Title: COSMETIC COMPOSITION COMPRISING PUMICE PARTICLES

Abstract: The invention relates to an anhydrous cosmetic composition comprising -more than 10% by weight, relative to the total weight of the composition, of pumice particles with a mean volume diameter of between 100 and 500 μm, -one or more organic compounds chosen from a) fatty substances, b) water-soluble organic solvents, and a mixture thereof, and -one or more surfactants, and also to a process for treating keratin fibres using the said composition, to kits containing it and to the use thereof.
COSMETIC COMPOSITION COMPRISING PUMICE PARTICLES

The present invention relates to a cosmetic composition comprising, inter alia, pumice, to a process for treating keratin fibres using the said composition, to kits containing it and to the use thereof.

Keratin fibres may suffer attack of diverse origins, for instance mechanical attack, such as disentangling or brushing, or chemical attack, such as dyeing, bleaching or permanent-waving processes. Such attack modifies the mechanical, morphological and physicochemical properties of the surface of keratin fibres. Specifically, the cuticle, the outer layer of the hair, which has a scale structure, is the part most easily affected by attack. In the course of such attack, the scales are raised and the edges of the scales, which are normally regular, become indented. Now, the cosmetic effects provided by a haircare treatment are dependent on the surface properties of the fibre. In the course of a haircare treatment, for example, degradation of the surface properties of the cuticle will lead to heterogeneous deposition of the care active agents contained in hair conditioners. Furthermore, these modifications of the surface morphology of the scales have an impact on the sensory properties, leading to a less smooth feel of the fibre and to more difficult disentangling.

A means has been sought for many years for depositing or effecting the penetration of care active agents uniformly onto and into the fibre and for making these deposits remanent with respect to washing several times, such as shampooing.

It is known practice to care for damaged hair by applying thereto a care product comprising, for example, specific polymers such as silicones or polymers with cationic charges. However, the improvement of the surface of the hair thus treated is only temporary, since, once the care product has been removed, for example after one or more washes, the hair regains its original state.
Document WO 2009/156 668 also discloses a process comprising a step of abrasion of the hair using solid particles and a step of applying a cosmetic product. However, this process does not give satisfactory results and remains to be improved.

There is a real need for compositions that enable long-lasting treatment of keratin fibres, such as human keratin fibres, and especially the hair, in particular hair that is damaged at the surface.

The invention is directed, inter alia, towards satisfying this need, and it achieves it by means of an anhydrous composition for treating keratin fibres, such as human keratin fibres and especially the hair, comprising at least specific pumice particles and particular compounds.

A first subject of the invention is thus an anhydrous cosmetic composition comprising:

- more than 10% by weight, relative to the total weight of the composition, of pumice particles with a mean volume diameter of between 100 and 500 µη,
- one or more organic compounds chosen from a) fatty substances, b) water-soluble organic solvents, and a mixture thereof, and
- one or more surfactants.

A second subject of the invention is a process for treating keratin fibres, such as human keratin fibres and especially the hair, comprising at least one step consisting in placing the hair in contact with a composition as defined above.

Finally, the invention relates to kits and to a use of the said composition.

As emerges from the examples hereinbelow, the treatment of keratin fibres, and especially the hair, with a composition in accordance with the invention or the process according to the invention makes it possible to care for the keratin fibre homogeneously without impairing it, by unifying the deposition of the treating agents. Excellent smoothing of keratin fibres and controlled
volume of the hairstyle are thus obtained. The hair has greater texture and body. The composition according to the invention and the process give fine hair mass and volume control. These effects are all the more noteworthy when the keratin fibres, especially the hair, are sensitized.

Furthermore, it turns out that the composition according to the invention shows very good working qualities, i.e. it is easy to apply and to rinse out. Finally, after rinsing, it leaves the keratin fibres, especially such as the hair, feeling very soft.

These effects are long-lasting and especially withstand shampoo washing several times.

The process may also advantageously be used for smoothing keratin fibres especially such as the hair.

The invention may also make it possible to prepare the hair for a hair post-treatment such as the application of a conditioner, a dye, a permanent-waving product, a hair-relaxing product, a bleaching product or the like.

The hair treatment that is performed using the invention may be more or less pronounced, as a function of the initial state of the hair and/or of the desired result. This treatment may especially have the effect of including a removal of heterogeneities present at the surface of the hair, especially via an action that may be termed abrasive, and, as a result, homogenizing the outer surface of the hair.

This type of abrasion may be relatively mild and/or short-lasting, so as to avoid damaging the hair, for example during subsequent treatment or mechanical stresses such as styling.

By virtue of the invention, the hair may be visibly smoother and the effect of the treatment is long-lasting.

Without wishing to be bound by any theory, it may be thought that, by virtue of the invention, the hair may be freed of any deposits present on its surface before the abrasion, and the edges of the scales of the cuticle may be made more regular.
Furthermore, after treatment, products intended for reinforcing certain properties of the hair or for modifying its appearance can penetrate more easily and deeply into the hair thus treated.

For the purposes of the invention, the term "anhydrous composition" means a composition whose water content is less than 1% and preferably less than 0.5% by weight relative to the total weight of the total composition. More particularly, the composition does not comprise any water. It should be noted that when water is present in the composition, it is more particularly "bound water", such as water of crystallization in salts, or traces of water absorbed by the starting materials used in the preparation of the compositions according to the invention.

In the text hereinbelow, unless otherwise indicated, the limits of a range of values are included in that range, especially in the expressions "between" and "ranging from".

Other subjects, features, aspects and advantages of the invention will emerge more clearly from reading the description and examples which follow.

**Pumice particles**

The composition according to the invention comprises more than 10% by weight, relative to the total weight of the composition, of pumice particles with a mean volume diameter of between 100 and 500 µm.

Pumice is of volcanic origin. It is formed at temperatures from about 500 to 600°C from lava projected into the air, which cools on falling, and whose degassing leads to the formation of bubbles, leading to a low density and high porosity.

Pumice is formed from fragments of rhyolite, dacite or andesite. It is considered as a glass since it does not have a crystalline structure.

Pumice particles are abrasive solid particles. In particular, they may have a hardness of greater than or equal to that of the hair,
especially ranging from 3 to 10 Moh, or even greater than or equal to 4, for example greater than or equal to 5, in particular ranging from 5 to 5.5 on the Moh scale.

The pumice particles have a lower mean volume diameter of between 100 and 500 µm and preferably between 105 and 300 µm.

According to the range of particles used, the mean volume diameter may be determined by using screens or by laser granulometry.

It may especially be a pumice powder sold under the name Ponce 0 ½ D by the company Eyraud, with a mean diameter D [4.3] (mean volume diameter) of about 140 µm measured by laser scattering.

It may also be a decontaminated pumice powder sold under the reference 0-D Ponce by the company Eyraud, with a mean volume diameter of less than 125 µm, or alternatively a pumice powder sold under the reference 2B D by the company Eyraud, with a mean volume diameter ranging from 100 to 500 µm.

The composition according to the invention preferably comprises pumice particles in a content ranging from 12% to 35% by weight, especially from 12% to 30% by weight and in particular from 12% to 25% by weight relative to the total weight of the composition.

**Organic compounds**

**Fatty substances**

The composition according to the invention comprises one or more organic compounds chosen from a) fatty substances, b) water-soluble organic solvents, and a mixture thereof.

The term "fatty substance" means an organic compound that is insoluble in water at ordinary temperature (25°C) and at atmospheric pressure (760 mm Hg; i.e. 1.013 × 10⁵ Pa), with a weight solubility of less than 4%, preferably 1% and even more preferentially 0.1%. They have in their structure at least one hydrocarbon-based chain containing at least 6 carbon atoms or a sequence of at least two siloxane groups. In addition, the fatty substances are soluble in organic solvents under
the same temperature and pressure conditions, for instance chloroform, ethanol or benzene.

The fatty substances of the invention are not oxyalkylenated.

Preferably, the fatty substances of the invention are chosen from hydrocarbons, fatty alcohols, fatty esters, silicones, non-neutralized fatty acids and fatty ethers, or mixtures thereof.

The fatty substances of the invention may be liquid or non-liquid at room temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013x10^5 Pa).

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

The term "liquid hydrocarbon" means a hydrocarbon which is composed solely of atoms of carbon and of hydrogen and which is liquid at standard temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013x10^5 Pa).

More particularly, the liquid hydrocarbons are chosen from:

- linear or branched, optionally cyclic, C₆-C₁₀ lower alkanes.

Examples that may be mentioned include hexane, undecane, dodecane, tridecane, and isoparaffins, for instance isohexadecane, isododecane and isodecane,

- linear or branched hydrocarbons of mineral, animal or synthetic origin with more than 16 carbon atoms, such as volatile or non-volatile liquid paraffins and derivatives thereof, petroleum jelly, liquid petroleum jelly, polydecenes, hydrogenated polyisobutene such as Parleam®, and squalane.

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

The term "liquid fatty alcohol" means a non-glycerolated and non-alkoxyalted fatty alcohol which is liquid at standard temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013x10^5 Pa).
Preferably, the liquid fatty alcohols of the invention comprise from 8 to 30 carbon atoms. The liquid fatty alcohols of the invention may be saturated or unsaturated.

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

More particularly, the liquid saturated fatty alcohols of the invention are chosen from octylidodecanol, isostearyl alcohol and 2-hexyldecanol. Octylidodecanol is most particularly preferred.

