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(54) Title: RESHAPING PROCESS AND COMPOSITION COMPRISING AT LEAST 40% BY WEIGHT OF NON-SILICONE FATTY SUBSTANCES AND AT LEAST ONE INORGANIC THICKENER

(57) Abstract: The present invention relates to a cosmetic composition for treating keratin fibres, in particular human keratin fibres such as the hair, comprising one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the composition and one or more inorganic thickeners in the form of particles having a primary number-average size ranging from 0.1 to 500 μm, the composition comprising no colouring agent. The invention also relates to a process for permanently reshaping keratin fibres, comprising a step of applying a cosmetic composition comprising one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the composition and one or more inorganic thickeners in particle form, and a step of heating the keratin fibres at a temperature ranging from 60 to 250°C by means of an iron after application of said cosmetic composition.

Reshaping process and composition comprising at least 40% by weight of non-silicone fatty substances and at least one inorganic thickener

The present invention relates to a cosmetic composition for treating keratin fibres, in particular human keratin fibres such as the hair, comprising one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the composition and one or more particular inorganic thickeners.

The invention also relates to a process for permanently reshaping and in particular straightening keratin fibres, in particular human keratin fibres such as the hair, comprising a step of applying said cosmetic composition to the keratin fibres and a step of heating the keratin fibres by means of an iron after application of said cosmetic composition.

Many people are not satisfied with the appearance of their hair; in particular, people who have curly hair most commonly seek to obtain straight hair, and conversely, individuals who have straight hair wish to have curly hair.

The first of the techniques normally used for permanently reshaping the hair consists, in a first step, in opening the -S-S- disulfide bonds of keratin (keratocystine) using a composition containing a suitable reducing agent (reduction step), and then, after having rinsed the head of hair thus treated, generally with water, in reconstituting said disulfide bonds, in a second step, by applying to the hair, which has been placed under tension beforehand with, for example, rollers, an oxidizing composition (oxidation step, also known as fixing step) so as finally to give the hair the desired shape. This technique thus makes it possible to make the hair wavy (permanent-wave process) and/or to straighten (relax) the hair. The new shape given to the hair by a chemical treatment such as that above is long-lasting and in particular withstands washing with water or with

shampoos, as opposed to the simple conventional techniques of temporary reshaping, such as hairsetting.

The reducing compositions that may be used for the first step of a permanent-reshaping operation, and in particular straightening operation, generally contain sulfites, bisulfites, alkylphosphines or, preferably, thiols as reducing agents. Among the latter, those commonly used are cysteine and various derivatives thereof, cysteamine and derivatives thereof, thiolactic acid or thioglycolic acid, and salts thereof and also esters thereof, especially glyceryl thioglycolate.

The oxidizing compositions required for performing the fixing step are usually compositions based on aqueous hydrogen peroxide solution.

In the context of hair relaxing and straightening techniques, this permanent reshaping operation is generally performed on curly or voluminous hair so as to obtain more or less pronounced straightening and a reduction of the volume and apparent mass of the hair.

However, such a technique is not entirely satisfactory. This is because, although this technique proves to be very effective for modifying the shape of the hair, it still degrades the hair fibres, which is mainly due to the high contents of reducing agents used in the reducing compositions and also to the various more or less long leave-on times that may be involved in such a process.

This technique can thus induce in the long-term an impairment of the quality of the hair, leading to a decrease in the cosmetic properties thereof, such as the sheen thereof, and a degradation of the mechanical properties thereof, more particularly of the mechanical strength thereof, due to swelling of the hair during the rinsing between the reduction step and the oxidation step, which can also be reflected by an increase in the porosity of said hair. These drawbacks are in

particular observed with thioglycolic acid, which is generally used in a basic medium at pH values between 8.5 and 9.5.

Moreover, if the technique of permanent reshaping of the hair described previously is applied to hair that has undergone prior artificial colouring, this technique usually leads to degradation or stripping of this artificial colouring.

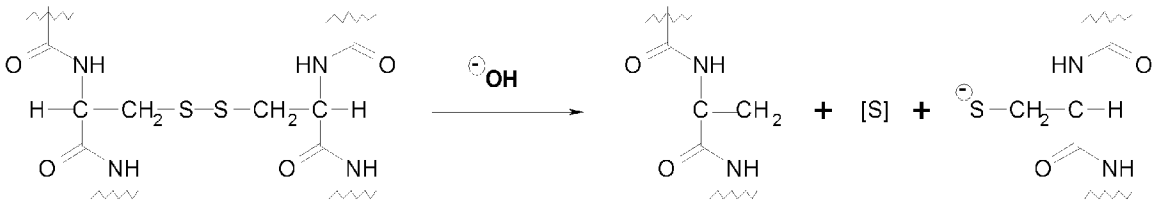
Similarly, if a colouring is applied to permanent-waved hair according to the technique described previously, the colour obtained is very different from the colour normally obtained on non-permanent-waved natural hair.

It has also been observed that the use of reducing agents results in an unsatisfactory durability for the straightening of the hair, in particular for the relaxing or smoothing of the hair.

Finally, it is very common to have to deal with problems of odours, both with the reducing compositions used, and in particular those containing thiols, and with the hair reduced.

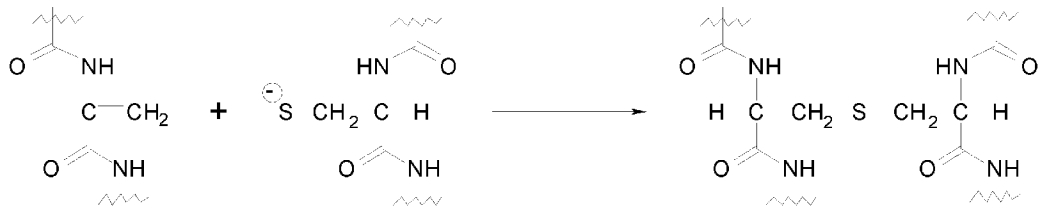
The second of the techniques normally used for obtaining hair straightening or relaxing consists in performing an operation known as lanthionization, using a composition containing a base belonging to the hydroxide family. It results in the replacement of the ($-CH_2-S-S-CH_2-$) disulfide bonds with ($-CH_2-S-CH_2-$) lanthionine bonds. This lanthionization operation involves two consecutive chemical reactions:

- The first reaction consists of a beta-elimination on the cystine caused by a hydroxide ion, resulting in the breaking of this bond and in the formation of dehydroalanine, as it is represented on the following reaction scheme.



cystine dehydroalanine

- The second reaction is a reaction of the dehydroalanine with a thiol group. Indeed, the double bond of the dehydroalanine formed is a reactive double bond. It can react with the thiol group of the cysteine residue which has been freed so as to form a new bond known as a lanthionine bridge or bond or residue. This second reaction is illustrated by the following reaction scheme.



dehydroalanine lanthionine

Compared with the first technique described above that uses a reducing agent, this lanthionization technique does not require a fixing step since the formation of the lanthionine bridges is irreversible. It is therefore carried out in a single step and makes it possible without distinction to either wave the hair, or to shape or smooth or straighten the hair. This technique is mainly used for shaping naturally curly hair.

However, the hydroxides employed during this process have the major drawback of being caustic. This causticity affects the scalp by causing irritations which are sometimes severe, and can also affect the condition of the hair by making it, on the one hand, rough to the

touch and, on the other hand, much more brittle. The use of hydroxides can also in certain cases cause bleaching of the natural colour of the hair.

Moreover, an oily cosmetic composition for maintaining the hair comprising a hydrocarbon-based compound which is solid at ambient temperature and/or a wax which is solid at ambient temperature, a volatile oil and a gelling oil is known from document JP 2008-303178.

