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(54) **Title:** USE OF A DYE COMPOSITION BASED ON AMINO SILICONES AND ON COPOLYMERS DERIVED FROM THE POLYMERIZATION OF AT LEAST ONE CROTONIC ACID MONOMER OR CROTONIC ACID DERIVATIVE, FOR LIMITING TRANSFER

(57) **Abstract:** The present invention relates to the use of a composition for dyeing keratin fibers, comprising (i) one or more copolymers derived from the polymerization of at least one crotonic acid monomer or crotonic acid derivative and of at least one vinyl ester monomer, (ii) one or more pigments and (iii) at least one amino silicone for limiting transfer.

USE OF A DYE COMPOSITION BASED ON AMINO SILICONES AND ON COPOLYMERS DERIVED FROM THE POLYMERIZATION OF AT LEAST ONE CROTONIC ACID MONOMER OR CROTONIC ACID DERIVATIVE, FOR LIMITING TRANSFER

The present invention relates to the use of a composition for dyeing keratin fibers, comprising at least one copolymer derived from the polymerization of at least one crotonic acid monomer or crotonic acid derivative and at least one pigment for limiting transfer.

In the field of dyeing keratin fibers, in particular human keratin fibers, it is already known practice to dye keratin fibers via various techniques using direct dyes or pigments for non-permanent dyeing, or dye precursors for permanent dyeing.

There are essentially three types of process for dyeing the hair:

a) "permanent" dyeing, the function of which is to afford a substantial modification to the natural color and which uses oxidation dyes which penetrate into the hair fiber and form the dye via an oxidative condensation process;

b) non-permanent, semi-permanent or direct dyeing, which does not use the oxidative condensation process and withstands four or five shampoo washes; it consists in dyeing keratin fibers with dye compositions containing direct dyes. These dyes are colored and coloring molecules that have affinity for keratin fibers.

c) temporary dyeing, which gives rise to a modification of the natural color of the hair that remains from one shampoo washing to the next, and which serves to enhance or correct a shade that has already been obtained. It may also be likened to a "makeup" process.

For this last type of dyeing, it is known practice to use colored polymers formed by grafting one or more dyes of azo, triphenylmethane, azine, indoamine or anthraquinone nature onto a polymer chain. These colored polymers are not entirely satisfactory, especially as regards the homogeneity of the coloring obtained and its resistance, not to mention the problems associated with their manufacture and especially with their reproducibility.

Another dyeing method consists in using pigments. Specifically, the use of pigment on the surface of keratin fibers generally makes it possible to obtain visible colorings on dark hair, since the surface pigment masks the natural color of the fiber. The use of pigment for dyeing keratin fibers is described, for example, in patent application FR 2 741 530; when they are applied to keratin fibers, these compositions have the drawback of transferring, i.e. of becoming at least partly deposited, leaving marks, on certain supports with which they may come into contact and in particular clothing or the skin. This results in mediocre persistence of the applied film, making it necessary to regularly repeat the application of the composition. Moreover, the appearance of these unacceptable marks may put certain people off using this type of dyeing.

Compositions for temporarily dyeing and/or making up the hair may also lead to a hair feel that is uncosmetic and/or not natural; the hair thus dyed may in particular lack softness and/or suppleness and/or individualization.

There is thus still a need to obtain compositions for the temporary dyeing of keratin materials, especially the hair, which have the advantage of forming a transfer-resistant deposit, which in particular does not become deposited, at least partly, onto supports with which said compositions are placed in contact, such as the skin (in particular the hands and the face) and/or clothing.

This aim is achieved with the present invention, one subject of which is the use of a composition for dyeing keratin fibers, especially human keratin fibers such as the hair, comprising at least one copolymer derived from the polymerization of at least one crotonic acid monomer or crotonic acid derivative and of at least one vinyl ester monomer, at least one pigment and at least one amino silicone for limiting transfer.

The term "at least one" means "one or more".

The term "comprising a" is understood to mean "comprising at least one", unless specified to the contrary.

One subject of the present invention is thus the use of a composition for dyeing keratin fibers, especially human keratin fibers such as the hair, comprising (i) one or more copolymers derived

from the polymerization of at least one crotonic acid monomer or crotonic acid derivative and of at least one vinyl ester monomer, (ii) one or more pigments and (iii) at least one amino silicone for limiting transfer.

For the purposes of the invention, the term "limiting transfer" means reducing the transfer of said composition applied to keratin fibers onto supports with which the composition comes into contact, such as the skin (in particular the hands and the face) and/or textile supports such as clothing, sheets, pillowcases and/or towels.

Preferably, the transfer of said composition applied to keratin fibers onto supports with which the composition comes into contact is reduced by at least 50%, preferentially at least 70%, better still at least 90% and preferably 99% so as to totally prevent the transfer of said composition from the keratin fibers onto the supports with which the composition comes into contact.

More particularly, for the purposes of the invention, the term "limiting transfer" means reducing the transfer of said composition onto supports with which it comes into contact, such as the skin (in particular the hands and the face) and/or clothing by at least 50%, preferably at least 70%, better still 90% and preferably 99% so as to totally prevent the transfer of the composition onto the supports with which it comes into contact.

Crotonic acid copolymers

The composition according to the invention comprises at least one copolymer derived from the polymerization of at least one crotonic acid monomer or crotonic acid derivative and of at least one vinyl ester monomer, preferably at least two different vinyl ester monomers.

Preferably, the copolymer according to the invention is chosen from copolymers derived from the polymerization of at least one crotonic acid monomer and of at least one vinyl ester monomer, preferably at least two different vinyl ester monomers.

The term "crotonic acid derivative" preferably means a crotonic acid ester or a crotonic acid amide.

The term "crotonic acid derivative" preferably means a crotonic acid ester or amide, in particular:

-(i) the crotonic acid esters of formula $CH_3CH=CHCOOR'1$ with R'1 representing a linear, branched or cyclic, saturated or unsaturated, optionally aromatic (aryl, aralkyl or alkylaryl) carbon-based and especially hydrocarbon-based (alkyl) chain, containing 1 to 30 carbon atoms, optionally comprising one or more functions chosen from -OH, -OR' with R' C1-C6 alkyl (alkoxy), -CN, -X (halogen, especially Cl, F, Br or I); mention may be made, for example, of methyl crotonate and ethyl crotonate,

-(ii) the crotonic acid amides of formula $CH_3CH=CHCONR'2R"2$ with R'2 and R"2, which may be identical or different, representing hydrogen or a linear, branched or cyclic, saturated or unsaturated, optionally aromatic, carbon-based and especially hydrocarbon-based (alkyl) chain, containing 1 to 30 carbon atoms, optionally comprising one or more functions chosen from -OH, -OR' with R' C1-C6 alkyl (alkoxy), -CN, -X (halogen, especially Cl, F, Br or I).

The term "crotonic acid derivative" preferably means a crotonic acid ester or amide, in particular:

-(i) the crotonic acid esters of formula $CH_3CH=CHCOOR'1$ with R'1 representing a linear, branched or cyclic, saturated or unsaturated, optionally aromatic such as an aryl, aralkyl or alkylaryl, carbon-based and especially hydrocarbon-based chain such as an alkyl, containing 1 to 30 carbon atoms, optionally comprising one or more functions chosen from -OH, -OR' with R' C1-C6 alkyl such as an alkoxy, -CN, -X such as a halogen, especially Cl, F, Br or I; mention may be made, for example, of methyl crotonate and ethyl crotonate,

-(ii) the crotonic acid amides of formula $CH_3CH=CHCONR'2R"2$ with R'2 and R"2, which may be identical or different, representing hydrogen or a linear, branched or cyclic, saturated or unsaturated, optionally aromatic, carbon-based and especially hydrocarbon-based chain such as an alkyl, containing 1 to 30 carbon atoms, optionally comprising one or more functions chosen from -OH, -OR' with R' C1-C6 alkyl such as an alkoxy, -CN, -X such as a halogen, especially Cl, F, Br or I.