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

These unsaturated fatty alcohols may be linear or branched.

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

More particularly, the liquid unsaturated fatty alcohols of the invention are chosen from oleyl alcohol, linoleyl alcohol, linolenyl alcohol and undecylenyl alcohol. Oleyl alcohol is most particularly preferred.

The term "liquid fatty ester" means an ester that is derived from a fatty acid and/or from a fatty alcohol and that is liquid at ordinary temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013x10^5 Pa).

The esters are preferably liquid esters of saturated or unsaturated, linear or branched C_{1-26} aliphatic mono- or polyacids and of saturated or unsaturated, linear or branched C_{1-26} aliphatic mono- or polyalcohols, the total carbon number of the esters being greater than or equal to 10.

Preferably, for the esters of monoalcohols, at least one from among the alcohol and the acid from which the esters of the invention are derived is branched.
Among the monoesters of monoacids and of monoalcohols, mention may be made of ethyl palmitate, isopropyl palmitate, alkyl myristates such as isopropyl myristate or ethyl myristate, isocetyl stearate, ethylhexyl isononanoate, isodecyl neopentanoate and isostearyl neopentanoate.

Esters of C4-C22 dicarboxylic or tricarboxylic acids and of C1-C22 alcohols and esters of mono-, di- or tricarboxylic acids and of non-sugar C4-C26 di-, tri-, tetra- or pentahydroxy alcohols may also be used.

Mention may be made especially of: diethyl sebacate; diisopropyl sebacate; bis(2-ethylhexyl) sebacate; diisopropyl adipate; di-n-propyl adipate; dioctyl adipate; bis(2-ethylhexyl) adipate; disostearyl adipate; bis(2-ethylhexyl) maleate; triisopropyl citrate; triisocetyl citrate; triisostearyl citrate; glycercyl trilactate; glycercyl trioctanoate; trioctyldodecyl citrate; trioctyl citrate; neopentyl glycol diheptanoate; diethylene glycol diisononanoate.

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

Examples of suitable sugars that may be mentioned include sucrose (or saccharose), glucose, galactose, ribose, fucose, maltose, fructose, mannose, arabinose, xylose and lactose, and derivatives thereof, especially alkyl derivatives, such as methyl derivatives, for instance methylglucose.

The sugar esters of fatty acids may be chosen especially from the group comprising the esters or mixtures of esters of sugars described previously and of linear or branched, saturated or unsaturated C6-C30 and preferably C12-C22 fatty acids. If they are
unsaturated, these compounds may have one to three conjugated or non-conjugated carbon-carbon double bonds.

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

These esters may be chosen, for example, from oleates, laurates, palmitates, myristates, behenates, cocoates, stearates, linoleates, linolenates, caprates and arachidonates, or mixtures thereof such as, especially, oleopalmitate, oleostearate and palmitostearate mixed esters.

It is more particularly preferred to use monoesters and diesters and especially sucrose, glucose or methylglucose mono- or diolates, stearates, behenates, oleopalmitates, linoleates, linolenates and oleostearates.

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

Finally, natural or synthetic esters of mono-, di- or triacids with glycerol may also be used.

Among these, mention may be made of plant oils.

Oils of plant origin or synthetic triglycerides that may be used in the composition of the invention as liquid fatty esters include, for example, triglyceride oils of plant or synthetic origin, such as the liquid triglycerides of fatty acids containing from 6 to 30 carbon atoms, for instance the triglycerides of heptanoic or octanoic acids, or else, for example, sunflower oil, corn oil, soybean oil, marrow oil, grapeseed oil, sesame oil, hazelnut oil, apricot oil, macadamia oil, arara oil, castor oil, avocado oil, caprylic/capric acid triglycerides, such as those sold by the company Stearineries Dubois or those sold under the names Miglyol® 810, 812 and 818 by the company Dynamit Nobel, jojoba oil and shea butter oil.

Liquid fatty esters derived from monoalcohols will preferably be used as esters according to the invention. Isopropyl myristate and isopropyl palmitate are particularly preferred.
The term "liquid silicone" means an organopolysiloxane that is liquid at ordinary temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013x10^5 Pa).

Preferably, the silicone is chosen from liquid polydialkylsiloxanes, especially liquid polydimethylsiloxanes (PDMS) and liquid polyorganosiloxanes comprising at least one aryl group.

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

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

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

(i) cyclic polydialkylsiloxanes containing from 3 to 7 and preferably from 4 to 5 silicon atoms. These are, for example, octamethylcyclotetrasiloxane sold in particular under the name Volatile Silicone® 7207 by Union Carbide or Silbione® 70045 V2 by Rhodia, decamethylcyclopentasiloxane sold under the name Volatile Silicone® 7158 by Union Carbide, Silbione® 70045 V5 by Rhodia, and dodecamethylcyclopentasiloxane sold under the name Silsoft 1217 by Momentive Performance Materials, and mixtures thereof.

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

\[
\begin{align*}
&\text{CH}_3 \quad \underbrace{\text{D}'' \text{D}' \text{D}'' \text{D}''} \\
&\text{CH}_3 \quad \text{Si} \quad \text{O} \quad \text{C}_8 \text{H}_{17}
\end{align*}
\]

with D'' : 

\[
\begin{align*}
&\text{CH}_3 \\
&\text{Si} \quad \text{O} \quad \text{C}_8 \text{H}_{17}
\end{align*}
\]

with D' : 

\[
\begin{align*}
&\text{Si} \quad \text{O} \quad \text{C}_8 \text{H}_{17}
\end{align*}
\]
Mention may also be made of mixtures of cyclic polydialkylsiloxanes with organosilicon compounds, such as the mixture of octamethylcyclooctasiloxane and tetratrimethylsilylpentaerythritol (50/50) and the mixture of octamethylcyclotetrasiloxane and oxy-1,1'-bis(2,2',2',3,3'-hexatrimethylsilyloxy)neopentane;

(ii) linear volatile polydialkylsiloxanes containing 2 to 9 silicon atoms and having a viscosity of less than or equal to $5 \times 10^{-6}$ m$^2$/s at 25°C. An example is decamethyltetrasiloxane sold in particular under the name SH 200 by the company Toray Silicone. Silicones belonging to this category are also described in the article published in Cosmetics and Toiletries, Vol. 91, Jan. 76, pp. 27-32, Todd & Byers "Volatile Silicone Fluids for Cosmetics". The viscosity of the silicones is measured at 25°C according to ASTM standard 445 Appendix C.

Non-volatile polydialkylsiloxanes may also be used.

These silicones are more particularly chosen from polydialkylsiloxanes, among which mention may be made mainly of polydimethylsiloxanes containing trimethylsilyl end groups.

Among these polydialkylsiloxanes, mention may be made, in a non-limiting manner, of the following commercial products:

- the Silbione® oils of the 47 and 70 047 series or the Mirasil® oils sold by Rhodia, for instance the oil 70 047 V 500 000;

- the oils of the Mirasil® series sold by the company Rhodia;

- the oils of the 200 series from the company Dow Corning, such as DC200 with a viscosity of 60 000 mm$^2$/s;

- the Viscasil® oils from General Electric and certain oils of the SF series (SF 96, SF 18) from General Electric.

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

Among the silicones containing aryl groups are polydiaryl siloxanes, especially polydiphenylsiloxanes and
polyalkylarylsiloxanes. Examples that may be mentioned include the products sold under the following names:

- the Silbione® oils of the 70 641 series from Rhodia;
- the oils of the series Rhodorsil® 70 633 and 763 from Rhodia;
- the oil Dow Corning 556 Cosmetic Grade Fluid from Dow Corning;
- the silicones of the PK series from Bayer, such as the product PK20;
- certain oils of the SF series from General Electric, such as SF 1023, SF 1154, SF 1250 and SF 1265.

The organomodified liquid silicones may especially contain thiol groups.

The non-neutralized liquid fatty acids are preferably unsaturated and/or branched fatty acids. Mention may be made in particular of oleic acid.

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

The fatty substances may be non-liquid at room temperature and at atmospheric pressure.

The term "non-liquid" preferably means a solid compound or a compound that has a viscosity of greater than 2 Pa.s at a temperature of 25°C and at a shear rate of 1 s⁻¹.

More particularly, the non-liquid fatty substances are chosen from fatty alcohols, esters of fatty acids and/or of fatty alcohols, non-silicone waxes, silicones, fatty ethers and non-neutralized fatty acids, which are non-liquid and preferably solid.

The non-liquid fatty alcohols that are suitable for use in the invention are more particularly chosen from saturated or unsaturated, linear or branched alcohols comprising from 8 to 30 carbon atoms. Mention may be made, for example, of cetyl alcohol, stearyl alcohol and a mixture thereof (cetylstearyl alcohol).
As regards the non-liquid esters of fatty acids and/or of fatty alcohols, mention may be made especially of solid esters derived from C9-C26 fatty acids and from C9-C26 fatty alcohols.

Among these esters, mention may be made of octyldecyl behenate; isocetyl behenate; cetyl lactate; stearyl octanoate; octyl octanoate; cetyl octanoate; decyl oleate; myristyl stearate; octyl palmitate; octyl pelargonate; octyl stearate; alkyl myristates such as cetyl, myristyl or stearyl myristate; hexyl stearate.

Still within the context of this variant, esters of C4-C22 dicarboxylic or tricarboxylic acids and of C1-C22 alcohols and esters of mono-, di- or tricarboxylic acids and of C2-C26 di-, tri-, tetra- or pentahydroxy alcohols may also be used.