This document does not describe a process for permanently reshaping keratin fibres involving the implementation of a step of heating the fibres by means of an iron.

There is therefore a real need to implement a process for permanently reshaping and in particular straightening keratin fibres, in particular human keratin fibres such as the hair, which does not have all the drawbacks described above, i.e. which not only makes it possible to straighten keratin fibres in a long-lasting manner while at the same time giving them satisfactorily cosmetic properties, but which also has improved implementation and use qualities.

The applicant has discovered, surprisingly, that it is possible to achieve the desired properties by implementing a process for permanently reshaping and in particular straightening or smoothing keratin fibres, in particular human keratin fibres such as the hair, comprising a step of applying to said keratin fibres a cosmetic composition comprising one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the composition and one or more inorganic thickeners, in particular in particle form, and a step up heating said keratin fibres at a temperature ranging from 60 to 250°C by means of an iron, said step occurring after the application of said cosmetic composition.

The permanent reshaping process according to the invention has improved use qualities, thereby facilitating its implementation and making it possible to satisfactorily straighten the fibres while at the same time giving them good cosmetic properties.

In particular, the cosmetic compositions do not run at the time they are applied to the keratin fibres nor when the iron is being passed over said fibres. The crackling of the compositions while the iron is being passed over the fibres is therefore minimized.

Moreover, the reshaping process according to the invention makes it possible to render the hair straight both to the touch and visually, in a long-lasting manner, while at the same time giving it good cosmetic properties.

The reshaping process according to the invention also confers on the hair reshaping and in particular straightening which withstands shampooing operations, and also satisfactory cosmetic properties.

More particularly, in the case of straightening, it is observed that initially curly hair becomes straight, even totally straight, after having been treated with the process according to the invention, and that it remains straight even after the application of several shampooing operations.

Likewise, it is observed that initially very frizzy hair loses its frizziness after having been treated with the process according to the invention.

It is also noted that the treatment process according to the invention makes it possible to confer more long-lasting straightening than a conventional care process, it being possible, for example, for the straightening to be still observed after about twenty or so shampooing operations.

Moreover, compared with the conventional permanent reshaping processes, the treatment process according to the invention

does not require the use of a reducing composition or of a composition based on alkaline active agents, and can be carried out on keratin fibres which may be damaged, without degrading the cosmetic properties thereof or the colours thereof.

The treatment process according to the invention also makes it possible to give the hair satisfactory cosmetic properties, in particular in terms of softness, feel and disentangling.

In the case of straightening, the treatment process according to the invention also results in a reduction in the volume and apparent mass of the hair.

A subject of the invention is therefore in particular a cosmetic composition for treating keratin fibres, in particular human keratin fibres such as the hair, comprising one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the composition and one or more inorganic thickeners in the form of particles having a primary number-average size ranging from 0.1 to 500 μm, the composition comprising no colouring agent.

The term "colouring agents" is understood to mean, according to the present invention, agents for colouring keratin fibres, such as direct dyes, pigments or oxidation dye precursors (bases and couplers). If they are present, their content does not exceed 0.001% by weight relative to the total weight of the composition. This is because, at such a content, only the composition would be dyed, i.e. no colouring effect would be observed on the keratin fibres.

It should be remembered that oxidation dye precursors, oxidation bases and couplers are colourless or only slightly coloured compounds which, by a condensation reaction in the presence of an oxidizing agent, give a coloured entity. With regard to direct dyes,

these compounds are coloured and exhibit a degree of affinity for keratin fibres.

In other words, the cosmetic composition according to the invention is a non-colouring composition.

The cosmetic composition according to the invention spreads easily on the keratin fibres, thereby facilitating it application and making it possible to satisfactorily plaster down the fibres.

Moreover, the cosmetic composition has a satisfactory texture and can be rinsed off easily.

A subject of the invention is also a process for permanently reshaping keratin fibres, in particular human keratin fibres such as the hair, comprising:

(a) a step of applying to the keratin fibres a cosmetic composition containing one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the composition and one or more inorganic thickeners, and

(b) a step of heating the keratin fibres at a temperature ranging from 60 to 250°C by means of an iron after application of said cosmetic composition.

The permanent reshaping is preferably straightening of the hair.

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

As indicated previously, the cosmetic composition according to the invention comprises one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the cosmetic composition.

The term “fatty substance” means an organic compound that is insoluble in water at ordinary ambient temperature (25°C) and at

atmospheric pressure (760 mmHg), with a solubility in water of less than 5%, preferably than 1% and even more preferentially than 0.1%. The non-silicone fatty substances generally have in their structure a hydrocarbon-based chain comprising at least 6 carbon atoms. In addition, the fatty substances are generally soluble in organic solvents under the same temperature and pressure conditions, for instance chloroform, ethanol, benzene, liquid petroleum jelly or decamethylcyclopentasiloxane.

The non-silicone fatty substance(s) of the invention is (are), moreover, nonpolyoxyethylenated and nonpolyglycerolated.

The term "non-silicone fatty substance" means a fatty substance of which the structure does not comprise any silicon atoms.

The fatty substance(s) may be liquid or non-liquid at ambient temperature and at atmospheric pressure. 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 liquid non-silicone fatty substance(s) used in the cosmetic composition according to the invention is (are) in particular chosen from hydrocarbons, fatty alcohols, esters of fatty acid and/or of fatty alcohol, non-salified fatty acids, alkoxysilanes having a fatty chain, and mixtures thereof.

The term “liquid hydrocarbon” means a hydrocarbon composed solely of carbon and hydrogen atoms, which is liquid at standard temperature (25°C) and at atmospheric pressure (760 mmHg, i.e. 1.013 $\times 10^5$ Pa).

More particularly, the liquid hydrocarbons are chosen from:

- linear or branched, optionally cyclic, C_6-C_{16} 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 liquid paraffins, and derivatives thereof, petroleum jelly, liquid petroleum jelly, polydecenes, hydrogenated polyisobutene such as the product sold under the brand name Parleam® by the company NOF Corporation, and squalane.

Preferably, the liquid hydrocarbon(s) is (are) chosen from liquid paraffins, isoparaffins, liquid petroleum jelly, undecane, tridecane, isododecane, and mixtures thereof.

In one preferred variant, the liquid hydrocarbon(s) is (are) chosen from liquid petroleum jelly, isoparaffins, isododecane, and a mixture of undecane and of tridecane.

The term “liquid fatty alcohol” means a nonglycerolated and nonoxyalkylenated fatty alcohol, which is liquid at standard temperature (25°C) and at atmospheric pressure (760 mmHg, i.e. 1.013×10^5 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 saturated liquid fatty alcohols of the invention are chosen from octyldodecanol, isostearyl alcohol and 2-hexyldecanol.

Octyldodecanol is most particularly preferred.

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

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 unsaturated liquid 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 esters" means an ester derived from a fatty acid and/or from a fatty alcohol that is liquid at standard temperature (25°C) and at atmospheric pressure (760 mmHg, i.e. 1.013×10^5 Pa).

The esters are preferably liquid esters of saturated or unsaturated, linear or branched C_1-C_{26} aliphatic monoacids or polyacids and of saturated or unsaturated, linear or branched C_1-C_{26} aliphatic monoalcohols or polyalcohols, the total number of carbon atoms of the esters being greater than or equal to 10.

Preferably, for the esters of monoalcohols, at least one of 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, 2-ethylhexyl isononanoate, isodecyl neopentanoate and isostearyl neopentanoate.