The vinyl ester monomer(s) may be chosen from the compounds of formula $CH_2=CH-OCO-R'3$ with R'3 representing a linear, branched or cyclic, saturated or unsaturated, optionally aromatic, carbon-based and especially hydrocarbon-based chain, containing 1 to 30 carbon

atoms, optionally comprising one or more functions chosen from -OH, -OR' with R' C1-C6 alkyl (alkoxy), -CN, -X (halogen, especially Cl, F, Br or I).

Mention may be made especially of vinyl acetate, vinyl propionate, vinyl butyrate (or butanoate), vinyl ethylhexanoate, vinyl neononanoate, vinyl neododecanoate, vinyl neodecanoate, vinyl pivalate, vinyl cyclohexanoate, vinyl benzoate, vinyl 4-tert-butylbenzoate and vinyl trifluoroacetate.

Preferably, the copolymer according to the invention is chosen from copolymers derived from the polymerization of at least one crotonic acid monomer and of at least two different vinyl ester monomers, said vinyl ester monomers preferably being chosen from vinyl acetate, vinyl propionate, vinyl butyrate (or butanoate), vinyl ethylhexanoate, vinyl neononanoate, vinyl neododecanoate, vinyl neodecanoate, vinyl pivalate, vinyl cyclohexanoate, vinyl benzoate, vinyl 4-tert-butylbenzoate and vinyl trifluoroacetate, preferably from vinyl acetate, vinyl propionate and vinyl neodecanoate, better still from vinyl acetate and vinyl neodecanoate.

More particularly, the copolymer according to the invention is chosen from copolymers derived from the polymerization of crotonic acid, vinyl acetate and vinyl propionate, copolymers derived from the polymerization of crotonic acid, vinyl acetate and vinyl neodecanoate, and mixtures thereof.

According to a particular embodiment, the copolymer of the composition according to the invention is a crotonic acid/vinyl acetate/vinyl neodecanoate terpolymer.

The copolymers according to the invention may optionally comprise other monomers such as allylic or methallylic esters, or vinyl ethers. These polymers may optionally be grafted or crosslinked.

Such polymers are described, *inter alia*, in French patent Nos. 1 222 944, 1 580 545, 2 265 782, 2 265 781, 1 564 110 and 2 439 798. Commercial products which fall into this category are the products Resyn® 28-2930 and 28-1310 sold by the company Akzo Nobel (INCI names VA / crotonates / vinyl decanoate copolymer and VA / crotonates copolymer, respectively). Mention may also be made of the products Luviset® CA 66 sold by the company BASF, Aristoflex® A60 sold by the company Clariant (INCI name VA / crotonates copolymer) and Mexomere®

PW or PAM sold by the company Chimex (INCI name VA / vinyl butyl benzoate / crotonates copolymer).

The total amount of copolymer(s) of crotonic acid or crotonic acid derivative according to the invention may range from 0.05% to 15% by weight relative to the weight of the composition, preferably from 0.1% to 10% by weight relative to the weight of the composition, preferably from 1% to 5% by weight relative to the weight of the composition.

Pigments

The composition comprises one or more pigments.

The term "pigment" is understood to mean white or colored particles of any shape which are insoluble in the composition in which they are present.

The pigments that may be used are especially chosen from the organic and/or mineral pigments known in the art, especially those described in Kirk-Othmer's Encyclopedia of Chemical Technology and in Ullmann's Encyclopedia of Industrial Chemistry.

They may be natural, of natural origin, or not.

These pigments may be in pigment powder or paste form. They may be coated or uncoated.

The pigments may be chosen, for example, from mineral pigments, organic pigments, lakes, pigments with special effects, such as nacres or glitter flakes, and mixtures thereof.

The pigment may be a mineral pigment. The term "mineral pigment" means any pigment that satisfies the definition in Ullmann's encyclopedia in the chapter on inorganic pigments. Mention may be made, among mineral pigments of use in the present invention, of ochres, such as red ochre (clay (in particular kaolinite) and iron hydroxide (for example hematite)), brown ochre (clay (in particular kaolinite) and limonite) or yellow ochre (clay (in particular kaolinite) and goethite); titanium dioxide, optionally surface-treated; zirconium or cerium oxides; zinc, (black, yellow or red) iron or chromium oxides; manganese violet, ultramarine blue, chromium hydrate and ferric blue; or metal powders, such as aluminum powder or copper powder.

Mention may also be made of alkaline earth metal carbonates (such as calcium carbonate or magnesium carbonate), silicon dioxide, quartz and any other compound used as inert filler in

cosmetic compositions, provided that these compounds contribute color or whiteness to the composition under the conditions under which they are employed.

The pigment may be an organic pigment. The term "organic pigment" means any pigment that satisfies the definition in Ullmann's encyclopedia in the chapter on organic pigments.

The organic pigment may especially be chosen from nitroso, nitro, azo, xanthene, pyrene, quinoline, anthraquinone, triphenylmethane, fluorane, phthalocyanine, metal-complex, isoindolinone, isoindoline, quinacridone, perinone, perylene, diketopyrrolopyrrole, indigo, thioindigo, dioxazine, triphenylmethane and quinophthalone compounds.

Use may also be made of any mineral or organic compound that is insoluble in the composition and standard in the cosmetics field, provided that these compounds give the composition color or whiteness under the conditions under which they are used, for example guanine, which, according to the refractive index of the composition, is a pigment.

In particular, the white or colored organic pigments may be chosen from carmine, carbon black, aniline black, azo yellow, quinacridone, phthalocyanine blue, the blue pigments codified in the Color Index under the references CI 42090, 69800, 69825, 73000, 74100, 74160, the yellow pigments codified in the Color Index under the references CI 11680, 11710, 15985, 19140, 20040, 21100, 21108, 47000, 47005, the green pigments codified in the Color Index under the references CI 61565, 61570, 74260, the orange pigments codified in the Color Index under the references CI 11725, 15510, 45370, 71105, the red pigments codified in the Color Index under the references CI 12085, 12120, 12370, 12420, 12490, 14700, 15525, 15580, 15620, 15630, 15800, 15850, 15865, 15880, 17200, 26100, 45380, 45410, 58000, 73360, 73915, 75470, the pigments obtained by oxidative polymerization of indole or phenolic derivatives as described in patent FR 2 679 771.

Examples that may also be mentioned include pigmentary pastes of organic pigments, such as the products sold by the company Hoechst under the names:

- Cosmenyl Yellow 10G: Pigment Yellow 3 (CI 11710);

- Cosmenyl Yellow G: Pigment Yellow 1 (CI 11680);

- Cosmenyl Orange GR: Pigment Orange 43 (CI 71105);

- Cosmenyl Red R: Pigment Red 4 (CI 12085);

- Carmine Cosmenyl FB: Pigment Red 5 (CI 12490);

- Cosmenyl Violet RL: Pigment Violet 23 (CI 51319);

- Cosmenyl Blue A2R: Pigment Blue 15.1 (CI 74160);

- Cosmenyl Green GG: Pigment Green 7 (CI 74260);

- Cosmenyl Black R: Pigment Black 7 (CI 77266).

The pigments in accordance with the invention may also be in the form of composite pigments, as described in patent EP 1 184 426. These composite pigments may be composed especially of particles comprising a mineral core, at least one binder, which provides for the attachment of the organic pigments to the core, and at least one organic pigment which at least partially covers the core.

The organic pigment may also be a lake. The term "lake" means dyes adsorbed onto insoluble particles, the assembly thus obtained remaining insoluble during use.

The mineral substrates onto which the dyes are adsorbed are, for example, alumina, silica, calcium sodium borosilicate or calcium aluminum borosilicate and aluminum.

Among the dyes, mention may be made of carminic acid. Mention may also be made of the dyes known under the following names: D&C Red 21 (CI 45 380), D&C Orange 5 (CI 45 370), D&C Red 27 (CI 45 410), D&C Orange 10 (CI 45 425), D&C Red 3 (CI 45 430), D&C Red 4 (CI 15 510), D&C Red 33 (CI 17 200), D&C Yellow 5 (CI 19 140), D&C Yellow 6 (CI 15 985), D&C Green (CI 61 570), D&C Yellow 1 O (CI 77 002), D&C Green 3 (CI 42 053), D&C Blue 1 (CI 42 090).