Mention may be made especially of: diethyl sebacate; diisopropyl sebacate; diisopropyl adipate; di-n-propyl adipate; dioctyl adipate; diocetyl maleate.

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

The (non-silicone) wax(es) are chosen especially from carnauba wax, candelilla wax, esparto grass wax, paraffin wax, ozokerite, plant waxes, for instance olive wax, rice wax, hydrogenated jojoba wax or the absolute waxes of flowers such as the essential wax of blackcurrant sold by the company Bertin (France), animal waxes, for instance beeswaxes, or modified beeswaxes (cerabellina); other waxes or waxy starting materials that may be used according to the invention are especially marine waxes such as the product sold by the company Sophim under the reference M82, and waxes of polyethylene or of polyolefins in general.

The non-liquid silicones that may be used in accordance with the invention may be in the form of waxes, resins or gums.

Preferably, the non-liquid silicone is chosen from polydialkylsiloxanes, especially polydimethylsiloxanes (PDMS), and organomodified polysiloxanes comprising at least one functional group
chosen from poly(oxyalkylene) groups, amino groups and alkoxy groups.

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

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

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

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

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

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

\[ R_2SiO_{1/2}, RsSiO_{1/2}, RSiO_{3/2} \text{ and } SiO_{4/2} \]
in which R represents an alkyl containing 1 to 16 carbon atoms. Among these products, the ones that are particularly preferred are those in which R denotes a C1-C4 lower alkyl group, more particularly methyl.

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

Mention may also be made of the trimethyl siloxysilicate type resins sold in particular under the names X22-49 14, X21-5034 and X21-5037 by the company Shin-Etsu.

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

- substituted or unsubstituted amino groups, such as the products sold under the names Q2 8220 and Dow Corning 929 or 939 by the company Dow Corning. The substituted amine groups are, in particular, C1-C4 aminoalkyl groups;

- alkoxy groups, such as the product sold under the name Abil Wax® 2428, 2434 and 2440 by the company Goldschmidt.

The non-liquid non-neutralized fatty acids are preferably chosen from linear saturated fatty acids. Mention may be made in particular of lauric acid, myristic acid, stearic acid and palmitic acid.

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

Preferably, the composition of the invention contains one or more fatty substances that are liquid at ordinary temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013×10^5 Pa), optionally combined with one or more fatty substances that are not liquid under the same conditions.

In one variant of the invention, the fatty substance does not contain any free carboxylic acid functions COOH.

Even more preferentially, the fatty substance is a plant oil or a liquid hydrocarbon.
Water-soluble organic solvents

The term "water-soluble organic solvent" means an organic compound that is soluble in water at ordinary temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013×10^5 Pa) to a weight concentration of greater than or equal to 4%.

Solvents are compounds that are capable of dissolving other substances without chemically modifying them.

The organic solvents of the invention preferably have a viscosity of less than or equal to 2 Pa.s, better still less than or equal to 1 Pa.s and even better still less than or equal to 0.1 Pa.s at a temperature of 25°C and at a shear rate of 1 s⁻¹.

The water-soluble organic solvents according to the invention are preferably chosen from monoalcohols, polyols and polyol ethers.

The monoalcohols are preferably saturated or unsaturated, linear or branched C₁-C₈ monoalcohols. They are preferably chosen from C₁-C₄ alkanols such as ethanol or isopropanol, or alcohols with an aromatic nucleus such as benzyl alcohol.

The polyols preferably comprise from 2 to 6 hydroxyl groups per molecule. They may be linear or branched and preferably comprise from 2 to 20 carbon atoms. Mention may be made more particularly of ethylene glycol, propylene glycol, 1,3-propanediol, glycerol, hexylene glycol, butylene glycol, neopentyl glycol, dipropylene glycol, tripropylene glycol and polyethylene glycols.

The polyol ethers are preferably the C₂-C₂₀ polyols described previously, etherified with one or more C₁-C₁₀ alkyl or C₆-C₃₀ aryl or C₇-C₃₀ aralkyl radicals. Mention may be made more particularly of ethylene glycol monobutyl ether, monomethyl ether and monoethyl ether, ethylene glycol monophenyl ether, propylene glycol monomethyl ether or monoethyl ether, dipropylene or tripropylene glycol monomethyl ether or dimethyl ether, and polyethylene glycol monomethyl ether or dimethyl ether.
The organic solvents that are preferred in the invention are polyols and in particular propylene glycol and glycerol.

According to one embodiment of the invention, the composition according to the invention may comprise only one type of organic compound, i.e. one or more fatty substances or one or more water-soluble organic solvents.

According to another embodiment of the invention, the composition according to the invention may comprise several organic compounds, at least one of which belonging to each of the two families of organic compounds, i.e. at least one fatty substance and at least one water-soluble organic solvent.

Preferably, in the composition according to the invention, the total concentration of organic compounds chosen from fatty substances and/or water-soluble solvents may range from 50% to 89.9%, preferably from 55% to 85% and even more preferentially from 60% to 80% by weight relative to the total weight of the composition.

When the organic compound is liquid, the composition according to the invention may be in the form of a dispersion.

When the organic compound is solid, the composition according to the invention may be in the form of a paste or a cream, which has the advantage of homogeneously coating the pumice particles.

**Surfactants**

The composition according to the invention also comprises one or more surfactants, and preferably anionic, amphoteric, zwitterionic, nonionic or cationic surfactants.

Nonionic surfactants are compounds that are well known per se (see especially in this regard the "Handbook of Surfactants" by M.R. Porter, published by Blackie & Son (Glasgow and London), 1991, pp. 116-178) and, in the context of the present invention, their nature is not a critical factor. Thus, they may be chosen especially from (non-limiting list) alcohols, alpha-diols and alkylphenols, these compounds
being polyethoxylated and/or polypropoxylated and containing a fatty chain comprising, for example, 8 to 18 carbon atoms, the number of ethylene oxide or propylene oxide groups possibly ranging especially from 2 to 50. Mention may also be made of copolymers ethylene oxide and propylene oxide, condensates of ethylene oxide and of propylene oxide with fatty alcohols; polyethoxylated fatty amides preferably having from 2 to 30 ethylene oxide units, polyglycerolated fatty amides containing on average 1 to 5, and in particular 1.5 to 4 glycerol groups, ethoxylated fatty acid esters of sorbitan containing from 2 to 30 ethylene oxide units, fatty acid esters of sucrose, fatty acid esters of polyethylene glycol, alkylpolyglycosides, N-alkylglucamine derivatives, amine oxides such as (C8-C14)alkylamine oxides or N-acylaminopropylmorpholine oxides; oxyethylenated and/or oxypropylenated polydimethylsiloxanes.

The amphoteric or zwitterionic surfactant(s) that can be used in the present invention may especially be derivatives of secondary or tertiary aliphatic amines, which are optionally quaternized, in which the aliphatic group is a linear or branched chain containing from 8 to 22 carbon atoms, the said amine derivatives containing at least one anionic group such as, for example, a carboxylate, sulfonate, sulfate, phosphate or phosphonate group. Mention may be made in particular of (C8-C20)alkylbetaines, sulfobetaines, (C8-C20)alkylamido(C3-Cs)alkylbetaines or (C6-C8)alkylamido(C6-C8)-alkylsulfobetaines. Among the optionally quaternized derivatives of secondary or tertiary aliphatic amines that may be used, as defined above, mention may also be made of the compounds with respective structures (I) and (II) below:

\[ R_a-\text{CONHCH}_2\text{CH}_2- \quad N^+(R_b)(R_c)(\text{CH}_2\text{COO}^-) \quad (1) \]

in which:
\( R_a \) represents a \( \text{C}_{10-30} \) alkyl or alkenyl group derived from an acid \( R_a' \)-COOH preferably present in hydrolysed coconut oil, a heptyl group, a nonyl group or an undecyl group,

\( R_b \) represents a beta-hydroxyethyl group, and

\( R_c \) represents a carboxymethyl group;

and

\[ R_a'-\text{CONHCH}_2\text{CH}_2\text{-N}(B)(B') \quad (II) \]

in which:

\( B \) represents \(-\text{CH}_2\text{CH}_2\text{O}X^*\),

\( B' \) represents \(-\{\text{CH}_2\}_z\text{-Y}', \) with \( z = 1 \) or \( 2 \),

\( X' \) represents the \(-\text{CH}_2\text{-COOH}, \text{CH}_2\text{-COOZ}', \text{-CH}_2\text{CH}_2\text{-COOH}\)

or \(-\text{CH}_2\text{CH}_2\text{-COOZ}'\) group, or a hydrogen atom.

\( Y' \) represents \(-\text{COOH}, \text{-COOZ}', \) the group \(-\text{CH}_2\text{-CHOH-SO}_3\text{H}\)

or \(-\text{CH}_2\text{-CHOH-SO}_3\text{Z}'\),

\( Z' \) represents an ion derived from an alkali metal or alkaline-earth metal, such as sodium, an ammonium ion or an ion derived from an organic amine.

\( R_a' \) represents a \( \text{C}_{10-30} \) alkyl or alkenyl group of an acid \( R_a' \)-COOH which is preferably present in coconut oil or in hydrolysed linseed oil, or an alkyl group, especially a \( \text{C}_{17} \) group, and its iso form, or an unsaturated \( \text{C}_{17} \) group.