Esters of C_4-C_{22} dicarboxylic or tricarboxylic acids and of C_1-C_{22} alcohols and esters of monocarboxylic, dicarboxylic or

tricarboxylic acids and of C_4-C_{26} dihydroxy, trihydroxy, tetrahydroxy or pentahydroxy nonsugar alcohols may also be used.

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

Among the esters mentioned above, it is preferred to use ethyl, isopropyl, myristyl, cetyl or stearyl palmitate, 2-ethylhexyl palmitate, 2-octyldecyl palmitate, alkyl myristates such as isopropyl, butyl, cetyl or 2-octyldodecyl myristate, hexyl stearate, propylene glycol dicaprylate, butyl stearate, isobutyl stearate; dioctyl malate, hexyl laurate, 2-hexyldecyl laurate, isononyl isononanoate or cetyl octanoate.

The composition may also comprise, as liquid fatty ester, sugar esters and diesters of C_6-C_{30} and preferably C_{12}-C_{22} fatty acids. It is recalled that the term “sugar” 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 can be monosaccharides, oligosaccharides or polysaccharides.

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

The esters according to this variant may also be chosen from mono-, di-, tri- and 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, in particular, oleopalmitate, oleostearate or palmitostearate mixed esters.

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

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

Among the sugar esters, it is also possible to use pentaerythrityl esters, preferably pentaerythrityl tetraisostearate, pentaerythrityl tetraoctanoate, and caprylic and capric acid hexaesters as a mixture with dipentaerythritol.

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.

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

- triglyceride oils of plant or synthetic origin, such as liquid fatty acid triglycerides containing from 6 to 30 carbon atoms, for instance heptanoic or octanoic acid triglycerides, or alternatively, for example, sesame oil, soybean oil, coffee oil, safflower oil, borage oil, sunflower oil, olive oil, apricot kernel oil, camellia oil, bambara groundnut oil, avocado oil, mango oil, rice bran oil, cottonseed oil, rose oil, kiwi seed oil, seabuckthorn pulp oil, bilberry oil, poppy oil, orange seed oil, sweet almond oil, palm oil, coconut oil, vernonia oil, marjoram oil, baobab oil, rapeseed oil, ximenia oil or pracaxi oil, caprylic/capric acid triglycerides, for instance those sold by the company Stéarineries Dubois or those sold under the names Miglyol® 810, 812 and 818 by the company Dynamit Nobel, jojoba oil and shea butter oil.

Preferably, use will be made, as liquid esters according to the invention, of triglycerides of plant origin, in particular oils chosen from avocado oil, olive oil, camellia oil, apricot kernel oil, and mixtures thereof, and esters of C_4-C_{22} dicarboxylic or tricarboxylic acids and of C_1-C_{22} alcohols, in particular 1,3-propanediol dicaprylate.

In order to be considered as a fatty substance, the fatty acid must not be in generally soluble soap form, i.e. it must not be salified with a base.

The liquid fatty acids may be chosen from acids of formula RCOOH, in which R is a saturated or unsaturated, linear or branched radical preferably comprising from 7 to 39 carbon atoms.

Preferably, R is a C_7-C_{29} alkyl or C_7-C_{29} alkenyl group and better still a C_{12}–C_{24} alkyl or C_{12}–C_{24} alkenyl group. R may be

substituted with one or more hydroxyl groups and/or one or more carboxyl groups.

The liquid fatty acid may in particular be chosen from oleic acid, linoleic acid and isostearic acid.

The alkoxysilanes involved are those which have a fatty chain preferentially comprising 16 or 18 carbon atoms.

Even more preferentially, the alkoxysilanes can be chosen from hexadecyltriethoxysilane and octadecyltriethoxysilane.

Preferably, the liquid fatty substance(s) is (are) chosen from linear or branched C_6-C_{16} alkanes, fatty alcohols and fatty acid esters, in particular oils of plant origin and esters of C_4-C_{22} dicarboxylic or tricarboxylic acids and of C_1-C_{22} alcohols.

The fatty substance(s) used in the composition according to the invention may also be fatty substances which are non-liquid at ambient temperature (25°C) and at atmospheric pressure (760 mmHg, i.e. 1.013×10^5 Pa).

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, fatty acid and/or fatty alcohol esters, non-silicone waxes and fatty ethers, which are non-liquid and preferably solid.

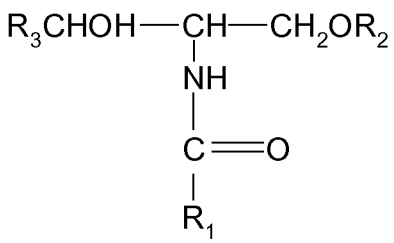
The non-liquid fatty alcohols suitable for the implementation of the invention are chosen more particularly from saturated or unsaturated and linear or branched alcohols comprising from 8 to 30 carbon atoms. Mention may be made, for example, of cetyl alcohol, stearyl alcohol and a mixture thereof (cetylstearyl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

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

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

The non-silicone wax(es) are chosen in particular from carnauba wax, candelilla wax, esparto wax, paraffin wax, ozokerite, plant waxes, such as olive tree wax, rice wax, hydrogenated jojoba wax or absolute flower waxes, such as the blackcurrant blossom essential wax sold by Bertin (France), or animal waxes, such as beeswaxes or modified beeswaxes (cerabellina), and ceramides.

Solid amides that may be mentioned include ceramides. The ceramides or ceramide analogues, such as glycoceramides, that may be used in the compositions according to the invention are known per se and are natural or synthetic molecules that may correspond to general formula (I) below:



(I)

in which:

- R_1 denotes a linear or branched, saturated or unsaturated alkyl radical, derived from C_{14}-C_{30} fatty acids, this radical possibly

being substituted with a hydroxyl group in the alpha position or a hydroxyl group in the omega position esterified with a saturated or unsaturated C_{16}-C_{30} fatty acid;

- R_2 denotes a hydrogen atom or a (glycosyl)n, (galactosyl)m or sulfogalactosyl radical, in which n is an integer ranging from 1 to 4 and m is an integer ranging from 1 to 8;

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

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

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

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

Such compounds are, for example:

- N-linoleoyldihydrosphingosine,
- N-oleoyldihydrosphingosine,
- N-palmitoyldihydrosphingosine,
- N-stearoyldihydrosphingosine,
- N-behenoyldihydrosphingosine,

or mixtures of these compounds.

Even more preferentially, use is made of ceramides for which R_1 denotes a saturated or unsaturated alkyl radical derived from fatty acids; R_2 denotes a galactosyl or sulfogalactosyl radical; and R_3 denotes a $-CH=CH-(CH_2)_{12}-CH_3$ group.

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

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

Preferably, the non-silicone fatty substance(s) used in the cosmetic composition according to the invention is (are) liquid at ambient temperature and atmospheric pressure.

Preferentially, the fatty substance(s) used in the cosmetic composition according to the invention is (are) chosen from hydrocarbons, in particular linear or branched C_6-C_{16} alkanes and linear or branched hydrocarbons, of mineral, animal or synthetic origin, with more than 16 carbon atoms, such as liquid parafins, and derivatives thereof, petroleum jelly, liquid petroleum jelly; fatty acid esters, in particular oils of plant origin and esters of C_4-C_{22} dicarboxylic or tricarboxylic acids and of C_1-C_{22} alcohols, these esters being more preferentially chosen from triglycerides of plant origin and liquid fatty alcohols, and mixtures thereof.

More preferentially, the non-silicone fatty substance(s) is (are) chosen from liquid petroleum jelly, isoparaffins, isododecane, undecane, tridecane, avocado oil, olive oil, camellia oil, apricot kernel oil, 1,3-propanediol dicaprylate, and mixtures thereof.