Mention may be made, as examples of lakes, of the product known under the following name: D&C Red 7 (CI 15 850:1).

The pigment may also be a pigment with special effects. The term "pigments with special effects" means pigments that generally create a colored appearance (characterized by a certain shade, a certain vivacity and a certain level of luminance) that is non-uniform and that changes as a function of the conditions of observation (light, temperature, angles of observation, etc.).

They thus contrast with colored pigments that afford a standard uniform opaque, semi-transparent or transparent shade.

Several types of pigment with special effects exist: those with a low refractive index, such as fluorescent or photochromic pigments, and those with a high refractive index, such as nacres, interference pigments or glitter flakes.

Examples of pigments with special effects that may be mentioned include nacreous pigments such as mica coated with titanium or with bismuth oxychloride, colored nacreous pigments such as mica coated with titanium and iron oxides, mica coaeted with iron oxide, mica coated with titanium and especially with ferric blue or with chromium oxide, mica coated with titanium and with an organic pigment of the abovementioned type, and also nacreous pigments based on bismuth oxychloride. Nacreous pigments that may be mentioned include the Cellini nacres sold by Engelhard (mica-TiO2-lake), Prestige sold by Eckart (mica-TiO2), Prestige Bronze sold by Eckart (mica-Fe2O3), and Colorona sold by Merck (mica-TiO2-Fe2O3).

Mention may be made of the gold-colored nacres sold especially by the company Engelhard under the name Brilliant gold 212G (Timica), Gold 222C (Cloisonne), Sparkle gold (Timica), Gold 4504 (Chromalite) and Monarch gold 233X (Cloisonne); the bronze nacres sold especially by the company Merck under the name Bronze fine (17384) (Colorona) and Bronze (17353) (Colorona) and by the company Engelhard under the name Super bronze (Cloisonne); the orange nacres sold especially by the company Engelhard under the name Orange 363C (Cloisonne) and Orange MCR 101 (Cosmica) and by the company Merck under the name Passion orange (Colorona) and Matte orange (17449) (Microna); the brown nacres sold especially by the company Engelhard under the name Nu-antique copper 340XB (Cloisonne) and Brown CL4509 (Chromalite); the nacres with a coppery glint sold especially by the company Engelhard under the name Copper 340A (Timica); the nacres with a red glint sold especially by the company Merck under the name Sienna fine (17386) (Colorona); the nacres with a yellow glint sold especially by the company Engelhard under the name Yellow (4502) (Chromalite); the red nacres with a gold glint sold especially by the company Engelhard under the name Sunstone G012 (Gemtone); the pink nacres sold especially by the company Engelhard under the name Tan opale G005 (Gemtone); the black nacres with a gold glint sold especially by the company Engelhard under the name Nu antique bronze 240 AB (Timica), the blue nacres sold especially by the company Merck under the name Matte blue (17433) (Microna), the white

nacres with a silvery glint sold especially by the company Merck under the name Xirona Silver, and the golden-green pink-orange nacres sold especially by the company Merck under the name Indian summer (Xirona), and mixtures thereof.

Still as examples of nacres, mention may also be made of particles comprising a borosilicate substrate coated with titanium oxide.

Particles comprising a glass substrate coated with titanium oxide are sold in particular under the name Metashine MC1080RY by the company Toyal.

Finally, examples of nacres that may also be mentioned include polyethylene terephthalate flakes, especially those sold by the company Meadowbrook Inventions under the name Silver 1P 0.004X0.004 (silver flakes).

It is also possible to envisage multilayer pigments based on synthetic substrates, such as alumina, silica, calcium sodium borosilicate, calcium aluminum borosilicate and aluminum.

The pigments with special effects may also be chosen from reflective particles, i.e. especially from particles whose size, structure, especially the thickness of the layer(s) of which they are made and their physical and chemical nature, and surface state, allow them to reflect incident light. This reflection may, if appropriate, have an intensity sufficient to create, at the surface of the composition or mixture, when the latter is applied to the substrate to be made up, highlight points visible to the naked eye, that is to say more luminous points which contrast with their surroundings by appearing to sparkle.

The reflective particles may be selected so as not to significantly alter the coloring effect generated by the coloring agents with which they are combined, and more particularly so as to optimize this effect in terms of color rendition. They may more particularly have a yellow, pink, red, bronze, orange, brown, gold and/or coppery color or glint.

These particles may have varied forms and may especially be in platelet or globular form, in particular in spherical form.

Irrespective of their form, the reflective particles may or may not have a multilayer structure, and, in the case of a multilayer structure, may have, for example, at least one layer of uniform thickness, especially of a reflective material.

When the reflective particles do not have a multilayer structure, they may be composed, for example, of metal oxides, especially titanium or iron oxides obtained synthetically.

When the reflective particles have a multilayer structure, they may comprise, for example, a natural or synthetic substrate, especially a synthetic substrate at least partially coated with at least one layer of a reflective material, especially of at least one metal or metallic material. The substrate may be made of one or more organic and/or mineral materials.

More particularly, it may be chosen from glasses, ceramics, graphite, metal oxides, aluminas, silicas, silicates, especially aluminosilicates and borosilicates, and synthetic mica, and mixtures thereof, this list not being limiting.

The reflective material may comprise a layer of metal or of a metallic material.

Reflective particles are described in particular in the documents

JP-A-09188830, JP-A-10158450, JP-A-10158541, JP-A-07258460 and JP-A-05017710.

Mention may also be made, still by way of example of reflective particles comprising a mineral substrate coated with a layer of metal, of the particles comprising a borosilicate substrate coated with silver.

Particles comprising a glass substrate coated with silver, in the form of platelets, are sold under the name Microglass Metashine REFSX 2025 PS by Toyal. Particles with a glass substrate coated with nickel/chromium/molybdenum alloy are sold under the name Crystal Star GF 550 and GF 2525 by this same company.

Use may also be made of particles comprising a metal substrate, such as silver, aluminum, iron, chromium, nickel, molybdenum, gold, copper, zinc, tin, magnesium, steel, bronze or titanium, said substrate being coated with at least one layer of at least one metal oxide, such as titanium oxide, aluminum oxide, iron oxide, cerium oxide, chromium oxide, silicon oxides and mixtures thereof.

Examples that may be mentioned include aluminum powder, bronze powder or copper powder coated with SiO2 sold under the name Visionaire by the company Eckart.

Mention may also be made of pigments with an interference effect which are not attached to a substrate, such as liquid crystals (Helicones HC from Wacker) or interference holographic

glitter flakes (Geometric Pigments or Spectra f/x from Spectratek). Pigments with special effects also comprise fluorescent pigments, whether these are substances that are fluorescent in daylight or that produce an ultraviolet fluorescence, phosphorescent pigments, photochromic pigments, thermochromic pigments and quantum dots, sold, for example, by the company Quantum Dots Corporation.

Quantum dots are luminescent semiconductive nanoparticles capable of emitting, under light excitation, irradiation with a wavelength of between 400 nm and 700 nm. These nanoparticles are known from the literature. In particular, they may be synthesized according to the processes described, for example, in US 6 225 198 or US 5 990 479, in the publications cited therein and also in the following publications: Dabboussi B.O. et al., "(CdSe)ZnS core-shell quantum dots: synthesis and characterization of a size series of highly luminescent nanocrystallites", Journal of Physical Chemistry B, vol. 101, 1997, pp. 9463-9475, and Peng, Xiaogang et al., "Epitaxial growth of highly luminescent CdSe/CdS core/shell nanocrystals with photostability and electronic accessibility", Journal of the American Chemical Society, vol. 119, No. 30, pages 7019-7029.

The variety of pigments that may be used in the present invention makes it possible to obtain a wide range of colors, and also particular optical effects such as metallic effects or interference effects.