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

By way of example, mention may be made of the cocoamphodiacetate sold by the company Rhodia under the trade name Miranol® C2M concentrate.
Among the abovementioned amphoteric or zwitterionic surfactants, it is preferred to use (C8-C20 alkyl)betaines such as cocoylbetaine, (C8-C20 alkyl)amido(C3-Cs alkyl)betaines such as cocoylamidopropylbetaine, and mixtures thereof. More preferably, the amphoteric or zwitterionic surfactant(s) is (are) selected from cocoylamidopropylbetaine and cocoylbetaine.

The term "anionic surfactant" means a surfactant comprising, as ionic or ionizable groups, only anionic groups. These anionic groups are preferably chosen from the following groups: C0\_2H, C0\_2\^-, SO3H, S0\_3\^-, OSO3H, OSO3\^-, H2PO3, HPO3\^-, P0\_3\^2-, H2PO2, HPCV, PO\_2\^2- POH, PO\^-

As examples of anionic surfactants that may be used in the composition according to the invention, mention may be made of alkyl sulfates, alkyl ether sulfates, alkylamido ether sulfates, alkylaryl(poly)ether sulfates, monoglyceride sulfates, alkylsulfonates, alkylamidesulfonates, alkylaryl(sulfonates), alpha-olefin sulfonates, paraffin sulfonates, alkylsulfosuccinates, alkylether sulfosuccinates, alkylamide sulfosuccinates, alkylsulfoacetates, acylsarcosinates, acylglutamates, alkylsulfosuccinamates, acylisethionates and N-acyltaurates, salts of alkyl monoesters of polylactic acid, acylic acid esters, D-galactoside-uronic acid esters, alkyl ether carboxylic acid esters, alkylaryl ether carboxylic acid esters, alkylamido ether carboxylic acid esters; and the corresponding non-salified forms of all these compounds; the alkyl and acyl groups of all these compounds comprising from 6 to 24 carbon atoms and the aryl group denoting a phenyl group.

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

The salts of C\_6-C24 alkyl monoesters of polylactic acid, polycarboxylic acids can be selected from C\_6-C24 alkyl polyglycoside-citrates, C\_6-C24 alkyl polyglycoside-tartrates and C\_6-C24 alkyl polyglycoside-sulfo succinates.
When the anionic surfactant(s) are in salt form, they may be chosen from alkali metal salts such as the sodium or potassium salt and preferably the sodium salt, the ammonium salts, the amine salts and in particular amino alcohol salts or the alkaline-earth metal salts such as the magnesium salt.

Examples of aminoalcohol salts that may especially be mentioned include mono-, di- and triethanolamine salts, mono-, di- or trisopropanolamine salts, 2-amino-2-methyl-1-propanol salts, 2-amino-2-methyl-1,3-propanediol salts and tris(hydroxy-methyl)aminomethane salts.

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

The anionic surfactants that may be present are preferably mild anionic surfactants, i.e. anionic surfactants without a sulfate function.

As regards mild anionic surfactants, mention may be made especially of the following compounds and salts thereof, and also mixtures thereof: polyoxyalkylenated carboxylic acid alkyl ethers, polyoxyalkylenated carboxylic acid alkyl aryl ethers, polyoxyalkylenated carboxylic acid alkylamido ethers, in particular those comprising 2 to 50 ethylene oxide groups, alkyl D-galactoside uronic acids, acylsarcosinates, acylglutamates and alkylpolyglycoside carboxylic esters.

Mention may be made most particularly of polyoxyalkylenated carboxylic acid alkyl ethers, for instance carboxylic acid lauryl ether (4.5 EO) sold, for example, under the name Akypo RLM 45 CA from Kao.

Preferably, the composition according to the invention does not contain any anionic detergent surfactant of sulfonate type (alkyl sulfate, alkylether sulfate or alkylamidoether sulfate). Furthermore, if it does contain any, its content is such that the weight ratio: anionic detergent surfactant of alkyl sulfate or alkyl ether sulfate type/sum of the amphoteric, zwitterionic, mild anionic and nonionic surfactants is
preferably less than or equal to 1, more particularly less than or equal to 0.75 and even more preferentially less than or equal to 0.5.

The term "cationic surfactant" means a surfactant that is positively charged when it is contained in the composition according to the invention. This surfactant may bear one or more positive permanent charges or may contain one or more cationizable functions in the composition according to the invention. The cationic surfactants of the invention do not comprise any anionic groups as described above.

The cationic surfactant(s) are preferably selected from primary, secondary or tertiary fatty amines, optionally polyoxyalkylenated, or salts thereof, and quaternary ammonium salts, and mixtures thereof.

Fatty amines generally comprise at least one C₈-C₃₀ hydrocarbon-based chain. Among the fatty amines that may be used according to the invention, examples that may be mentioned include stearylamidopropyldimethylamine and distearylamine.

Examples of quaternary ammonium salts that may especially be mentioned include:
- those corresponding to the general formula (III) below:

\[
\text{[R₈ - N - R₁₀]⁺} \quad \text{X⁻}
\]

(III)

in which the groups R₈ to R₁₁, which may be identical or different, represent a linear or branched aliphatic group containing from 1 to 30 carbon atoms, or an aromatic group such as aryl or alkylaryl, at least one of the groups R₈ to R₁₁ denoting a group containing from 8 to 30 carbon atoms, preferably from 12 to 24 carbon atoms. The aliphatic groups can comprise heteroatoms such as, in particular, oxygen, nitrogen, sulfur and halogens. The aliphatic groups are chosen, for example, from C₁-C₃₀ alkyl, C₁-C₃₀ alkoxy,
polyoxyalkylene (C₂-C₆), C₁-C₃₀ alkylamide, (C₁₂-C₂₂)alkylamido-
(C₂-C₆)alkyl, (C₁₂-C₂₂)alkyl acetate and C₁-C₃₀ hydroxyalkyl groups;
X⁻ is an anion chosen from the group consisting of halides, phosphates, acetates, lactates, (C₂-C₆)alkyl sulfates, alkylsulfonates
and alkyl-aryl sulfonates.

Among the quaternary ammonium salts of formula (III), those
that are preferred are, on the one hand, tetraalkylammonium salts, for
instance dialkyldimethylammonium or alkyltrimethylammonium salts
in which the alkyl group contains approximately from 12 to 22 carbon
atoms, in particular behenyltrimethylammonium,
distearyldimethyl-ammonium, cetyltrimethylammonium or
benzyldimethylstearylammonium chlorides, or, on the other hand,
palmitylamidopropyltrimethylammonium chloride or the
stearamidopropylidimethyl(myristyl acetate)ammonium salt sold under
the name Ceraphyl® 70 by the company Van Dyk.

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

![Chemical Structure](Image)

in which R₁₂ represents an alkyl or alkenyl group containing
from 8 to 30 carbon atoms, derived for example from tallow fatty
acids, R₁₃ represents a hydrogen atom, a C₁-C₄ alkyl group or an alkyl
or alkenyl group containing from 8 to 30 carbon atoms, R₁₄ represents
a C₁-C₄ alkyl group, R₁₅ represents a hydrogen atom or a C₁-C₄ alkyl
group, X⁻ is an anion selected from the group consisting of halides,
phosphates, acetates, lactates, alkyl sulfates, alkylsulfonates or
alkylaryl sulfonates in which the alkyl and aryl groups each preferably
comprise from 1 to 20 carbon atoms and from 6 to 30 carbon atoms.
$R_{12}$ and $R_{13}$ preferably denote a mixture of alkyl or alkenyl groups containing from 12 to 21 carbon atoms, derived for example from tallow fatty acids, $R_{14}$ preferably denotes a methyl group, and $R_{15}$ preferably denotes a hydrogen atom. Such a product is sold, for example, under the name Rewoquat® W 75 by the company Rewo;

- quaternary diammonium or triammonium salts, particularly of formula (V):

$$\begin{array}{c}
\left[ \begin{array}{c}
R_{18} \\
R_{17}
\end{array} \right] \\
N-(CH_2)_3 \\
N-R_{21}
\end{array}^{2+} \quad 2X^-$$

in which $R_{i_0}$ denotes an alkyl radical containing approximately from 16 to 30 carbon atoms, which is optionally hydroxylated and/or interrupted with one or more oxygen atoms, $R_{i_7}$ is selected from hydrogen and an alkyl radical containing from 1 to 4 carbon atoms or a group $(R_{i_6a})(R_{i_7a})(R_{i_8a})N-(CH_2)_3$, $R_{i_6a}$, $R_{i_7a}$, $R_{i_8a}$, $R_{i_9}$, $R_{i_9}$, $R_{20}$ and $R_{21}$, which are identical or different, are selected from hydrogen and an alkyl radical containing from 1 to 4 carbon atoms, and $X$ is an anion selected from the group of halides, acetates, phosphates, nitrates and methyl sulfates. Compounds of this kind are, for example, Finquat CT-P, available from the company Finetex (Quaternium 89), and Finquat CT, available from the company Finetex (Quaternium 75),

- quaternary ammonium salts containing at least one ester function, such as those of formula (VI) below:

$$R_{24}-C-(O-C_{r_{i_2}}(OH)_{r_{i_1}})_y \quad ^+ \quad (C_{r_{i_2}}(OH)_{r_{i_1}}-O)_x \quad R_{23} \quad X^-$$
in which:
R22 is selected from Ci-C₆ alkyl groups and Ci-C₆ hydroxyalkyl or dihydroxyalkyl groups;
R23 is selected from:

- the group \(-\text{O} \text{R26}\text{C}\)

- groups R27 which are linear or branched, saturated or unsaturated Ci-C22 hydrocarbon-based groups,
- a hydrogen atom,
R25 is selected from:

- the group \(-\text{O} \text{R29}\text{C}\)

- groups R29, which are linear or branched, saturated or unsaturated Ci-C₆ hydrocarbon-based groups,
- a hydrogen atom,
R24, R26 and R28, which may be identical or different, are selected from linear or branched, saturated or unsaturated C7-C21 hydrocarbon-based groups;
r, s and t, which may be identical or different, are integers ranging from 2 to 6;
y is an integer ranging from 1 to 10;
x and z, which may be identical or different, are integers ranging from 0 to 10;

\[ X^- \text{ is a simple or complex, organic or inorganic anion; } \]

- with the proviso that the sum \(x + y + z\) is from 1 to 15, that when \(x\) is 0 then \(R_{23}\) denotes \(R_{27}\), and that when \(z\) is 0 then \(R_{25}\) denotes \(\text{R29}\).