Even more preferentially, the non-silione fatty substance(s) is (are) chosen from avocado oil, liquid petroleum jelly, and mixtures thereof.

The non-silicone fatty substance(s) used in the cosmetic composition according to the invention can be present in a content ranging from 40% to 100% by weight, preferably in a content ranging from 50% to 100% by weight and even more preferentially in a content ranging from 75% to 100% by weight relative to the total weight of the composition.

Preferably, the cosmetic composition comprises one or more non-silicone fatty substances in a content of greater than or equal to 50% by weight relative to the total weight of the composition.

As indicated previously, the cosmetic composition according to the invention comprises one or more inorganic thickeners in the form of particles which have a primary number-average size ranging from 0.1 to 500 μm.

For the purposes of the present invention, the term "thickener" means an agent which, when introduced at 1% by weight into an aqueous solution or an aqueous-alcoholic solution containing 30% ethanol, and at pH 7, or into an oil chosen from liquid petroleum jelly, isopropyl myristate or cyclopentadimethylsiloxane, makes it possible to achieve a viscosity of at least 100 cps and preferably of at least 500 cps, at 25°C and at a shear rate of 1 s^{-1}. This viscosity may be measured using a cone/plate viscometer (Haake R600 rheometer or the like).

For the purposes of the present invention, the expression "thickener in the form of particles" means a thickener which is insoluble in the composition at a temperature of 25°C and present in said composition in solid or pasty form, preferably solid form.

The thickener(s) used in the present invention may be chosen from inorganic particles essentially constituted of inorganic oxides and/or hydroxides.

For the purposes of the present invention the expression "primary number-average size of particles" means the maximum dimension that it is possible to measure between two diametrically opposed points of an individual particle. When it is a question of a population of particles of various sizes, the size indicated corresponds to the number-average size of the population.

Preferably, the primary number-average size of the inorganic particles used in the present invention ranges from 0.1 to 200 μm, and even more preferentially ranges from 1 to 100 μm.

The size of the inorganic particles can be determined by transmission electron microscopy or from the measurement of the specific surface area by the BET method or using a laser particle sizer.

The inorganic particles may be in various shapes, for example a spherical, needle, flake or platelet shape.

In one variant of the invention, the thickener(s) is (are) platelet-shaped particles.

The thickener(s) in the particle form that are used in the cosmetic composition can preferably be chosen from clays and silicas.

Clays are products that are already well known per se, and that are described, for example, in the publication Minéralogie des argiles [Mineralogy of Clays], S. Caillère, S. Hénin, 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 family of vermiculites, stevensite and chlorites.

The clays can be of natural or synthetic origin. Preferably, clays that are cosmetically compatible and acceptable with keratin fibres such as the hair are used.

The clay can be chosen from montmorillonite, bentonite, hectorite, attapulgite, sepiolite and their mixtures. Preferably, the clay is a bentonite or a hectorite.

The clays may be chosen from organophilic clays.

The organophilic clays are clays modified with a chemical compound chosen from quaternary amines, tertiary amines, amine acetates, imidazolines, amine soaps, fatty sulfates, alkyl aryl sulfonates and amine oxides, and mixtures thereof.

Preferably, the organophilic clays according to the invention are clays modified with a chemical compound chosen from quaternary amines.

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 Elementis, Tixogel VP by the company United Catalyst, and Claytone 34, Claytone 40 and Claytone XL by the company Southern Clay; stearalkonium bentonites such as those sold under the names Bentone 27V by the company Elementis, Tixogel LG by the company United Catalyst, and Claytone AF and Claytone APA by the company Southern Clay and quaternium-18/benzalkonium bentonites such as those sold under the names Claytone HT and Claytone PS by the company Southern Clay.

The organophilic clay is in particular chosen from modified hectorites such as hectorite modified with C_{10}-C_{12} fatty acid ammonium chloride, in particular distearyldimethylammonium chloride and stearylbenzyldimethylammonium chloride.

The silicas that can be used may be natural and untreated. Mention may thus be made of the silicas provided under the names

Sillitin N85, Sillitin N87, Sillitin N82, Sillitin V85 and Sillitin V88 by the company Hoffmann Mineral.

They may be fumed silicas.

The fumed silicas can be obtained by high-temperature hydrolysis of a volatile silicon compound in an oxyhydrogen flame, producing a finely divided silica. This process makes it possible in particular to obtain hydrophilic silicas having a large number of silanol groups at their surface. It is possible to chemically modify the surface of said silica via a chemical reaction which brings about a reduction in the number of silanol groups. It is possible in particular to replace silanol groups with hydrophobic groups: a hydrophobic silica is then obtained.

The hydrophobic groups can be:

(a) trimethylsiloxyl groups, which are obtained in particular by treating fumed silica in the presence of hexamethyldisilazane. Silicas thus treated are known as "Silica silylate" according to the CTFA (6th Edition, 1995);

(b) dimethylsilyloxyl or polydimethylsiloxane groups, which are obtained in particular 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).

Functionalized silicas that may be mentioned include the products provided under the names Aktisil Mam, Aktisil Mam-r and Aktisil WW by the company Hoffmann Mineral.

Preferably, the thickener(s) is (are) chosen from organophilic clays, untreated natural clays, and mixtures thereof.

More preferentially, the thickeners are chosen from hectorites modified with C_{10}-C_{12} fatty acid ammonium chloride, in particular

distearyldimethylammonium chloride and stearylbenzyldimethylammonium chloride, and untreated natural clays.

Even more preferentially, the thickeners are chosen from hectorites modified with distearyldimethylammonium chloride, such as the product sold under the name Bentone 38VCG by the company Elementis, and hectorite modified with stearylbenzyldimethylammonium chloride, such as the product sold under the name Bentone 27V by the company Elementis.

The particulate thickener(s) may be present in the cosmetic composition or the process according to the invention in a content ranging from 0.01% to 30% by weight, preferably in a content ranging from 0.1% to 20% by weight, better still in a content ranging from 1% to 15% by weight and even better still in a content ranging from 2% to 10% by weight relative to the total weight of the composition.

According to one embodiment, the cosmetic composition according to the present invention comprises one or more non-silicone fatty substances in a content of at least 40% by weight, relative to the total weight of the composition, chosen from hydrocarbons, fatty acid esters, in particular triglycerides of plant origin, liquid fatty alcohols and also mixtures thereof, and one or more inorganic thickeners in the form of particles as previously defined, chosen from organophilic clays, silicas, and mixtures thereof.

According to one particular embodiment, the cosmetic composition according to the present invention comprises a mixture of fatty substances comprising one or more triglycerides of plant origin and one or more liquid fatty alcohols, and one or more inorganic thickeners in the form of particles as defined previously, chosen from organophilic clays, in particular from hectorites modified with C_{10}-C_{12} fatty acid ammonium chloride, the mixture of fatty

substances being in a content of at least 40% by weight relative to the total weight of the composition.

The cosmetic composition according to the present invention may comprise water. If the composition comprises water, its content generally ranges from 0.5% to 60% by weight, preferably from 0.5% to 10% by weight and better still from 0.5% to 5% by weight relative to the total weight of the composition.

Preferably, the cosmetic composition according to the invention is anhydrous.

For the purposes of the present invention, the term "anhydrous" means that the cosmetic composition comprises a water content of less than 5% by weight, preferably less than 2% by weight and even more preferably less than 1% by weight relative to the weight of said composition. It should be noted that the water in question is more particularly bound water, such as water of crystallization in salts, or traces of water absorbed by the raw materials used in the production of the compositions according to the invention.

The cosmetic composition according to the invention may in particular be in the form of a gel, cream, paste, foam, spray, lotion, aerosol or thickened liquid.