The size of the pigment used in the cosmetic composition according to the present invention is generally between 10 nm and 200 μm, preferably between 20 nm and 80 μm and even more preferably between 30 nm and 50 μm.

The pigments may be dispersed in the product by means of a dispersant.

The dispersant serves to protect the dispersed particles against agglomeration or flocculation. This dispersant may be a surfactant, an oligomer, a polymer or a mixture of several thereof, bearing one or more functionalities with strong affinity for the surface of the particles to be dispersed. In particular, they may become physically or chemically attached to the surface of the pigments. These dispersants also contain at least one functional group that is compatible with or soluble in the continuous medium. In particular, 12-hydroxystearic acid esters and C8 to C20 fatty acid esters of polyols such as glycerol or diglycerol are used, such as poly(12-hydroxystearic acid) stearate with a molecular weight of about 750 g/mol, such as the product

sold under the name Solsperse 21 000 by the company Avecia, polyglyceryl-2 dipolyhydroxystearate (CTFA name) sold under the reference Dehymyls PGPH by the company Henkel, or polyhydroxystearic acid such as the product sold under the reference Arlacel P100 by the company Uniqema, and mixtures thereof.

As other dispersants that may be used in the compositions of the invention, mention may be made of quaternary ammonium derivatives of polycondensed fatty acids, for instance Solsperse 17 000 sold by the company Avecia, and polydimethylsiloxane/oxypropylene mixtures such as those sold by the company Dow Corning under the references DC2-5185 and DC2-5225 C.

The pigments used in the cosmetic composition according to the invention may be surface-treated with an organic agent.

Thus, the pigments that have been surface-treated beforehand, which are useful in the context of the invention, are pigments that have totally or partially undergone a surface treatment of chemical, electronic, electrochemical, mechanochemical or mechanical nature, with an organic agent such as those described especially in Cosmetics and Toiletries, February 1990, Vol. 105, pages 53-64, before being dispersed in the composition in accordance with the invention. These organic agents can, for example, be chosen from waxes, for example carnauba wax and beeswax; fatty acids, fatty alcohols and their derivatives, such as stearic acid, hydroxystearic acid, stearyl alcohol, hydroxystearyl alcohol, lauric acid and their derivatives; anionic surfactants; lecithins; sodium, potassium, magnesium, iron, titanium, zinc or aluminum salts of fatty acids, for example aluminum stearate or laurate; metal alkoxides; polyethylene; (meth)acrylic polymers, for example polymethyl methacrylates; polymers and copolymers comprising acrylate units; alkanolamines; silicone compounds, for example silicones or polydimethylsiloxanes; fluorinated organic compounds, for example perfluoroalkyl ethers; or fluorosilicone compounds.

The surface-treated pigments that are useful in the cosmetic composition according to the invention may also have been treated with a mixture of these compounds and/or may have undergone several surface treatments.

The surface-treated pigments that are useful in the context of the present invention may be prepared according to surface-treatment techniques that are well known to those skilled in the art, or may be commercially available in the required form.

Preferably, the surface-treated pigments are coated with an organic layer.

The organic agent with which the pigments are treated may be deposited on the pigments by evaporation of solvent, chemical reaction between the molecules of the surface agent or creation of a covalent bond between the surface agent and the pigments.

The surface treatment may thus be performed, for example, by chemical reaction of a surface agent with the surface of the pigments and creation of a covalent bond between the surface agent and the pigments or the fillers. This method is especially described in patent US 4 578 266.

An organic agent covalently bonded to the pigments will preferably be used.

The agent for the surface treatment may represent from 0.1% to 50% by weight, preferably from 0.5% to 30% by weight and even more preferentially from 1% to 10% by weight relative to the total weight of the surface-treated pigment.

Preferably, the surface treatments of the pigments are chosen from the following treatments:

- a PEG-silicone treatment, for instance the AQ surface treatment sold by LCW;
- a methicone treatment, for instance the SI surface treatment sold by LCW;
- a dimethicone treatment, for instance the Covasil 3.05 surface treatment sold by LCW;
- a dimethicone/trimethyl siloxysilicate treatment, for instance the Covasil 4.05 surface treatment sold by LCW;
- a magnesium myristate treatment, for instance the MM surface treatment sold by LCW;
- an aluminum dimyristate treatment, such as the MI surface treatment sold by Miyoshi;
- a perfluoropolymethylisopropyl ether treatment, for instance the FHC surface treatment sold by LCW;
- an isostearyl sebacate treatment, for instance the HS surface treatment sold by Miyoshi;
- a perfluoroalkyl phosphate treatment, for instance the PF surface treatment sold by Daito;

- an acrylate/dimethicone copolymer and perfluoroalkyl phosphate treatment, for instance the FSA surface treatment sold by Daito;

- a polymethylhydrogenosiloxane/perfluoroalkyl phosphate treatment, for instance the FS01 surface treatment sold by Daito;

- an acrylate/dimethicone copolymer treatment, for instance the ASC surface treatment sold by Daito;

- an isopropyl titanium triisostearate treatment, for instance the ITT surface treatment sold by Daito;

- an acrylate copolymer treatment, for instance the APD surface treatment sold by Daito;

- a perfluoroalkyl phosphate/isopropyl titanium triisostearate treatment, for instance the PF + ITT surface treatment sold by Daito.

Preferably, the pigment is chosen from mineral or mixed mineral-organic pigments.

The amount of pigment(s) may range from 0.01% to 30% by weight, more particularly from 0.05% to 20% by weight, preferably from 0.1% to 15% by weight and preferably from 1% to 10% by weight relative to the total weight of the composition.

The composition of the invention may contain colored or coloring species other than the pigments according to the invention, such as direct dyes or dye precursors.

Aminated silicone

The composition also comprises at least one amino silicone.

The silicones may be solid or liquid at 25°C and atmospheric pressure (1.013×10^5 Pa), and volatile or nonvolatile.

The silicones that may be used may be soluble or insoluble in the composition according to the invention; they may be in the form of oil, wax, resin or gum; silicone oils are preferred.

Silicones are especially described in detail in Walter Noll's *Chemistry and Technology of Silicones* (1968), Academic Press.

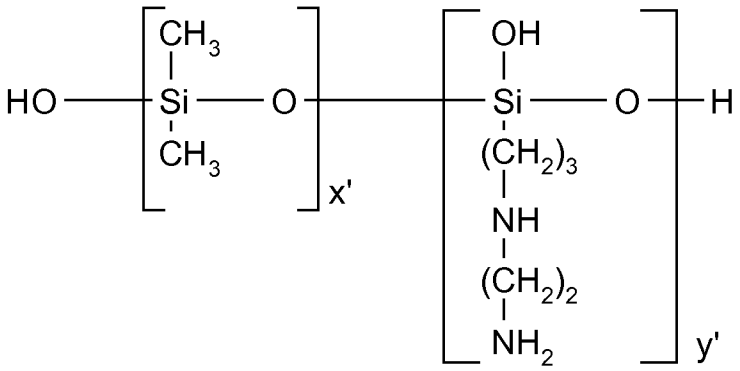
Preferably, the composition contains one or more silicones that are liquid at 25°C and atmospheric pressure (1.013×10^5 Pa).