The alkyl groups R22 may be linear or branched, and more particularly linear.

Preferably, R22 denotes a methyl, ethyl, hydroxyethyl or dihydroxypropyl group, and more particularly a methyl or ethyl group.

Advantageously, the sum \(x + y + z\) is from 1 to 10.
When \( \text{R}_{23} \) is an \( \text{R}_{27} \) hydrocarbon group, it may be long and may contain from 12 to 22 carbon atoms, or may be short and may have from 1 to 3 carbon atoms.

When \( \text{R}_{z,5} \) is an \( \text{R}_{z,9} \) hydrocarbon-based group, it preferably contains 1 to 3 carbon atoms.

Advantageously, \( \text{R}_{24}, \text{R}_{26} \) and \( \text{R}_{z,8} \), which are identical or different, are selected from linear or branched, saturated or unsaturated \( \text{C}_{11-21} \) hydrocarbon-based groups, and more particularly from linear or branched, saturated or unsaturated \( \text{C}_{11-21} \) alkyl and alkenyl groups.

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

Advantageously, \( y \) is equal to 1.

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

The anion \( \text{X}^- \) is preferably a halide (chloride, bromide or iodide) or an alkyl sulfate, more particularly methyl sulfate. It is possible, however, to use methanesulfonate, phosphate, nitrate or tosylate, an anion derived from organic acid, such as acetate or lactate, or any other anion which is compatible with ester-functional ammonium.

The anion \( \text{X}^- \) is even more particularly chloride or methyl sulfate.

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

\[ \text{R}_{22} \text{ denotes a methyl or ethyl group,} \]
\[ x \text{ and } y \text{ are equal to 1;} \]
\[ z \text{ is equal to 0 or 1;} \]
\[ r, s \text{ and } t \text{ are equal to 2;} \]
\[ \text{R}_{23} \text{ is selected from:} \]
\[ \text{- the group } \text{R}_{z,6} - \text{C} - \]
\[ \text{- methyl, ethyl or } \text{C}_{14-22} \text{ hydrocarbon-based groups,} \]
- a hydrogen atom;
R_{25} is selected from:
\[ \begin{array}{c}
\text{o} \\
\| \\
C
\end{array} \]
- the group \( R_{25} \)
- a hydrogen atom;

R_{24}, R_{26} and R_{28}, which are identical or different, are selected from linear or branched, saturated or unsaturated C_{13}-C_{17} hydrocarbon-based groups, and preferably from linear or branched, saturated or unsaturated C_{13}-C_{17} alkyl and alkenyl groups.

The hydrocarbon-based groups are advantageously linear.

Mention may be made, for example, of the compounds of formula (XIV) such as the diacyloxyethyltrimethylammonium, diacyloxyethylhydroxyethyltrimethylammonium, monoacyloxyethyl-dihydroxyethyltrimethylammonium, triacyloxyethyltrimethylammonium and monoacyloxyethylhydroxyethyltrimethylammonium salts (chloride or methyl sulfate in particular), and mixtures thereof. The acyl groups preferably contain 14 to 18 carbon atoms and are obtained more particularly from a plant oil such as palm oil or sunflower oil. When the compound contains several acyl groups, these groups may be identical or different.

These products are obtained, for example, by direct esterification of triethanolamine, of triisopropanolamine, of alkyl diethanolamine or of alkyl diisopropanolamine, which are optionally alkoxylated, with C_{10}-C_{3} fatty acids or with mixtures of C_{10}-C_{3} fatty acids of plant or animal origin, or by transesterification of their methyl esters. This esterification is followed by a quaternization by means of an alkylating agent such as an alkyl (preferably methyl or ethyl) halide, a dialkyl (preferably methyl or ethyl) sulfate, methyl methanesulfonate, methyl para-toluene sulfonate, glycol chlorohydrin or glycerol chlorohydrin.

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

The composition according to the invention may contain, for example, a mixture of quaternary ammonium salts of mono-, di- and triesters with a weight majority of diester salts.

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

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

The cationic surfactant(s) that may particularly preferably be used according to the invention are the compounds of formula (III) or of formula (VI).

The surfactant(s) may be present in the composition in concentrations ranging from 0.1% to 40% by weight, preferably from 0.2% to 25% by weight, and more particularly from 1% to 20% by weight, relative to the total weight of the composition.

Preferably, the composition contains one or more nonionic and/or cationic surfactants.

Other components of the composition

The composition according to the present invention may preferably comprise one or more oil thickeners.

The thickener may be chosen from polymeric thickeners, non-polymeric agents, mineral thickeners and organic thickeners, and mixtures thereof.

The term "thickener" means a compound that modifies the rheology of the medium into which it is incorporated.
The oily-medium thickener may be chosen from:
- organophilic clays;
- fumed silicas;
- alkyl guar gums (with a C_i-C_6 alkyl group), such as those described in EP-A-708 114;
- oil-gelling polymers, for instance triblock polymers or star polymers resulting from the polymerization or copolymerization of at least one monomer containing an ethylenic group, for instance the polymers sold under the name Kraton;
- polymers with a weight-average molecular mass of less than 100,000, comprising a) a polymer backbone containing hydrocarbon-based repeating units containing at least one heteroatom, and optionally b) at least one pendent fatty chain and/or at least one terminal fatty chain, which are optionally functionalized, containing from 6 to 120 carbon atoms and being linked to these hydrocarbon-based units, as described in patent applications WO-A-02/056 847 and WO-A-02/476 19, the content of which is incorporated by way of reference; in particular, polyamide resins (especially comprising alkyl groups containing from 12 to 22 carbon atoms) such as those described in US-A-5 783 657, the content of which is incorporated by way of reference;
- the silicone-based polyamide resins as described in patent application EP-A-1 266 647 and in the French patent application filed under the number 0 216 039, the content of which is incorporated by way of reference.

Such thickeners are especially described in patent application EP-A-1 400 234, the content of which is incorporated by way of reference.

The thickener may be an organic gelling agent, i.e. an agent comprising at least one organic compound. The organogelling agents may be chosen from those described in patent application WO-A-03/1 05 788, the content of which is incorporated by way of reference.
More specifically, the polymeric thickener is an amorphous polymer formed by polymerization of an olefin. The olefin may especially be an elastomeric ethylenically unsaturated monomer.

Examples of olefins that may be mentioned include ethylenic carbide monomers especially containing one or two ethylenic unsaturations, containing from 2 to 5 carbon atoms, such as ethylene, propylene, butadiene or isoprene.

The polymeric thickener is capable of thickening or gelling the composition. The term "amorphous polymer" means a polymer that does not have a crystalline form. The polymeric thickener may also be film-forming.

The polymeric thickener may especially be a diblock, triblock, multiblock, radial or star copolymer, or mixtures thereof.


Advantageously, the polymeric thickener is an amorphous block copolymer of styrene and of olefin.

The polymeric thickener is preferably hydrogenated to reduce the residual ethylenic unsaturations after polymerization of the monomers.

In particular, the polymeric thickener is an optionally hydrogenated copolymer, containing styrene blocks and ethylene/C3-C4 alkyene blocks.

Diblock copolymers, preferably hydrogenated, that may be mentioned include styrene-ethylene/propylene copolymers and styrene-ethylene/butadiene copolymers. The diblock polymers are especially sold under the name Kraton® G1701E by the company Kraton Polymers.

Triblock copolymers, which are preferably hydrogenated, that may be mentioned include styrene-ethylene/propylene-styrene copolymers, styrene-ethylene/butadiene-styrene copolymers, styrene-isoprene-styrene copolymers and styrene-butadiene-styrene copolymers. Triblock polymers are especially sold under the names
Kraton® G 1650, Kraton® G 1652, Kraton® D1101, Kraton® D1102 and Kraton® D1160 by the company Kraton Polymers.

A mixture of hydrogenated styrene-butadiene/ethylene-styrene triblock copolymer and of hydrogenated ethylene-propylene-styrene star polymer may also be used, such a mixture especially being in isododecane. Such mixtures are sold, for example, by the company Penreco under the trade names Versagel® M5960 and Versagel® M5670.

A diblock copolymer such as those described above, in particular a styrene-ethylene/propylene diblock copolymer, is advantageously used as polymeric thickener.

More precisely, organophilic clays are clays modified with chemical compounds that make the clay able to swell.