In particular, when it contains water, the cosmetic composition according to the invention may be in the form of an emulsion, in particular an oil-in-water (O/W) or water-in-oil (W/O) or multiple (W/O/W or polyol/O/W or O/W/O) emulsion, of a microemulsion or of a nanoemulsion.

The cosmetic composition may also comprise one or more surfactants.

The surfactants optionally present in the cosmetic composition used according to the invention may be anionic, non-ionic, amphoteric or cationic.

The term "anionic surfactant" means a surfactant comprising, as ionic or ionizable groups, only anionic groups. These anionic groups are preferably chosen from the CO_2H, CO_2^-, SO_3H, SO_3^-, OSO_3H, OSO_3^-, O_2PO_2H, $O_2PO_2H^-$ and $O_2PO_2^{2-}$ groups.

The anionic surfactant(s) that may be used in the compositions of the invention is (are) chosen in particular from alkyl sulfates, alkyl ether sulfates, alkylamido ether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, alkylsulfonates, alkylamide sulfonates, alkylarylsulfonates, α-olefin sulfonates, paraffin sulfonates, alkylsulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl sulfoacetates, acylsarcosinates, acylglutamates, alkylsulfosuccinamates, acylisethionates and N-acyltaurates, salts of alkyl monoesters and polyglycoside-polycarboxylic acids, acyllactylates, salts of D-galactoside uronic acids, salts of alkyl ether carboxylic acids, salts of alkyl aryl ether carboxylic acids, and salts of alkylamido ether carboxylic acids; or the non-salified forms of all of these compounds, the alkyl and acyl groups of all of these compounds containing from 6 to 24 carbon atoms and the aryl group denoting a phenyl group.

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

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

When the anionic surfactant(s) is (are) in salt form, it (they) is (are) not in the form of zinc salts, and it (they) may be chosen from alkali metal salts, such as the sodium or potassium salt, and preferably the sodium salt, ammonium salts, amine salts, and in particular amino

alcohol salts, and alkaline-earth metal salts such as the magnesium salt.

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

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

Use is preferably made of (C_6-C_{24})alkyl sulfates, (C_6-C_{24})alkyl ether sulfates, which are optionally oxyethylenated, comprising from 2 to 50 ethylene oxide units, and mixtures thereof, in particular in the form of alkali metal salts or alkaline-earth metal salts, ammonium salts or amino alcohol salts. More preferentially, the anionic surfactant(s) is (are) chosen from (C_{10}-C_{20})alkyl ether sulfates, and in particular sodium lauryl ether sulfate containing 2.2 mol of ethylene oxide.

When they are present, the amount of the anionic surfactant(s) preferably ranges from 0.1% to 20% by weight and even better still from 4% to 15% by weight relative to the total weight of the composition.

Examples of non-ionic surfactants that may be used in the cosmetic composition used according to the invention are described, for example, in the "Handbook of Surfactants" by M.R. Porter, published by Blackie & Son (Glasgow and London), 1991, pp. 116-178. They are in particular chosen from alcohols, α-diols and (C_{1-20})alkylphenols, these compounds being polyethoxylated, polypropoxylated and/or polyglycerolated and having at least one fatty chain comprising, for example, from 8 to 18 carbon atoms, the number

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

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

Unless otherwise mentioned, the term "fatty" compound (for example a fatty acid) denotes for these surfactants a compound comprising, in its main chain, at least one saturated or unsaturated hydrocarbon-based chain containing at least 6 carbon atoms, preferably from 8 to 30 carbon atoms and even better still from 10 to 22 carbon atoms, which is optionally substituted with one or more hydroxyl groups, and preferably unsubstituted.

When they are present, the amount of the non-ionic surfactant(s) varies preferably from 0.01% to 20% by weight and better still from 0.2% to 10% by weight relative to the total weight of the composition.

The amphoteric or zwitterionic surfactant(s) that can be used in the present invention may in particular be optionally quaternized secondary or tertiary aliphatic amine derivatives, in which the aliphatic group is a linear or branched chain containing from 8 to 22 carbon atoms, said amine derivatives containing at least one anionic group such as, for example, a carboxylate, sulfonate, sulfate, phosphate or phosphonate group. Mention may be made in particular of (C_8-C_{20})alkylbetaines, sulfobetaines, (C_8-C_{20})alkylamido(C_3-C_8)alkylbetaines or (C_8-C_{20})alkylamido(C_6-C_8) alkyl sulfobetaines. Among the optionally quaternized secondary or tertiary aliphatic amine derivatives that may be used, as defined above, mention may

also be made of the compounds having the respective structures (II) and (III) below:

$$RaCONHCH_2CH_2\,N^{+}(Rb)(Rc)(CH_2COO^{-}) \qquad (II)$$

in which:

Ra represents a C_{10}-C_{30} alkyl or alkenyl group derived from an acid

Ra-COOH, preferably present in hydrolyzed coconut oil, represents a heptyl, nonyl or undecyl group,

Rb represents a β-hydroxyethyl group, and

Rc represents a carboxymethyl group;

and

$$Ra'\text{-}CONHCH_2CH_2\text{-}N(B)(B') \qquad (III)$$

in which:

B represents $-CH_2CH_2OX'$,

B' represents $(CH_2)zY'$, with z = 1 or 2,

X' represents the group $-CH_2-COOH$, CH_2-COOZ', $-CH_2CH_2-COOH$ or $-CH_2CH_2-COOZ'$, or a hydrogen atom,

Y' represents –COOH, –COOZ' or the group $-CH_2-CHOH-SO_3H$ or $-CH_2-CHOH-SO_3Z'$,

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,

Ra' represents a C_{10}-C_{30} alkyl or alkenyl group of an acid Ra'-COOH which is preferably present in coconut oil or in hydrolysed linseed oil, or an alkyl group, in particular a C_{17} group, and its iso form, or an unsaturated 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.

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

Among the abovementioned amphoteric or zwitterionic surfactants, use is preferably made of (C_8-C_{20} alkyl)betaines such as cocoylbetaine, and (C_8-C_{20} alkyl)amido(C_2–C_8 alkyl)betaines such as cocoylamidopropylbetaine, and mixtures thereof. More preferably, the amphoteric or zwitterionic surfactant(s) is (are) chosen from cocoylamidopropylbetaine and cocoylbetaine.

When they are present, the amount of the amphoteric or zwitterionic surfactant(s) is preferably in the range from 0.01% to 20% by weight and better still from 0.5% to 10% by weight relative to the total weight of the composition.

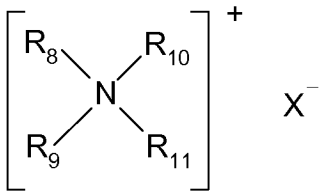
The term "cationic surfactant" means a surfactant that is positively charged when it is contained in the composition according to the invention. This surfactant may bear one or more positive permanent charges or may contain one or more functions that are cationizable in the composition according to the invention.

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

The fatty amines generally comprise at least one C_8-C_{30} hydrocarbon-based chain. Among the fatty amines that can be used according to the invention, examples that may be mentioned include stearylamidopropyldimethylamine and distearylamine.