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

The weight-average molecular masses of these amino silicones may be measured by gel permeation chromatography (GPC) at room 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 μl 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 are chosen from:

a) the polysiloxanes corresponding to formula (A):



(A)

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

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

$$R'_aG_{3-a}\text{-}Si(OSiG_2)_n\text{-}(OSiG_bR'_{2-b})_m\text{-}O\text{-}SiG_{3-a}\text{-}R'_a \qquad (B)$$

in which:

- G, which may be identical or different, denotes a hydrogen atom or a phenyl, OH or C_1-C_8 alkyl, for example methyl, or C_1-C_8 alkoxy, for example methoxy, group,

- a, which may be identical or different, denotes 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;

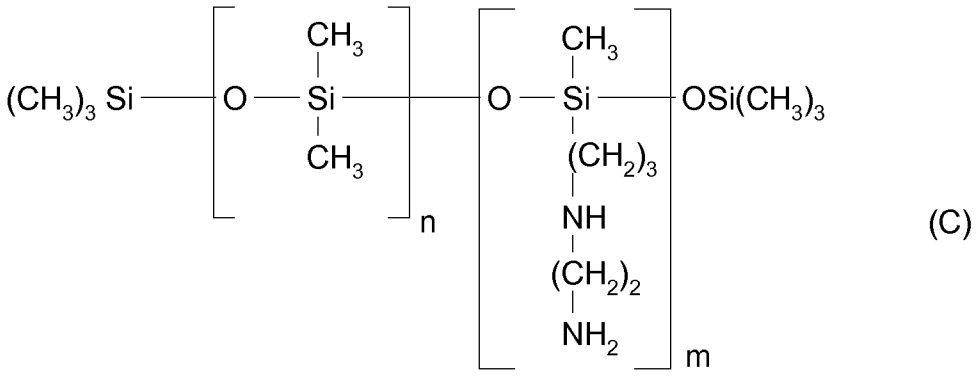
- R', which may be identical or different, denotes a monovalent radical of formula $-C_qH_{2q}L$ in which q is a number ranging from 2 to 8 and L is an optionally quaternized amino group chosen from the following groups:

$-N(R")_2$; $-N^+(R")_3$ 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.

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

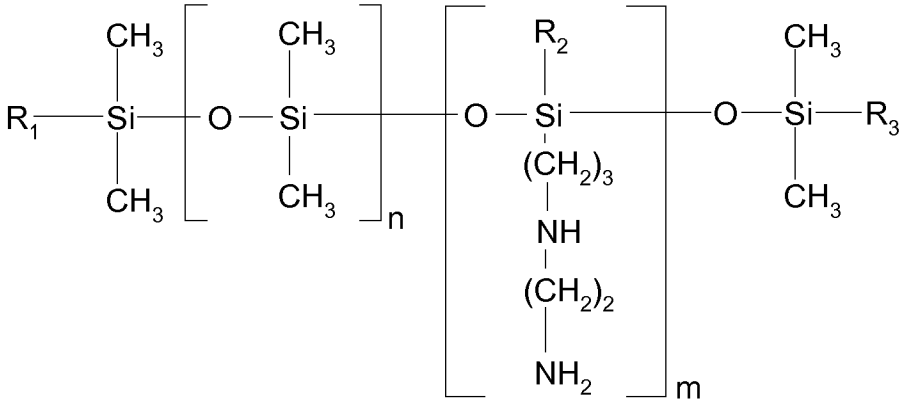
According to a first embodiment, the amino silicones corresponding to formula (B) are chosen from the silicones known as "trimethylsilyl amodimethicone" corresponding to formula (C):



(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:



(D)

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;

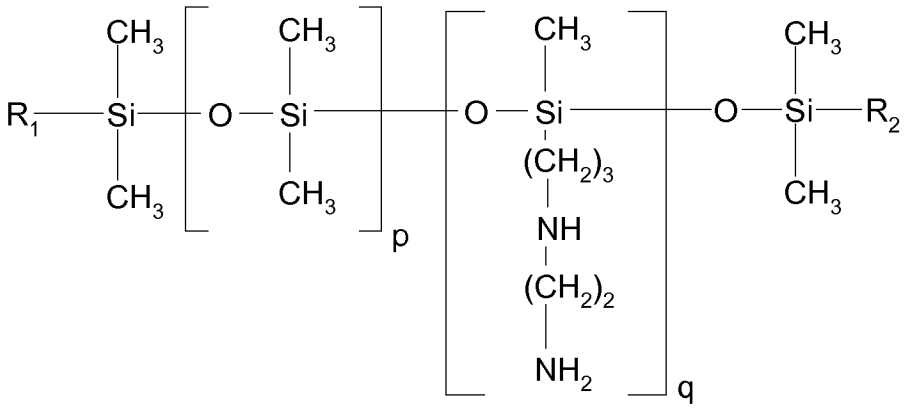
- R1, R2 and R3, which may be identical or different, represent a hydroxyl or C1-C4 alkoxy radical, at least one of the radicals R1 to R3 denoting an alkoxy radical.

Preferably, the alkoxy radical is a methoxy radical.

The hydroxyl/alkoxy mole ratio preferably ranges 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 mass (Mw) of these silicones preferably ranges from 2000 to 1 000 000 and more particularly from 3500 to 200 000.

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



(E)

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.

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.

The weight-average molecular mass (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.

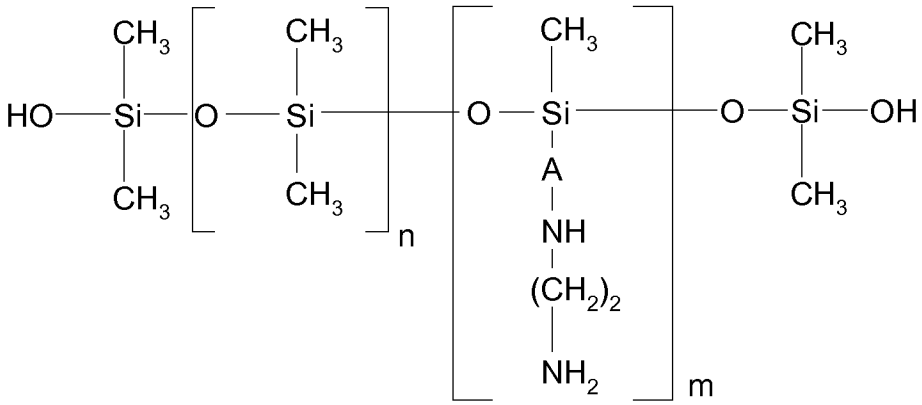
The commercial products comprising silicones of structure (D) or (E) may include in their composition one or more other amino silicones of which the structure is different from formula (D) or (E).

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 nonionic. 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:



(F)

in which:

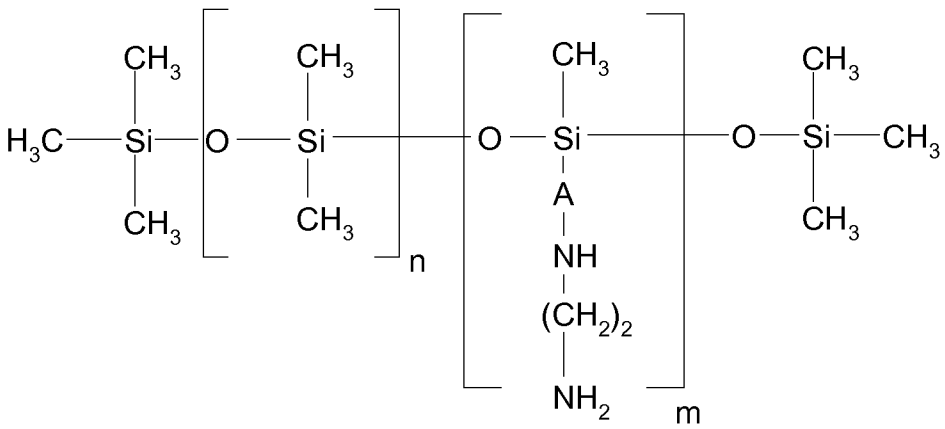
- m and n are numbers such that the sum (n + m) ranges from 1 to 2000 and in particular from 50 to 150, it being possible for n to denote a number from 0 to 1999 and in particular from 49 to 149, and for m to denote a number from 1 to 2000 and in particular from 1 to 10;

- 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 mass (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 formula (B) are chosen from the silicones of formula (G) below:



(G)

in which:

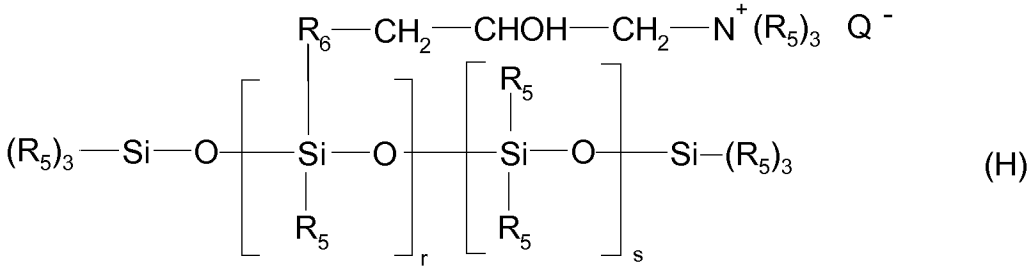
- m and n are numbers such that the sum (n + m) ranges from 1 to 2000 and in particular from 50 to 150, it being possible for n to denote a number from 0 to 1999 and in particular from 49 to 149, and for m to denote a number from 1 to 2000 and in particular from 1 to 10;

- 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 mass (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):



(H)

in which:

- R_5 represents a monovalent hydrocarbon-based radical containing from 1 to 18 carbon atoms, and in particular a C_1-C_{18} alkyl or C_2-C_{18} alkenyl, for example methyl, radical;

- R_6 represents a divalent hydrocarbon-based radical, in particular a C_1-C_{18} alkylene radical or a divalent C_1-C_{18}, for example C_1-C_8, alkyleneoxy radical linked to the Si via an SiC bond;

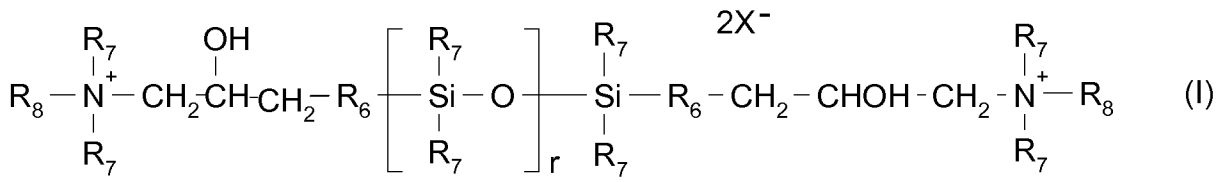
- Q- is an anion such as a halide, especially chloride, ion or an organic acid salt, especially acetate;

- r represents a mean statistical value ranging from 2 to 20 and in particular from 2 to 8;

- s represents a mean statistical value ranging 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 quaternary ammonium silicones of formula (I):



(I)

in which:

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

- R_6 represents a divalent hydrocarbon-based radical, in particular a C_1-C_{18} alkylene radical or a divalent C_1-C_{18}, for example C_1-C_8, alkyleneoxy radical linked to the Si via an SiC bond;

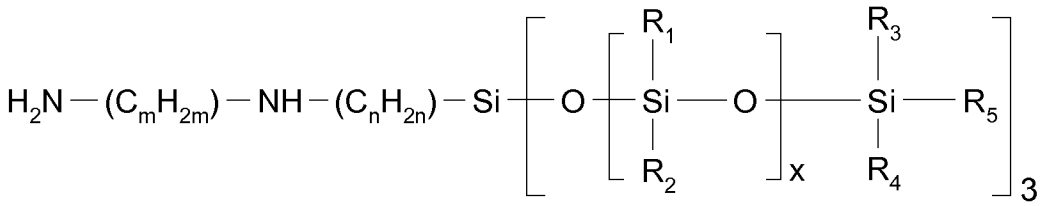
- R_8, which may be identical or different, represent a hydrogen atom, a monovalent hydrocarbon-based radical containing from 1 to 18 carbon atoms, and in particular a C_1-C_{18} alkyl radical, a C_2-C_{18} alkenyl radical or a radical -R_6-NHCOR_7;

- X- is an anion such as a halide, especially chloride, ion or an organic acid salt, especially 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.

e) the amino silicones of formula (J):



(J)

in which:

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

- R_5 denotes a C_1-C_4 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 multiblock polyoxyalkylenated amino silicones, of the type (AB)n, A being a polysiloxane block and B being a polyoxyalkylenated block comprising at least one amine

group.

Said silicones are preferably constituted of repeating units of the following general formulae:

$[-(SiMe_2O)_xSiMe_2$ - R -N(R")- R'-$O(C_2H_4O)_a(C_3H_6O)_b$ -R'-N(H)-R-]

or alternatively

$[-(SiMe_2O)_xSiMe_2$ - R -N(R")- R' - $O(C_2H_4O)_a(C_3H_6O)_b$ -]

in which:

- a is an integer greater than or equal to 1, preferably ranging from 5 to 200 and more particularly ranging from 10 to 100;

- b is an integer between 0 and 200, preferably ranging from 4 to 100 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" is a hydrogen atom or a methyl;

- R, which may be identical or different, represent a divalent linear or branched C_2-C_{12} hydrocarbon-based radical, optionally including 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 $-CH_2CH_2CH_2OCH_2CH(OH)CH_2-$ radical; preferentially R denotes a $-CH_2CH_2CH_2OCH_2CH(OH)CH_2-$ radical;

- R', which may be identical or different, represent a linear or branched C_2-C_{12} 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 $-CH_2CH_2CH_2OCH_2CH(OH)CH_2-$ radical; preferentially, R' denotes $-CH(CH_3)-CH_2-$.

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%.

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 mass (Mw) of the silicone is preferably between 5000 and 1 000 000 and more particularly between 10 000 and 200 000.

Mention may be made especially of the silicones sold under the names Silsoft A-843 or Silsoft A+ by Momentive.

g) and mixtures thereof.

Preferably, the amino silicone(s) have the INCI name amodimethicone.

Preferably, the amino silicone(s) are present in a total amount of at least 0.1% by weight relative to the total weight of the composition, more preferably at least 0.15%, more preferentially at least 0.3%, more preferably at least 0.5%, better still at least 0.75% and even better still 1% by weight relative to the total weight of the composition.

Preferably, the amino silicone(s) are present in a total amount ranging from 0.1% to 15% by weight relative to the total weight of the composition, more preferably from 0.15% to 10%, more preferentially from 0.3% to 7% by weight, even more preferably from 0.5% to 5% by weight, better still from 0.75% to 4% by weight and even better still from 1% to 3% by weight relative to the total weight of the composition.

Preferably, the weight ratio of the total amount of copolymer(s) of crotonic acid or crotonic acid derivative according to the invention to the total amount of amino silicone(s) ranges from 0.1 to 30, more preferentially from 0.5 to 25 and better still from 1 to 20.

Thickener

According to a preferred embodiment, the composition according to the invention comprises at least one thickener, preferably chosen from natural polymers, carboxyvinyl polymers such as homopolymers or copolymers of acrylic and/or methacrylic acid and/or ester, which are preferably crosslinked, crosslinked thickening polyacrylamides and associative polymers comprising at least one hydrophilic unit and at least one fatty chain.

According to the present invention, the term "thickener" refers to a compound which, by its presence at a concentration of 0.05% by weight, increase the viscosity of a composition into which it is introduced by at least 20 cps, preferably by at least 50 cps, at room temperature (25°C), at atmospheric pressure and at a shear rate of 1 s^{-1} (the viscosity may be measured using a cone/plate viscometer, a Haake R600 rheometer or the like).

The thickeners may be chosen especially from carboxyvinyl polymers such as crosslinked acrylic acid homopolymers (carbomer) such as those sold under the name Carbopol by the company Goodrich, polyacrylates and polymethacrylates such as the products sold under the names Lubrajel or Norgel by the company Guardian or under the name Hispagel by the company Hispano Chimica; polyacrylamides such as the product sold under the name Sepigel 305 by the company SEPPIC; polysaccharides such as alginates, cellulose and derivatives thereof, especially carboxymethylcellulose, hydroxymethylcellulose, hydroxypropylcellulose and microcrystalline cellulose; natural gums such as xanthan gum, guar gum, locust bean gum, acacia gum, scleroglucans, chitin and chitosan derivatives, carrageenans; or clays such as montmorillonite, bentones and magnesium aluminum silicates (Veegum).