Clays are products that are already well known per se, which are described, for example, in the publication Mineralogie des argiles "[Mineralogy of Clays], S. Caillere, S. Henin, M. Rautureau, 2nd Edition 1982, Masson", the teaching of which is included herein by way of reference.

Clays are silicates containing a cation that may be chosen from calcium, magnesium, aluminium, sodium, potassium and lithium cations, and mixtures thereof.

Examples of such products that may be mentioned include clays of the smectite family such as montmorillonites, hectorites, bentonites, beidellites and saponites, and also of the vermiculite, stevensite and chlorite families.

These clays may be of natural or synthetic origin. Clays that are cosmetically compatible and acceptable with keratin materials are preferably used.

The organophilic clay may be chosen from optionally modified montmorillonite, bentonite, hectorite, attapulgite and sepiolite, and mixtures thereof. The clay is preferably a bentonite or a hectorite.

These clays may be modified with a chemical compound chosen from quaternary amines, tertiary amines, amine acetates, imidazolines,
amine soaps, fatty sulfates, alkylarylsulfonates and amine oxides, and mixtures thereof.

Organophilic clays that may be mentioned include quaternium-18 bentonites such as those sold under the names Bentone 3, Bentone 38 and Bentone 38V by the company Rheox, Tixogel VP by the company United Catalyst, Claytone 34, Claytone 40 and Claytone XL by the company Southern Clay; stearalkonium bentonites such as those sold under the names Bentone 27 by the company Rheox, Tixogel LG by the company United Catalyst and Claytone AF and Claytone APA by the company Southern Clay; quaternium-18/benzalkonium bentonites such as those sold under the names Claytone HT and Claytone PS by the company Southern Clay.

The fumed silicas may be obtained by high-temperature hydrolysis of a volatile silicon compound in an oxhydric flame, producing a finely divided silica. This process makes it possible especially to obtain hydrophilic silicas having a large number of silanol groups at their surface. Such hydrophilic silicas are sold, for example, under the names Aerosil 130®, Aerosil 200®, Aerosil 255®, Aerosil 300® and Aerosil 380® by the company Degussa, and Cab-O-Sil HS-5®, Cab-O-Sil EH-5®, Cab-O-Sil LM-130®, Cab-O-Sil MS-55® and Cab-O-Sil M-5® by the company Cabot.

It is possible to chemically modify the surface of the said silica, via a chemical reaction generating a reduction in the number of silanol groups. It is especially possible to substitute silanol groups with hydrophobic groups: a hydrophobic silica is then obtained.

The hydrophobic groups may be:
- trimethylsiloxyl groups, which are obtained especially by treating fumed silica in the presence of hexamethyldisilazane. Silicas thus treated are known as "silica silylate" according to the CTFA (6th Edition, 1995). They are sold, for example, under the references Aerosil R812® by the company Degussa and Cab-O-Sil TS-530® by the company Cabot.
- dimethylsilyloxy or polydimethylsiloxane groups, which are especially obtained by treating fumed silica in the presence of polydimethylsiloxane or dimethyldichlorosilane. Silicas thus treated are known as "silica dimethyl silylate" according to the CTFA (6th Edition, 1995). They are sold, for example, under the references Aerosil R972® and Aerosil R974® by the company Degussa, and Cab-O-Sil TS-610® and Cab-O-Sil TS-720® by the company Cabot.

The fumed silica preferably has a particle size that may be nanometric to micrometric, for example ranging from about 5 to 200 nm.

A hydrophilic fumed silica is preferably used as mineral thickener.

Preferably, the mineral thickeners are combined with carbonates, for instance propylene carbonate.

The thickener is preferably present in the composition in a total content ranging from 0.5% to 15% by weight, preferably ranging from 1% to 10% by weight and more preferentially ranging from 2% to 7% by weight relative to the total weight of the emulsion.

The composition according to the invention may moreover comprise additives that are conventional in the field, for instance those chosen from the non-exhaustive list such as reducing agents, oxidizing agents, sequestrants, softeners, antifoams, moisturizers, emollients, basifying agents, plasticizers, sunscreens, direct dyes or oxidation dyes, fragrances, peptizers, preserving agents, vitamins, antidandruff agents, antiseborrhoeic agents and hair-loss counteractants.

The adjuvants mentioned above 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.

Among the adjuvants, silicones containing quaternary ammonium groups are particularly appreciated.

In accordance with the invention, the term "silicone containing quaternary ammonium groups" means any silicone comprising one or
more quaternary ammonium groups. These quaternary ammonium groups may be attached in the alpha or omega position or in the form of side groups. They may be attached directly to the polysiloxane backbone or may be borne by hydrocarbon-based chains.

The silicones containing quaternary ammonium groups of the present invention are chosen, for example, from the compounds corresponding to the following general formulae:

\[
R_2\text{Si}-\text{O}\left[R_1\text{Si}-\text{O}\right]_q\left[R_2\text{Si}-\text{O}\right]_m\left[R_3\text{Si}-\text{O}\right]_n\text{Si}-R_2
\]

(VII)

\[
R_1\text{Si}-\text{O}\left[R_2\text{Si}-\text{O}\right]_p\left[R_1\text{Si}-\text{O}\right]_n\text{Si}-R_1
\]

(VIII)

\[
R_2\text{Si}-\text{O}\left[R_1\text{Si}-\text{O}\right]_q\left[R_2\text{Si}-\text{O}\right]_n\text{Si}-R_2
\]

(IX)

\[
R_1\text{Si}-\text{O}\left[R_2\text{Si}-\text{O}\right]_p\left[R_1\text{Si}-\text{O}\right]_r\left[R_2\text{Si}-\text{O}\right]_n\text{Si}-R_1
\]

(X)

in which formulae:
- \( R_i \), which may be identical or different, represents a \( C_{1-30} \) linear or branched alkyl group or a phenyl group;
The radicals \( R_8 \) independently represent a linear or branched \( C_1 \)-\( C_{22} \) alkyl or \( C_2 \)-\( C_{22} \) alkenyl radical, optionally bearing one or more OH groups, or represent a group \( C_{b}H_{2b}ZCOR_9 \):

\[
\begin{align*}
R_6 & \quad + \\
\big[ & C_fH_{(2f+g)}(OH)_g \big] \quad \downarrow \\
R_7 & \quad \downarrow \\
R_8 & \quad A \\
R_9 & \quad R_5
\end{align*}
\]

\( R_6, R_7 \) and \( R_9 \), which may be identical or different, represent linear or branched \( C_1 \)-\( C_{22} \) alkyl or \( C_2 \)-\( C_{22} \) alkenyl radicals, optionally bearing one or more OH groups, or \( R_7 \) may form with part of \( R_8 \) a heterocycle (ring containing at least one heteroatom, for instance N, O or P), the heterocycle especially being an imidazoline. Preferably, \( R_6 \) and \( R_7 \) denote a \( C_1 \)-\( C_6 \) alkyl radical and more particularly methyl, \( R_9 \) preferably denotes a radical chosen from \( C_5 \)-\( C_{15} \) alkyl and \( C_5 \)-\( C_{15} \) alkenyl and especially a cocoyl radical.

\( m \) ranges from 0 to 20;

\( n \) ranges from 0 to 500;

\( p \) ranges from 1 to 50;

\( q \) ranges from 0 to 20;

\( r \) ranges from 1 to 20;

\( a \) ranges from 0 to 50;

\( b \) ranges from 0 to 50;

\( c \) ranges from 0 to 4;

\( d \) denotes 0 or 1;

\( f \) ranges from 0 to 4;

\( g \) ranges from 0 to 2, and is preferably equal to 1;

\( h \) ranges from 1 to 4, and is preferably equal to 3;

\( Z \) represents an oxygen atom or NH;
A\(^{-}\) represents a monovalent organic or inorganic anion such as a halide (e.g. chloride, bromide), a sulfate or a carboxylate (e.g. acetate, lactate, citrate).

Quaternary ammonium silicones of formula (VIII) or (IX) are preferably used.

It is preferred to use silicones containing quaternary ammonium corresponding to the general formula (IX) as defined above, and more particularly those corresponding to the general formula (IX) in which at least one, and preferably all, of the following conditions are met:

- \(c\) is equal to 0;
- \(d\) denotes 0;
- \(a\) is equal to zero;
- \(b\) is equal to 1;
- \(n\) ranges from 0 to 100;
- \(q\) is equal to 0;
- \(f\) is 3;
- \(g\) is 1;

\(R_6\) and \(R_7\) denote a methyl group;

\(R_8\) denotes a C10-C22 alkyl radical.

Among the silicones of the invention, examples that may be mentioned include those sold by the company Goldschmidt under the names Abil Quat 3272, Abil B 9905, Abil Quat 3474 and Abil K 3270, by the company Lipo France under the names Silquat Q-100, Silquat Q-200 WS, Silquat AX, Silquat AC, Silquat AD and Silquat AM, all manufactured by the company Siltech, by the company OSI under the names Magnasoft Exhaust and Silsoft C-880, and by the company UCIB under the names Pecosil 14-PQ and Pecosil 36-PQ (manufactured by Phoenix Chemical).

These silicones are especially described in patents EP 530 974, DE 3 719 086, DE 3 705 121, EP 617 607 and EP 714 654.

According to one embodiment, the silicone containing quaternary ammonium groups is of formula (IX). Even more
preferentially, the quaternary silicone is the compound referenced in the CTFA (INCI name) under the name Quaternium-80.