Mention may in particular be made, as quaternary ammonium salts, of, for example:

- those corresponding to general formula (IV) below:



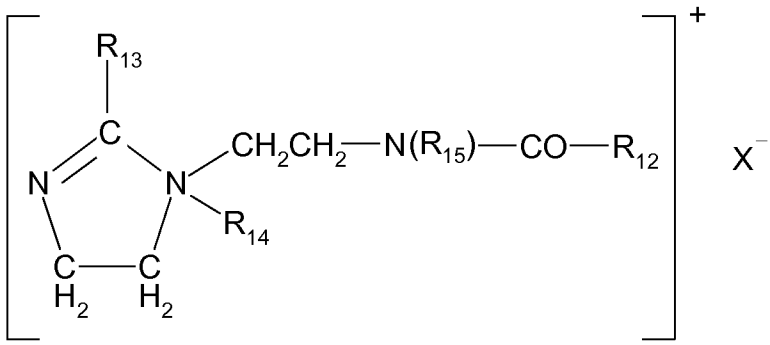
(IV)

in which the groups R_8 to R_{11}, 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 R_8 to R_{11} denoting a group containing from 8 to 30 carbon atoms, preferably from 12 to 24 carbon atoms. The aliphatic groups may comprise heteroatoms such as, in particular, oxygen, nitrogen, sulfur and halogens. The aliphatic groups are chosen, for example, from C_1-C_{30} alkyl, C_1-C_{30} alkoxy, (C_2-C_6) polyoxyalkylene, C_1-C_{30} alkylamide, (C_{12}-C_{22})alkylamido(C_2-C_6)alkyl, (C_{12}-C_{22})alkyl acetate, and C_1-C_{30} hydroxyalkyl groups; X^- is an anion chosen from the group of halides, phosphates, acetates, lactates, (C_1-C_4)alkyl sulfates and (C_1-C_4)alkyl sulfonates or (C_1-C_4)alkylaryl 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, distearyldimethylammonium, cetyltrimethylammonium or

benzyldimethylstearylammonium salts, or, on the other hand, the palmitylamidopropyltrimethylammonium salt, the stearamidopropyltrimethylammonium salt, the stearamidopropyldimethylcetearylammonium salt, or the stearamidopropyldimethyl(myristyl acetate)ammonium salt sold under the name Ceraphyl® 70 by the company Van Dyk. It is particularly preferred to use the chloride salts of these compounds;

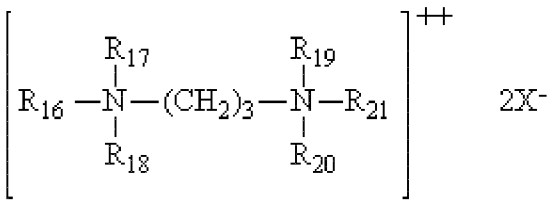
- quaternary ammonium salts of imidazoline, such as, for example, those of formula (V) below:



(V)

in which R_{12} represents an alkenyl or alkyl group containing from 8 to 30 carbon atoms, for example tallow fatty acid derivatives, R_{13} represents a hydrogen atom, a C_1-C_4 alkyl group or an alkenyl or alkyl group containing from 8 to 30 carbon atoms, R_{14} represents a C_1-C_4 alkyl group, R_{15} represents a hydrogen atom or a C_1-C_4 alkyl group, X^- is an anion chosen from the group of halides, phosphates, acetates, lactates, alkyl sulfates, alkyl sulfonates or alkylaryl sulfonates, the alkyl and aryl groups of which preferably comprise, respectively, from 1 to 20 carbon atoms and from 6 to 30 carbon atoms. Preferably, R_{12} and R_{13} denote a mixture of alkenyl or alkyl groups comprising from 12 to 21 carbon atoms, for example tallow fatty acid derivatives, R_{14} denotes a methyl group, and R_{15} denotes a hydrogen atom. Such a product is sold, for example, under the name Rewoquat® W 75 by the company Rewo;

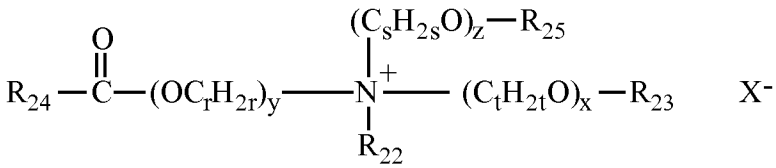
- diquaternary or triquaternary ammonium salts, in particular of formula (VI):



(VI)

in which R_{16} 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_{17} is chosen from hydrogen and an alkyl radical containing from 1 to 4 carbon atoms or a group $(R_{16a})(R_{17a})(R_{18a})N\text{-}(CH_2)_3$, R_{16a}, R_{17a}, R_{18a}, R_{18}, R_{19}, R_{20} and R_{21}, which may be identical or different, are chosen from hydrogen and an alkyl radical containing from 1 to 4 carbon atoms, and X^- is an anion chosen from the group of halides, acetates, phosphates, nitrates and methyl sulfates. Such compounds are, for example, Finquat CT-P, provided by the company Finetex (Quaternium 89), and Finquat CT provided by the company Finetex (Quaternium 75),

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

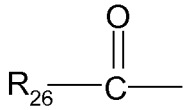


(VII)

in which:

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

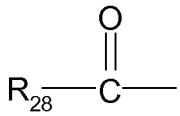
R_{23} is chosen from:

- the group 

- the groups R_{27} which are linear or branched, saturated or unsaturated C_1-C_{22} hydrocarbon-based groups,

- a hydrogen atom,

R_{25} is chosen from:

- the group 

- the groups R_{29} which are linear or branched, saturated or unsaturated C_1-C_6 hydrocarbon-based groups,

- a hydrogen atom,

R_{24}, R_{26} and R_{28}, which may be identical or different, are chosen from linear or branched, saturated or unsaturated C_7-C_{21} hydrocarbon-based groups;

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

r_1 and t_1, which may be identical or different, are 0 or 1

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

y is an integer ranging from 1 to 10;

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

X^- 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 R_{29}.

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

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

Advantageously, the sum x + y + z is from 1 to 10.

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

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

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

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 X^- is preferably a halide (chloride, bromide or iodide) or an alkyl sulfate, more particularly methyl sulfate. However, it is possible to use methanesulfonate, phosphate, nitrate, tosylate, an anion derived from an organic acid, such as acetate or lactate, or any other anion that is compatible with the ammonium containing an ester function.

The anion 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 (VII) in which:

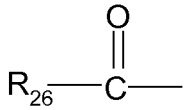
R_{22} denotes a methyl or ethyl group,

x and y are equal to 1;

z is equal to 0 or 1;

r, s and t are equal to 2;

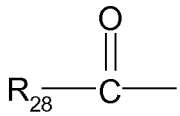
R_{23} is chosen from:

- the group 

- methyl, ethyl or C_{14}-C_{22} hydrocarbon groups,

- a hydrogen atom;

R_{25} is chosen from:

- the group 

- a hydrogen atom;

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

The hydrocarbon-based groups are advantageously linear.

Mention may, for example, be made of the compounds of formula (VI), such as the salts (in particular chloride or methyl sulfate) of diacyloxyethyldimethylammonium, diacyloxyethylhydroxyethylmethylammonium, monoacyloxyethyldihydroxyethylmethylammonium, triacyloxyethylmethylammonium or monoacyloxyethylhydroxyethyldimethylammonium, 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 alkyldiethanolamine or of alkyldiisopropanolamine, which are optionally oxyalkylenated, with C_{10}-C_{30} fatty acids or with mixtures of C_{10}-C_{30} fatty acids of plant or animal origin, or by transesterification

of their methyl esters. This esterification is followed by quaternization using an alkylating agent such as an alkyl (preferably methyl or ethyl) halide, a dialkyl (preferably dimethyl or diethyl) sulfate, methyl methanesulfonate, methyl para-toluenesulfonate, glycol chlorohydrin or glycerol chlorohydrin.

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

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

It is also possible to use the ammonium salts containing at least one ester function that are described in patents US-A-4 874 554 and US-A-4 137 180.

Use may be made of behenoylhydroxypropyltrimethylammonium chloride provided by KAO under the name Quatarmin BTC 131.

