 to 24 carbon atoms and in particular 8 to 18 carbon atoms, or an alkylphenyl radical whose linear or branched alkyl radical comprises 6 to 24 carbon atoms and in particular 8 to 18 carbon atoms;

R_{21} represents an alkylene radical comprising 2 to 4 carbon atoms,

G_1 represents a sugar unit comprising 5 to 6 carbon atoms,

30 t_1 denotes a value ranging from 0 to 10 and preferably 0 to 4,

v_1 denotes a value ranging from 1 to 15 and preferably 1 to 4;

preferably in which:

R_{20} denotes a linear or branched, saturated or unsaturated alkyl radical comprising from 8 to 18 carbon atoms,

35 R_{21} represents an alkylene radical comprising 2 to 4 carbon atoms,

t_1 denotes a value ranging from 0 to 3, preferably equal to 0,

G_1 denotes glucose, fructose or galactose, preferably glucose;

the degree of polymerization, i.e. the value of v_1 , possibly ranging from 1 to 15 and preferably from 1 to 4; the mean degree of polymerization more particularly being

40 between 1 and 2;

preferably present in an amount ranging from 0.01% to 20% by weight, preferably ranging from 0.1% to 15% by weight, better still from 0.2% to 10% by weight and preferentially from 0.5% to 5% by weight, relative to the total weight of the compo-

sition.

18. Composition according to any one of the preceding claims, comprising water in a content preferably ranging from 40% to 95% by weight, in particular from 50% to 90% by weight and better still from 60% to 85% by weight, relative to the total weight of the composition.

19. Composition according to any one of the preceding claims, having a pH inclusively between 4.5 and 9, in particular between 5 and 9, even better still between 5.5 and 8.5, in particular between 6 and 8, and preferentially between 6.5 and 7.5.

20. Cosmetic process for treating, and more particularly for washing and/or conditioning, keratin materials, in particular keratin fibres, in particular the hair, which comprises the application to said keratin materials of a composition according to any one of the preceding claims, optionally followed by a leave-on time and/or a rinsing step and/or a drying step

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/061802

A. CLASSIFICATION OF SUBJECT MATTER INV. A61K8/39 A61K8/46 A61K8/58 A61Q5/02 A61Q5/12 A61K8/898 A61K8/90 A61K8/73 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A61K A61Q Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data, BIOSIS, EMBASE, FSTA		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE GNPD [Online] MINTEL; April 2013 (2013-04), "Shampoo", XP002763762, Database accession no. 2053023 paragraph [ingredients]	1-20
Y	----- FR 2 954 099 A1 (OREAL [FR]) 24 June 2011 (2011-06-24) claims 1-4, 6,8 example 1 page 3, line 14 - page 4, line 20 page 32, line 15 ----- -/--	1-20
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search	Date of mailing of the international search report	
28 July 2017	09/08/2017	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Krattinger, B	

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/061802

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2011/158927 A1 (VIRAVAU VALERIE [FR] ET AL) 30 June 2011 (2011-06-30) claims 1-6 examples paragraphs [0007] - [0011] -----	1-20
Y	DATABASE GNPD [Online] MINTEL; November 2015 (2015-11), "Shampoo", XP002763763, Database accession no. 3570147 paragraph [ingredients] paragraph -----	1-20
Y	DATABASE GNPD [Online] MINTEL; February 2013 (2013-02), "Hydrating shampoo", XP002763764, Database accession no. 2004828 paragraph [ingredients] paragraph -----	1-20
A	US 2012/294819 A1 (HERRWERTH SASCHA [DE] ET AL) 22 November 2012 (2012-11-22) tables 1-3 paragraphs [0166] - [0175], [0190] - [0192] -----	1-20
A	US 5 302 322 A (BIRTWISTLE DAVID H [GB]) 12 April 1994 (1994-04-12) examples claims 1-3 -----	1-20
A	anonymous: "Silsoft A+ conditioning agent", Momentive , December 2009 (2009-12), XP002763765, Retrieved from the Internet: URL: http://s3.amazonaws.com/zanran_storage/www.momentive.com/ContentPages/45675670.pdf [retrieved on 2016-11-03] page 1 figure 3 ----- -/--	1-20

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/061802

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	anonymous: "hair cleansing and conditioning product application overview", dow February 2015 (2015-02), XP002763803, Retrieved from the Internet: URL: http://msdssearch.dow.com/PublishedLiteratureDOWCOM/dh_092d/09 [retrieved on 2016-11-03] pages 1-2, paragraph conditioning polymers -----	1-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2017/061802

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FR 2954099	A1	24-06-2011	NONE
US 2011158927	A1	30-06-2011	BR PI1005247 A2 02-04-2013 CN 102106792 A 29-06-2011 EP 2343042 A2 13-07-2011 FR 2954100 A1 24-06-2011 JP 5946988 B2 06-07-2016 JP 2011132244 A 07-07-2011 US 2011158927 A1 30-06-2011
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