The silicones containing quaternary ammonium groups used in accordance with the invention may be in the form of aqueous solutions, or optionally in the form of dispersions or emulsions in water.

The content of silicones containing quaternary ammonium in the composition may range from 0.001% to 10% by weight, preferably from 0.005% to 5% by weight and even more preferentially from 0.01% to 3% by weight relative to the total weight of the composition.

**Galenical form**

The composition according to the invention may be in various galenical forms, such as a lotion, gel, cream, a wax or a paste.

When the composition according to the invention is in liquid form, for instance a lotion, it is in the form of a dispersion.

The composition may be conditioned in any type of container with or without an applicator. The container may contain a roller or a member making it possible especially to homogenize the composition before its application to the keratin fibres. The container containing the composition may have a capacity of greater than or equal to 15 ml, especially greater than or equal to 50 ml, or even 100 ml, especially greater than or equal to 150 ml, for example between 15 ml and 500 ml.

The composition may be applied onto any type of support, for instance woven or nonwoven supports, a paper or a flexible polymer. The composition may impregnate a wipe.

The composition may be introduced into a stream of carrier fluid, and may be sprayed onto the hair.

In one particular embodiment, the composition may be contained in a reservoir of a comb or a brush having, for example, orifices at the base of the teeth or bristles, for delivering the product
and applying it to the hair, such as those described in document WO 2009/156668.

The composition according to the invention as defined above may be in its native form or it may result from the mixing, before use, of a first composition comprising pumice particles with amine volume diameter of between 100 and 500 μm; and of a second composition comprising one or more organic compounds chosen from a) fatty substances and b) water-soluble organic solvents, and a mixture thereof, and one or more surfactants.

**Treatment process**

The invention also relates to a process for treating keratin fibres, such as human keratin fibres and especially the hair, which consists in applying to the wet or dry keratin fibres a composition as defined previously, and then in optionally performing rinsing.

The treatment, for example abrasion, of the keratin fibres, and especially the hair, may take place immediately after application of the composition to the hair, for example in a period of less than one hour, especially less than 30 minutes, or even 10 minutes, after application of the composition to the hair. Rinsing of the fibres, when it is performed, may take place rapidly after treatment, for example abrasion, of the fibres. The time between the application of the composition and rinsing may be, for example, less than 4 hours, especially less than 1 hour, for example less than 20 minutes. In general, this rinsing is performed immediately after the treatment.

The step of treatment, for example abrasion, of the hair may be performed by rubbing the hair with bare hands or by placing at least one surface between the hands and the hair charged with composition, for example a wipe or towel, a glove or the like. The treatment may be performed other than by using a comb or a brush.

The treatment, for example the abrasion, of the hair may be performed, for example, using at least one surface placed in motion, in vibration or in rotation, especially by a mechanized system.
The treatment using the composition may be performed, for example, by hand, lock by lock, in two movements: a first "tangential" movement, i.e. substantially along the hair, for example from the root to the end, and a second "shear" motion, i.e. substantially orthogonal to the hair, in a transverse direction thereto. The two movements may be repeated several times, for example at least five times, for example ten times. As a variant, only one of the abovementioned movements may be performed and optionally repeated several times.

The duration of treatment, for example abrasion, using the composition in accordance with the invention may depend, for example, on the desired intensity of the abrasion and on the condition of the keratin fibre, especially of the hair.

The process according to the invention may comprise two treatment steps, for example abrasion, using two compositions applied successively, each comprising pumice particles in accordance with the invention, the mean volume diameters or the hardness of the pumice particles in accordance with the invention of the two compositions being different.

A single bottle may contain the two compositions conditioned separately, or two different bottles may each contain a composition.

Another conditioning mode may consist of a bottle containing a base composition free of pumice particles in accordance with the invention, which are conditioned separately, for example in at least two separate compartments, as a function of their particle size or their hardness. In the latter case, the user selects before the treatment, for example abrasion, the pumice particles in accordance with the invention to be mixed with the base composition to form the first composition, the mixing being performed by the user or in the bottle. After the first treatment, for example the first abrasion, the user may perform a second treatment, for example a second abrasion, this time by mixing other pumice particles in accordance with the invention with the base composition to form the second composition. Rinsing may be performed between and/or after the two treatments.
The treatment process may be performed after a step of
characterization of the keratin fibre, and especially the hair, for
example by means of a visual examination with the naked eye or under
a magnifying device or by instrumental means, for example by
recording the sound produced by the movement of a comb through the
hair using a sonometer or by optically determining the gloss of the
hair. The characterization of the fibre may also involve a chemical
reagent applied onto a sample of the fibre.

The process according to the invention may include the
preliminary step consisting in rinsing the keratin fibres before
applying the composition.

The process according to the invention may include the step
consisting in combing and/or rinsing the keratin fibres after
application of the composition. The rinsing may be performed with
water.

The presence of surfactants in the composition in particular
allows the removal of the composition according to the invention by
emulsification.

The process according to the invention may also include the
step consisting in heating the keratin fibres before or during the
placing in contact with the composition, for example to a temperature
of between 40°C and 250°C and especially between 60°C and 220°C.
This may especially increase the efficacy of the treatment.

The keratin fibres may also be heated after the treatment so as
to shape them, for example by blow-drying. The heating of the hair
may be performed, for example, using an iron, a liquid water/steam
mixture or using a heating hood.

The keratin fibres may be totally or partially dried.

**Application of a treatment process**

The process according to the invention may also include the
step consisting in applying, for example before or after treatment
using the compositions according to the invention, another treatment
product to the keratin fibres. The treatment products may be, for example, a cosmetic product, especially a conditioner, a permanent-waving product, a relaxing product or a product for dyeing or bleaching keratin fibres, especially the hair.

The treatment product may be chosen, for example, from the following products, this list not being limiting:

- products for modifying the mechanical properties of the hair, especially comprising a reducing agent, such as thioglycolic acid and derivatives thereof, cysteine, sulfites, trihydroxymethyl phosphine, or an oxidizing agent, such as $\text{H}_2\text{O}_2$, persulfates or an alkali metal hydroxide at very high pH,

- products for restructuring the interior of the hair, comprising, for example, an ionene, a protein, a hydroxy acid or a reactive compound, especially a formaldehyde generator, a silane and direct dyes or oxidation dyes.

The treatment product may be applied before the treatment, for example of abrasion type, and may contribute towards protecting the hair during the said treatment, in order especially to avoid excessive abrasion.

The treatment product is preferably applied after application of the composition according to the invention.

Thus, according to one embodiment, the process in accordance with the invention may include an additional step that consists in subjecting the treated hair to a post-treatment, the post-treatment being chosen from the application of a conditioning agent, a permanent-waving product, a relaxer and a product for dyeing or bleaching the hair.

### Treatment kits

A subject of the invention is also, independently or in combination with the foregoing, a kit for treating keratin fibres and especially the hair, comprising:
- a cosmetic composition A comprising pumice particles as defined above, and
- a composition B comprising one or more organic compounds chosen from a) fatty substances and b) water-soluble organic solvents, and a mixture thereof, and one or more surfactants.

A subject of the invention is also, independently or in combination with the foregoing, a kit for treating keratin fibres and especially the hair, comprising:

- a composition or a set of compositions according to the invention as defined above, and
- a support comprising instructions for the use of the composition on the keratin fibres, especially the hair, for example in order to perform abrasion of the hair.

The kit may also comprise a composition for the post-treatment of keratin fibres and especially the hair. The post-treatment composition may comprise one or more of the following cosmetic active agents: a conditioner, a permanent-waving product, a relaxer or a product for dyeing or bleaching keratin fibres and especially the hair. The post-treatment product may be chosen, for example, from those described above.

Finally, the invention relates to the use of the composition as defined above for smoothing keratin fibres, especially the hair.

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

EXAMPLE 1

The following treatment compositions (pre-shampoo) were prepared (in grams of commercial product per se):

<table>
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<tr>
<th>Components</th>
<th>% sm</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,7,11,15-Tetramethyl-1,2,3-trihydroxyhexadecane</td>
<td>0.5</td>
</tr>
<tr>
<td>Pumice: Natural silicate pumice (&lt; 200 microns, hardness 5.5 Moh) (decontaminated Ponce 0 ½ D sold by Eyraud)</td>
<td>20</td>
</tr>
<tr>
<td>Oxyethylenated glyceryl triisostearate (20 EO) (Uniox GT 20ISL sold by Nof Corporation)</td>
<td>8</td>
</tr>
<tr>
<td>Avocado oil</td>
<td>25</td>
</tr>
<tr>
<td>Sweet almond oil</td>
<td>16</td>
</tr>
<tr>
<td>1% Aloe vera extract in a mixture of liquid fatty esters (Aloe Vera Oil sold by Aloe Laboratories)</td>
<td>5.5</td>
</tr>
<tr>
<td>Fumed silica of hydrophilic nature (Aerosil 300 sold by Evonik Degussa)</td>
<td>4</td>
</tr>
<tr>
<td>Safflower oil</td>
<td>20</td>
</tr>
<tr>
<td>Fragrance</td>
<td>1</td>
</tr>
</tbody>
</table>

The study is performed on a panel of 20 women: 10 women with natural long hair and 10 women with sensitized long hair.

10 to 15 g of the composition are applied per half-head.

The application, to wet hair as a pre-shampoo, is performed lock by lock in two movements: a first "tangential" movement and a
second "shear" movement. The two movements are repeated ten times. The hair is combed, then rinsed and finally dried by blow-drying.