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

Among the quaternary ammonium salts containing at least one ester function, which can be used, it is preferred to use dipalmitoylethylhydroxyethylmethylammonium salts.

When they are present, the amount of the cationic surfactant(s) is preferably in the range of from 0.01% to 20% by weight and better still from 0.5% to 10% by weight relative to the total weight of the composition.

Preferably, the surfactant(s) is (are) chosen according to the fatty substance(s) present in the cosmetic composition, in particular

the selected surfactant has a fatty chain with a length similar to that predominantly present in the fatty substance used.

Preferably, the cosmetic composition according to the invention comprises one or more non-ionic surfactants.

According to one embodiment, the cosmetic composition according to the present invention is anhydrous and comprises one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the composition, one or more inorganic thickeners in the form of particles as previously defined, and one or more surfactants.

The presence of one or more surfactants in a cosmetic composition according to the present invention, which is anhydrous, makes it possible to improve the rinsing-off of the composition.

According to one particular embodiment, the cosmetic composition according to the invention is anhydrous and comprises one or more non-silicone fatty substances in a content of at least 40% by weight, chosen from triglycerides of plant origin, one or more inorganic thickeners in the form of particles as previously defined, chosen from organophilic clays and hydrophilic fumed silicas, and one or more non-ionic surfactants, in particular polyglycerolated or polyoxyethylenated surfactants.

The compositions of the invention may comprise one or more linear, branched or cyclic, volatile or non-volatile silicones.

These silicones, preferably polydimethylsiloxanes, may or may not be organomodified. The term "organomodified" means silicones bearing functions such as amine, amide, hydroxyl, aryl, carboxyl, phosphate, alkoxy or polyoxyalkylenated functions.

Preferably, the silicones are polydimethylsiloxanes which are optionally aminated and/or polyoxyethylenated.

The cosmetic composition may contain one or more organic solvents other than the fatty substances previously described and chosen from C_1-C_4 alcohols, for instance ethanol, isopropanol, tert-butanol or n-butanol; propylene carbonate, polyols such as propylene glycol, and polyol ethers; acetone, and mixtures thereof.

Preferably, the organic solvents are water-soluble, i.e. they have a solubility in water of greater than 10% by weight at 25°C.

When these organic solvents are present, their proportion ranges in particular from 1% to 59.99% by weight, preferably between 5% and 50% by weight and even more preferentially between 8% and 40% by weight relative to the total weight of the hair treatment composition.

The composition may also contain one or more additives chosen from the active ingredients and cosmetic adjuvants commonly used in the field of haircare. These additives are chosen, for example, from conditioning agents such as cationic polymers, chitosans and derivatives thereof, vitamins, amino acids, oligopeptides, peptides, hydrolyzed or non-hydrolyzed, modified or unmodified proteins, enzymes, organic acids other than the non-salified fatty acids, UV screening agents, antioxidants and free-radical scavengers, chelating agents, antidandruff agents, seborrhoea-regulating agents, calmatives, acids, bases, plasticizers, fragrances and preservatives.

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

The composition may comprise one or more colouring agents chosen from direct dyes, oxidation dye precursors, pigments, and mixtures thereof, in a content of less than 0.001% by weight relative to the total weight of the composition.

According to one embodiment, the cosmetic composition may be packaged in aerosol form.

The propellant may be any liquefiable gas customarily used in aerosol devices. Dimethyl ether, C_3-C_5 alkanes, chlorinated and/or fluorinated hydrocarbons such as 1,1-difluoroethane, and mixtures thereof, for instance mixtures of dimethyl ether and of C_3-C_5 alkanes, and mixtures of 1,1-difluoroethane and of dimethyl ether and/or of C_3-C_5 alkanes, are in particular chosen. Carbon dioxide, nitrous oxide, nitrogen or compressed air, or mixtures thereof, may also be used as propellant.

Preferably, the propellant gas used is dimethyl ether or C_3-C_5 alkanes, and in particular propane, n-butane and isobutane, and mixtures thereof.

The liquid phase/propellant weight ratio of the pressurized hair compositions of the present invention is preferably between 50 and 0.05, and in particular between 50 and 1.

The aerosol device used to package the compositions of the invention may be made up of two compartments, formed from an outer aerosol can comprising an inner bag hermetically sealed to a valve. The composition is introduced into the inner bag and a compressed gas is introduced between the bag and the can at a pressure sufficient to make the product come out in the form of a spray through a nozzle orifice. Such a device is sold, for example, under the name EP Spray by the company EP Spray System SA. Said compressed gas is preferably used at a pressure of between 1 and 12 bar and even better still between 9 and 11 bar.

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

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

In the case of aerosol foams, the composition according to the invention may also contain at least one cationic, non-ionic, anionic or amphoteric surfactant.

The present invention also relates to a process for permanently reshaping keratin fibres, in particular human keratin fibres such as the hair, comprising:

(a) a step of applying to the keratin fibres a cosmetic composition comprising one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the composition and one or more inorganic thickeners, in particular in particle form, and

(b) a step of heating the keratin fibres at a temperature ranging from 60 to 250°C by means of an iron after application of said cosmetic composition.

The cosmetic composition can be applied to dry or wet hair, preferentially to wet hair, with or without a leave-on time.

After application of the cosmetic composition according to the invention and before the increase in temperature of the keratin fibres by means of an iron, said composition can be left on for a period ranging from 5 to 60 minutes, preferably ranging from 5 to 15 minutes. The leave-on time can be performed under heat, and in particular under an occlusive system.

The cosmetic composition according to the invention is applied to the keratin fibres preferably in an amount of from 0.1 to 10 grams

and better still from 0.2 to 5 grams of composition per gram of keratin fibres.

After application of the cosmetic composition according to the invention, the keratin fibres can be wrung out in order to remove the excess composition.

As explained previously, the process according to the invention comprises a step of heating the hair at a temperature ranging from 60 to 250°C which is carried out by means of an iron, after application of the cosmetic composition according to the invention.

The heating step is necessary to optimize the effects of the process.

For the purposes of the present invention, the term "iron" means a device for heating keratin fibres which brings said fibres and the heating device into contact.

The end of the iron which comes into contact with the keratin fibres generally has two flat surfaces. These two surfaces may be made of metal. In particular, these two surfaces may be smooth or crimped.

The heating step can be performed by means of a straightening iron, a curling iron, a crimping iron or a steam iron. Preferably, the heating step is performed by means of a straightening iron.

By way of example of irons which can be used in the straightening process according to the invention, mention may be made of any type of flat iron, and in particular, in a non-limiting manner, those described in patents US 5 957 140 and US 5 046 516.

The iron can be applied by successive separate strokes lasting a few seconds or by gradual movement or sliding along the locks.

Preferably, the iron is applied in the process according to the invention by a continuous movement from the root to the tip, in one or more passes, in particular in two passes each lasting from 5 seconds to 1 minute.

The use of the iron during the process according to the invention provides the keratin fibres with a dry heat and not with a wet heat, which makes possible reshaping and in particular permanent straightening of the keratin fibres.

Preferably, the step of heating the hair is carried out at a temperature ranging from 100 to 250°C, preferably from 190 to 220°C, better still from 200 to 215°C, and in particular at a temperature of 210°C, for a period of time which can range from 5 seconds to one hour, and preferentially from 5 seconds to one minute.

The straightening process according to the invention can also comprise an additional step of pre-drying after the application of the cosmetic composition and before the step of heating the keratin fibres carried out at a temperature ranging from 60 to 250°C so as to prevent significant releases of vapours which might burn the hands of the hairdresser and the scalp of the person. The pre-drying step can be carried out by means of a hand-held hairdryer or of a hood dryer or else by drying in the open air.