According to a particular embodiment of the invention, the composition comprises at least one thickener chosen from crosslinked acrylic and/or methacrylic acid polymers.

According to a particular embodiment of the invention, the composition comprises at least one thickener chosen from crosslinked acrylic acid homopolymers.

The thickener may be present in the composition in a total content ranging from 0.01% to 10% by weight relative to the weight of the composition, preferably from 0.1% to 5% by weight relative to the weight of the composition, preferably from 0.4% to 2% by weight relative to the weight of the composition.

The composition according to the invention advantageously comprises water, which may preferably be present in a content ranging from 20% to 98% by weight relative to the weight of the composition.

The composition according to the invention may also comprise one or more fatty substances, preferably chosen from silicones and non-silicone fatty substances that are liquid at 30°C and at atmospheric pressure, better still from silicones and triglyceride oils of plant origin.

When the composition comprises one or more fatty substances, the total content of fatty substances may range from 0.01% to 20% by weight, preferably from 0.05% to 15% by weight and better still from 0.1% to 10% by weight relative to the total weight of the composition.

Additives

The compositions may also comprise at least one agent commonly used in cosmetics, for example chosen from reducing agents, organic solvents, softeners, antifoams, moisturizers, UV-screening agents, peptizers, solubilizers, fragrances, anionic, cationic, nonionic or amphoteric surfactants, proteins and vitamins.

The above additives are generally present in an amount for each of them of between 0.01% and 20% by weight relative to the weight of the composition.

Of course, a person skilled in the art will take care to choose this or these optional additive(s) so that the advantageous properties intrinsically attached to the formation of the sheathing in accordance with the invention are not, or not substantially, detrimentally affected.

Presentation form

The composition according to the invention may especially be in the form of a suspension, a dispersion, a gel, an emulsion, especially an oil-in-water (O/W) or water-in-oil (W/O) emulsion, or a multiple emulsion (W/O/W or polyol/O/W or O/W/O), in the form of a cream, a mousse, a stick, a dispersion of vesicles, especially of ionic or nonionic lipids, or a two-phase or multi-phase lotion. Preferably, the composition is in the form of a gel.

A person skilled in the art may select the appropriate presentation form, and also the method for preparing it, on the basis of his general knowledge, taking into account first the nature of the constituents used, especially their solubility in the support, and secondly the application envisaged for the composition.

Organic solvents

The composition according to the invention may comprise one or more organic solvents.

Examples of organic solvents that may be mentioned include lower C_1-C_4 alkanols, such as ethanol and isopropanol; polyols and polyol ethers, for instance 2-butoxyethanol, propylene glycol, propylene glycol monomethyl ether and diethylene glycol monoethyl ether and monomethyl ether, and also aromatic alcohols, for instance benzyl alcohol or phenoxyethanol, and mixtures thereof.

Preferably, the composition according to the invention comprises one or more organic solvents.

When they are present, the organic solvents are present in proportions preferably inclusively between 0.1% and 40% by weight approximately relative to the total weight of the dye composition, more preferentially between 1% and 30% by weight approximately and even more particularly inclusively between 5% and 25% by weight relative to the total weight of the composition.

Process

The composition described above may be used on wet or dry keratin fibers, and also on any type of fair or dark, natural or dyed, permanent-waved, bleached or relaxed keratin fibers.

The application to the fibers may be performed via any standard means, in particular using a comb, a fine brush, a coarse brush or with the fingers.

After application of the composition, the fibers may be left to dry naturally or dried, for example at a temperature above or equal to 30°C. The drying, if it is performed, may be performed immediately after the application. Preferably, if the fibers are dried, they are dried, in addition to supplying heat, with a flow of air.

During drying, a mechanical action may be exerted on the locks, such as combing, brushing or running the fingers through. This operation may similarly be performed once the fibers have been dried, naturally or otherwise.

The drying step of the process of the invention may be performed with a hood, a hairdryer, a straightening iron, a Climazon, etc.

When the drying step is performed with a hood or a hairdryer, the drying temperature is between 30°C and 110°C and preferably between 50 and 90°C.

When the drying step is performed with a straightening iron, the drying temperature is between 110 and 220°C and preferably between 140 and 200°C.

EXAMPLES

Composition examples:

Example 1:

Compositions (g AM/100g)

	E **Invention**	**F** **Comparative**
VA/crotonates/vinyl neodecanoate copolymer	**10**	**10**

Carbomer	**0,75**	**0.75**
Amodimethicone	**10**	**-**
Synthetic mica and titanium dioxide and Red 7 calcium lake on barium sulfate substrate	**7**	**7**
Preserving agent, fragrance	**qs**	**qs**
Neutralizer	**qs**	**qs**
Ethanol	**7,5**	**7,5**
PEG-40 hydrogenated castor oil	**1**	**1**
Water	**Qs 100**	**Qs 100**

Protocol:

The compositions E and F are applied on the locks of Yak hair at a rate of 1g of composition applied per gram of locks of hair.

After application, the locks of hair are combed, dried with a hair-drier and then combed again.

Results: Suppleness, natural touch and individualization of the hair

In order to evaluate the suppleness and the individualization of the hair, the locks of hair are fixed at one extremity of the lock and are maintained horizontal at the other extremity of the lock. The non-fixed end of the lock is then released and the behaviour of the locks is observed:

The more the locks of the hair remains horizontal, the more the locks of hair will be rigid and agglomerated into packs (not individualized)

The more the locks of hair fall with a “curtain” effect (not agglomerated into packs), the more the locks of hair will be individualized, loose and suppleness.

A picture of the locks of hair has been taken 10 seconds after releasing the locks. The results obtained are disclosed herewith:

Comparative example F on the picture (see Fig. 1):

The lock stays horizontal. The lock of hair is agglomerated into packs, not individualized and with not good suppleness.

Moreover, the touch is rigid and not natural.

Composition of the invention E on the picture (see Fig.1):

The lock of hair falls with a "curtain" effect, the lock of hair is well individualized.

Moreover, the touch is suppleness and natural.

The lock of hair treated with composition E according to the invention has a more natural behaviour, the hairs are well individualized and have a good suppleness compared to the lock of hair treated with comparative composition F.

CLAIMS

1. The use of a composition comprising (i) one or more copolymers derived from the polymerization of at least one crotonic acid monomer or crotonic acid derivative and of at least one vinyl ester monomer, (ii) one or more pigments and (iii) at least one amino silicone for limiting transfer.

2. The use as claimed in claim 1, characterized in that said copolymer(s) are derived from the polymerization of at least one crotonic acid monomer.

3. The use as claimed in either of the preceding claims, characterized in that said at least one crotonic acid derivative is chosen from crotonic acid esters or amides.

4. The use as claimed in any one of the preceding claims, characterized in that said at least one crotonic acid derivative is chosen from the crotonic acid esters of formula $CH_3CH=CHCOOR'1$ with R'1 representing a linear, branched or cyclic, saturated or unsaturated, optionally aromatic (aryl, aralkyl or alkylaryl) carbon-based and especially hydrocarbon-based (alkyl) chain, containing 1 to 30 carbon atoms, optionally comprising one or more functions chosen from -OH, -OR' with R' C1-C6 alkyl (alkoxy), -CN, -X (halogen, especially Cl, F, Br or I) such as methyl crotonate and ethyl crotonate.

5. The use as claimed in any one of the preceding claims, characterized in that said at least one crotonic acid derivative is chosen from the crotonic acid amides of formula $CH_3CH=CHCONR'2R''2$ with R'2 and R”2, which may be identical or different, representing hydrogen or a linear, branched or cyclic, saturated or unsaturated, optionally aromatic, carbon-based and especially hydrocarbon-based (alkyl) chain, containing 1 to 30 carbon atoms, optionally comprising one or more functions chosen from -OH, -OR' with R' C1-C6 alkyl (alkoxy), -CN, -X (halogen, especially Cl, F, Br or I).