The composition according to the invention shows very good working qualities (ease of application, rinseability, quality of the feel after rinsing).

Shampoo applied after rinsing out the composition of the invention lathers more easily (more abundant lather) and more quickly.

An analysis of the cosmetic effects provided by the treatments is performed. This analysis is performed by experts.

A study of shampoo remanence of the cosmetic effects observed on application is performed.

Sensory analysis

The experts comparatively evaluate the sensory properties of each half-head: one treated with the process of the invention and the other with a pumice-free placebo.

The results show that hair treated with the composition of the invention is smoother and more uniform than hair treated with the placebo.

The experts also observe that the composition of the invention makes it possible to reduce the body and to control the volume of the hair (absence of frizziness). The effects are all the more noteworthy when the hair is sensitized and thick.

After five shampoo washes, the smoothness of the keratin fibres is conserved, as is the volume control, irrespective of the degree of sensitization of the hair (natural to very sensitized).

EXAMPLE 2
The following pre-shampoo compositions were prepared (in grams of SM):

<table>
<thead>
<tr>
<th>Components</th>
<th>% sm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene glycol</td>
<td>28</td>
</tr>
<tr>
<td>Glycerol</td>
<td>20</td>
</tr>
<tr>
<td>Pumice: Natural silicate pumice (&lt; 200 microns, hardness 5.5 Moh) (decontaminated Ponce 0 ½ D sold by Eyraud)</td>
<td>20</td>
</tr>
<tr>
<td>Polyethylene glycol (8 EO) (Polyethylene Glycol 400 Dub PEG 8 sold by Stearineries Dubois)</td>
<td>10</td>
</tr>
<tr>
<td>Polydimethylsiloxane alpha-omega coconut-chain quaternary ammonium acetate at 50% in propylene glycol (Abil Quat 3272 sold by Evonik Degussa)</td>
<td>5</td>
</tr>
<tr>
<td>Oxyethylenated (10/14 OEt) polydimethylsiloxane/propylene glycol (95/5) (Abil B8842 sold by Evonik Degussa)</td>
<td>5</td>
</tr>
<tr>
<td>Palmitylamidopropyltrimethylammonium chloride at 60% in propylene glycol (Varisoft PATC sold by Evonik Degussa)</td>
<td>1</td>
</tr>
<tr>
<td>N-Octanoylglutamine (Lipacide C8G sold by SEPPIC)</td>
<td>0.5</td>
</tr>
<tr>
<td>Fumed silica of hydrophilic nature (Aerosil 300 sold by Evonik Degussa)</td>
<td>5</td>
</tr>
<tr>
<td>Fragrance</td>
<td>1.5</td>
</tr>
<tr>
<td>Oxyethylenated glycercyl cocoate (7 EO) (Tegosoft GC sold by Evonik Degussa)</td>
<td>4</td>
</tr>
</tbody>
</table>

The study is performed on a panel of 20 women: 10 women with natural long hair and 10 women with sensitized long hair. 10 to 15 g of the composition are applied per half-head.
The application, to wet hair as a pre-shampoo, is performed lock by lock in two movements: a first "tangential" movement and a second "shear" movement. The two movements are repeated ten times. The hair is combed, then rinsed and finally dried by blow-drying.

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An analysis of the cosmetic effects provided by the treatments is performed. This analysis is performed by experts.

A study of shampoo remanence of the cosmetic effects observed on application is performed.

**Sensory analysis**

The experts comparatively evaluate the sensory properties of each half-head: one treated with the process of the invention and the other with a pumice-free placebo.

The results show that hair treated with the composition of the invention is smoother and more uniform than hair treated with the placebo. On wet hair, disentangling is easier when the hair has been treated with the composition of the invention.

The experts also observe that the composition of the invention makes it possible to reduce the body and to control the volume of the hair (absence of frizziness). The effects are all the more noteworthy when the hair is sensitized and thick.

After five shampoo washes, the smoothness of the keratin fibres is conserved, as is the volume control, irrespective of the degree of sensitization of the hair (natural to very sensitized).
CLAIMS

1. Anhydrous cosmetic composition comprising:
   - more than 10% by weight, relative to the total weight of the composition, of pumice particles with a mean volume diameter of between 100 and 500 µm,
   - one or more organic compounds chosen from a) fatty substances, b) water-soluble organic solvents, and a mixture thereof, and
   - one or more surfactants.

2. Composition according to Claim 1, characterized in that the pumice particles have a hardness ranging from 3 to 10 Moh, or even greater than or equal to 4, for example greater than or equal to 5, and in particular ranging from 5 to 5.5 on the Moh scale.

3. Composition according to Claim 1 or 2, characterized in that the pumice particles are present in a content ranging from 12% to 35% by weight, especially from 12% to 30% by weight and in particular from 12% to 25% by weight relative to the total weight of the composition.

4. Composition according to any one of the preceding claims, characterized in that the organic compound is a fatty substance chosen from hydrocarbons, fatty alcohols, fatty esters, silicones, non-neutralized fatty acids and fatty ethers, and mixtures thereof.

5. Composition according to any one of the preceding claims, characterized in that the fatty substance is liquid at room temperature and at atmospheric pressure.

6. Composition according to any one of the preceding claims, characterized in that the fatty substance is a plant oil or a liquid hydrocarbon.

7. Composition according to any one of Claims 1 to 3, characterized in that the water-soluble organic solvent(s) are chosen
8. Composition according to any one of Claims 1 to 7, characterized in that the water-soluble organic solvent(s) are chosen from propylene glycol and glycerol.

9. Composition according to any one of the preceding claims, characterized in that the concentration of organic compounds chosen from fatty substances and/or water-soluble solvents may range from 50% to 89.9%, preferably from 55% to 85% and even more preferentially from 60% to 80% by weight relative to the total weight of the composition.

10. Composition according to any one of the preceding claims, characterized in that it contains one or more nonionic and/or cationic surfactants.

11. Composition according to any one of the preceding claims, characterized in that the surfactant(s) are present in the composition in an amount ranging from 0.1% to 40% by weight, preferably from 0.2% to 25% and more particularly from 1% to 20% by weight relative to the total weight of the composition.

12. Composition according to any one of the preceding claims, characterized in that the composition comprises one or more oil thickeners.

13. Process for treating keratin fibres, such as human keratin fibres and especially the hair, comprising a step of applying to the fibres at least one composition as defined in any one of the preceding claims, optionally followed by a rinsing step.

14. Process according to Claim 13, characterized in that it includes an additional step consisting in subjecting the treated keratin fibres to a post-treatment, the post-treatment being chosen from the application of a conditioner, a permanent-waving product, a relaxer, and a product for dyeing or bleaching keratin fibres, and especially the hair.
15. Process according to Claim 13 or 14, characterized in that the step of applying the composition as defined in any one of Claims 1 to 12 to the keratin fibres and especially to the hair is performed by rubbing the keratin fibres and especially the hair with bare hands or by placing at least one surface between the hands and the keratin fibres and especially the hair charged with composition.

16. Hair treatment kit comprising:
   - a compartment containing a cosmetic composition A comprising pumice particles with a mean volume diameter of between 100 and 500 µm as defined in Claim 2 or 3, and
   - a compartment containing a cosmetic composition B comprising one or more organic compounds chosen from a) fatty substances, b) water-soluble organic solvents and a mixture thereof, and one or more surfactants, as defined in any one of Claims 4 to 11,
   - and optionally a compartment containing a composition for post-treatment of keratin fibres and especially the hair, preferably chosen from a conditioner, a permanent-waving product, a relaxer, and a product for dyeing or bleaching keratin fibres, and especially the hair.

17. Use of the composition as defined in any one of Claims 1 to 12, for smoothing keratin fibres, especially the hair.
### INTERNATIONAL SEARCH REPORT

**International application No**

PCT/EP2011/055654

### A. CLASSIFICATION OF SUBJECT MATTER

INV. A61Q5/02 A61Q5/04 A61Q5/12 A61K8/19 A61K8/34
A61K8/39 A61K8/58 A61K8/86
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 practical, search terms used)

EPO-Internal, WPI Data, PAJ

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<th>Relevant to claim No.</th>
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<td>wo 2009/156668 A2 (OREAL [FR]; ROLLAT-CORVOL ISABELLE [FR]; KHENNICHE SAMI RA [FR]; SAMAIN) 30 December 2009 (2009-12-30) cited in the application example 3 claims 1-3, 10-15</td>
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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 document but published on or after the international filing date
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  * 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
  * 6: document member of the same patent family

Date of the actual completion of the international search: 22 June 2011

Date of mailing of the international search report: 01/07/2011

Name and mailing address of the ISA/

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NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040
Fax. (+31-70) 340-3016

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Form PCT/ISA/210 (second sheet) (April 2005)
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| A        | FR 2 931 644 A1 (OREAL [FR])  
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the whole document | 1-17 |
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| A        | US 2002/012697 A1 (SCHWARTZ SAM [US])  
31 January 2002 (2002-01-31)  
paragraph [0020]  
claims 1,14,16 | 1-17 |
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21 June 2007 (2007-06-21)  
paragraphs [0001], [0012], [0016]  
example 1 | 1-17 |
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13 July 1971 (1971-07-13)  
the whole document | 1-17 |
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<tr>
<td>WO 2009156668 A2</td>
<td>30-12-2009</td>
<td>CN 102046138 A</td>
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