6. The use as claimed in claims 1 to 5, characterized in that said copolymer(s) are derived from the polymerization of at least one crotonic acid monomer or crotonic acid derivative and of at least two different vinyl ester monomers.

7. The use as claimed in claims 1 to 6, characterized in that said vinyl ester monomer(s) are chosen from vinyl acetate, vinyl propionate, vinyl butyrate (or butanoate), vinyl ethylhexanoate, vinyl neononanoate, vinyl neododecanoate, vinyl neodecanoate, vinyl pivalate, vinyl cyclohexanoate, vinyl benzoate, vinyl 4-tert-butylbenzoate and vinyl trifluoroacetate, preferably from vinyl acetate, vinyl propionate and vinyl neodecanoate, better still from vinyl acetate and vinyl neodecanoate.

8. The use as claimed in claims 1 to 7, characterized in that said copolymer(s) are chosen from copolymers derived from the polymerization of crotonic acid, vinyl acetate and vinyl propionate, copolymers derived from the polymerization of crotonic acid, vinyl acetate and vinyl neodecanoate, and mixtures thereof.

9. The use as claimed in claims 1 to 8, characterized in that the copolymer is a crotonic acid/vinyl acetate/vinyl neodecanoate terpolymer.

10. The use as claimed in claims 1 to 9, characterized in that said copolymer(s) also comprise other monomers such as allylic or methallylic esters or vinyl ethers.

11. The use as claimed in any one of the preceding claims, in which said crotonic acid copolymer derived from the polymerization of at least one crotonic acid monomer or crotonic acid derivative and of at least one vinyl ester monomer is present in an amount ranging from 0.05% to 15% by weight relative to the weight of the composition, preferably from 0.1% to 10%

by weight relative to the weight of the composition, preferably from 1% to 5% by weight relative to the total weight of the composition.

12. The use as claimed in any one of the preceding claims, in which said amino silicone has the INCI name amodimethicone.

13. The use as claimed in any one of the preceding claims, in which said amino silicones(s) are present in a total amount of at least 0.1% by weight relative to the total weight of the composition, preferably at least 0.15%, more preferentially at least 0.3%, more preferably at least 0.5%, better still at least 0.75% and even better still 1% by weight relative to the total weight of the composition.

14. The use as claimed in any one of the preceding claims, in which said amino silicone(s) are present in a total amount ranging from 0.1% to 15% by weight relative to the total weight of the composition, preferably from 0.15% to 10%, more preferentially from 0.3% to 7% by weight, more preferably from 0.5% to 5% by weight, better still from 0.75% to 4% by weight and even better still from 1% to 3% by weight relative to the total weight of the composition.

15. The use as claimed in any one of the preceding claims, in which the weight ratio of the total amount of copolymer(s) of crotonic acid or crotonic acid derivative to the total amount of amino silicone(s) ranges from 0.1 to 30, more preferentially from 0.5 to 25 and better still from 1 to 20.

16. The use as claimed in any one of the preceding claims, characterized in that said composition also comprises a thickener, preferably chosen from crosslinked polymers of acrylic and/or methacrylic acid, and is preferably a crosslinked acrylic acid homopolymer.

17. The use as claimed in any one of the preceding claims, characterized in that said composition also comprises a non-silicone fatty substance, preferably coconut oil.

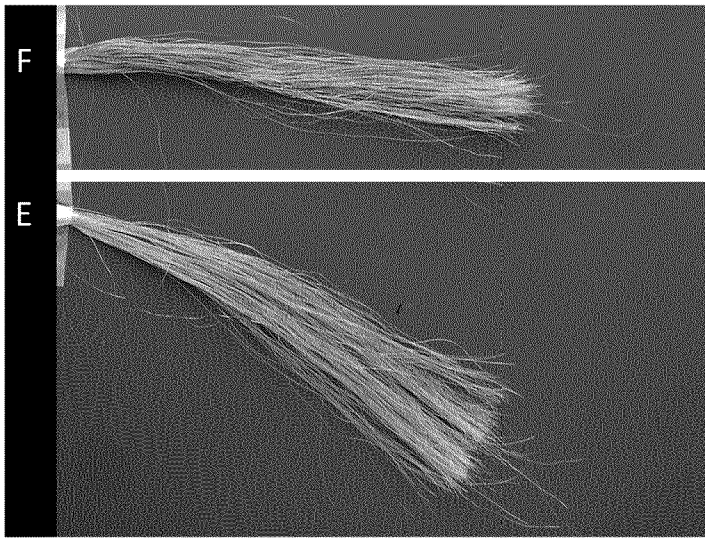


Fig. 1

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/061583

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61Q5/06 A61K8/81
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)
A61Q A61K

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2 750 601 A1 (OREAL [FR]) 9 January 1998 (1998-01-09) example 2 -----	1-17
Y	US 6 106 577 A (AUDOUSSET MARIE-PASCALE [FR] ET AL) 22 August 2000 (2000-08-22) examples 1-3, comp. ex claim 1 column 3, line 53 - column 4, line 12 column 3, line 7 - line 10 column 10, line 45 -----	1-17
A	FR 2 709 418 A1 (MITSUBISHI PENCIL CO [JP]) 10 March 1995 (1995-03-10) claims 1,6,9; example 3 -----	1-17
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 June 2018	06/07/2018

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/061583

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 159 486 A (TERREN NADIA [FR] ET AL) 12 December 2000 (2000-12-12) column 2, line 56 - line 64 column 4, line 30 - line 31; examples column 10, line 27 - line 30 column 11, line 13	1-17
A	US 2005/063933 A1 (VRIGNAUD SABINE [FR] ET AL) 24 March 2005 (2005-03-24) examples	1-17
Y	US 2016/136084 A1 (TEBOUL KAREN [FR]) 19 May 2016 (2016-05-19) paragraphs [0011], [0192]	1-17
X	US 2013/149358 A1 (COLACO ALLWYN [US] ET AL) 13 June 2013 (2013-06-13) paragraphs [0001], [0003] - [0005], [0026], [0060]; examples	1-17

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2018/061583

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2750601 A1	09-01-1998	NONE	
US 6106577 A	22-08-2000	CA 2211797 A1	29-05-1997
		EP 0808150 A1	26-11-1997
		FR 2741530 A1	30-05-1997
		JP 3040176 B2	08-05-2000
		JP H10502945 A	17-03-1998
		US 6106577 A	22-08-2000
		WO 9718795 A1	29-05-1997
FR 2709418 A1	10-03-1995	FR 2709418 A1	10-03-1995
		JP H0769849 A	14-03-1995
US 6159486 A	12-12-2000	AT 185968 T	15-11-1999
		CA 2224950 A1	24-07-1998
		CN 1199608 A	25-11-1998
		DE 69800031 D1	02-12-1999
		DE 69800031 T2	20-07-2000
		EP 0856309 A1	05-08-1998
		ES 2140987 T3	01-03-2000
		FR 2758719 A1	31-07-1998
		JP 3037251 B2	24-04-2000
		JP H10203919 A	04-08-1998
		US 5955003 A	21-09-1999
		US 6159486 A	12-12-2000
US 2005063933 A1	24-03-2005	NONE	
US 2016136084 A1	19-05-2016	BR 112015029960 A2	25-07-2017
		CN 105283168 A	27-01-2016
		EP 3010480 A1	27-04-2016
		FR 3007287 A1	26-12-2014
		KR 20160021871 A	26-02-2016
		US 2016136084 A1	19-05-2016
		WO 2014202658 A1	24-12-2014
US 2013149358 A1	13-06-2013	AR 089049 A1	23-07-2014
		BR 112014012857 A2	13-06-2017
		CA 2854801 A1	13-06-2013
		CN 103987375 A	13-08-2014
		EP 2787963 A2	15-10-2014
		MX 349745 B	10-08-2017
		TW 201323009 A	16-06-2013
		US 2013149358 A1	13-06-2013
		US 2014044762 A1	13-02-2014
		WO 2013085577 A2	13-06-2013