After the passage of the iron, the keratin fibres can be optionally rinsed or washed with a shampoo. The keratin fibres are then optionally dried by means of a hand-held hairdryer or of a hood dryer.

Preferably, the compositions used in the process of the invention comprise one or more inorganic thickeners in the form of particles having a primary number-average size ranging from 0.1 to 500 μm, in particular from 0.1 to 200 μm, and more particularly from 1 to 100 μm.

Preferably, the compositions used in the process of the invention comprise one or more inorganic thickeners chosen from clays and silicas.

Preferably, the cosmetic composition used in the process comprises one or more non-silicone fatty substances in a content of greater than or equal to 50% by weight relative to the total weight of the composition.

The straightening process according to the invention advantageously does not comprise the application of a reducing composition, neither before, nor during, nor after the application of the cosmetic composition of the invention.

In particular, the cosmetic composition according to the invention is preferably free of reducing agents.

For the purposes of the present invention, the expression "composition free of reducing agents" means a composition containing less than 1% by weight of reducing agents relative to the total weight of the composition, preferably a composition which does not contain reducing agents.

According to one embodiment, the permanent reshaping and in particular straightening process according to the invention comprises a step of applying a cosmetic composition containing one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the composition and one or more inorganic thickeners in particle form, a step of carrying out one or more cosmetic treatments of the keratin fibres, in particular a step of applying a shampoo to the fibres, and a step of heating the keratin fibres by means of an iron after application of said cosmetic composition according to the invention, until the desired shape or shape intensity is obtained.

When relaxing or defrizzing the hair, the cosmetic composition is applied to the hair, preferably wet hair, and the hair is then subjected to mechanical reshaping for fixing it in its new shape, by

means of a hair straightening operation, with a wide-toothed comb, with the back of a comb, by hand or with a brush.

The step of heating the hair is then carried out at a temperature ranging from 60 to 250°C by means of an iron, preferably a flat iron, as previously indicated.

Preferably, the treatment process is carried out on frizzy or curly hair.

The present invention also relates to a kit comprising a cosmetic composition containing one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight and one or more inorganic thickeners, in particular in the form of particles preferably chosen from clays or silicas, and an iron that can provide a temperature ranging from 60 to 250°C.

The following examples are given as illustrations of the present invention.

EXAMPLE

I. Compositions tested

a. Compositions based on fumed silica

The compositions according to the invention (1) to (6) are prepared from the ingredients indicated in the table below, the amounts of which are expressed as weight percentages relative to the total weight of the composition.

Compositions	1	2	3	4	5	6
Avocado oil	92	91.5	91	90	87	94
Silica at 20 µm (1)	8	8	8	8	8	5
Water	-	0.5	1	2	5	1

(1) The silica is sold under the name Sillitin N85 by the company Hoffmann Mineral.

b. Compositions based on clays

The compositions according to the invention (7) to (16) are prepared from the ingredients indicated in the table below, the amounts of which are expressed as weight percentages relative to the total weight of the composition.

Compositions	7	8	9	10	11	12	13
Avocado oil	88	92	96	-	-	-	44
Liquid petroleum jelly	-	-	-	88	92	96	44
Hectorite modified with stearylbenzyl-dimethylammonium, at 55 µm (2)	9	6	3	-	-	-	-
Hectorite modified with distearyldimethyl-ammonium, at 0.8 µm (3)	-	-	-	9	6	3	9
Propylene carbonate	3	2	1	3	2	1	3

Compositions	14	15	16
Avocado oil	44	87	-
Liquid petroleum jelly	44	-	87
Hectorite modified with stearylbenzyldimethyl-ammonium, at 55 µm [2]	9	-	-
Hectorite modified with distearyldimethyl-ammonium, at 0.8 µm [3]	-	9	9
Propylene carbonate	3	3	3
Water	-	1	1

[2] The hectorite modified with stearylbenzyldimethylammonium is sold under the name Bentone 27V by the company Elementis

[3] The hectorite modified with distearyldimethylammonium is sold under the name Bentone 38 VCG by the company Elementis

c. Compositions based on clays containing a surfactant

The composition (17) according to the invention is prepared from the ingredients indicated in the table below, the amounts of which are expressed as weight percentages relative to the total weight of the composition.

Compositions	17
Avocado oil	77
Hectorite modified with stearylbenzyldimethylammonium, at 55 μm (2)	6
Propylene carbonate	2
Polyglycerolated (2 mol) oleyl alcohol	15

(2) The hectorite modified with stearylbenzyldimethylammonium is sold under the name Bentone 27V by the company Elementis

d. Compositions based on clays containing a mixture of fatty substances

The composition (18) according to the invention is prepared from the ingredients indicated in the table below, the amounts of which are expressed as weight percentages relative to the total weight of the composition.

Compositions	18
Avocado oil	75.5
Hectorite modified with distearyldimethylammonium, at 0.8 µm [4]	9
Propylene carbonate	3
Water	1
Octyldodecanol	11.5

[3] The hectorite modified with distearyldimethylammonium is sold under the name Bentone 38 VCG by the company Elementis

II. Application to locks

1. Application protocol

Locks of natural curly hair weighing 2.7 grams are washed beforehand with a shampoo.

2.7 grams of each of compositions (1) to (18) according to the invention and a reference composition (A) comprising 100% of water are applied to each of the locks. After a leave-on time of 10 minutes, the locks are then wrung out in order to remove the excess product, and are then pre-dried using a hand-held hairdryer at a temperature of 60°C.

A straightening iron is then applied a temperature of 210°C with two passes being performed. The locks are washed with a shampoo and are then dried.

A panel of experts compares the effects provided by compositions (1) to (18) according to the invention and the reference composition (A).

2. Results

It is noted that the locks treated with compositions (1) to (16) went from curly to straight after natural drying. After ten shampooing operations, the locks treated with compositions (1) to (16) are still straight. The lock treated with the reference composition (A) remains curly.

III. Application to heads

The curliness of the hair is graded on a scale of 1 to 10, 1 being completely straight hair and 10 very curly hair.

Curly hair model - comparison composition (15)/reference composition (A)

a. Application protocol

Composition (15) according to the invention and the reference composition (A) are applied to one half of the head of a model with curly hair, and left on for 10 minutes. After the leave-on time, the hair is then wrung out in order to remove the excess product, and then pre-dried using a hand-held hairdryer at a temperature of 60°C.

A straightening iron is then applied a temperature of 210°C with two passes being performed. The head of hair of the model is then washed with a shampoo and then dried.

The application protocol is carried out on five models who exhibit on average a natural curliness of 4, i.e. curly hair.

A panel of experts compares the effects provided on the head of hair by compositions (15) and (A).

b. Results

After natural drying, it is noted that, on the side on which composition (15) according to the invention was applied, the degree of curliness decreased on average to a degree of curliness of 2.4. The head of hair went from curly to slightly wavy.

The head of hair of the models was also evaluated over time. On three models, after a period of 15 days and an average of 5 shampooing operations, it is noted that the head of hair of the models, on the side on which composition (15) according to the invention was applied, retained the same degree of curliness as just after the application.

CLAIMS

1. Process for permanently reshaping keratin fibres, in particular human keratin fibres such as the hair, comprising:

a) a step of applying to the keratin fibres a cosmetic composition containing one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of said composition and one or more inorganic thickeners, and

b) a step of heating the keratin fibres at a temperature ranging from 60 to 250°C by means of an iron after application of said cosmetic composition.

2. Process according to claim 1, characterized in that the temperature ranges from 100 to 250°C, preferably from 190 to 220°C and better still from 200 to 215°C.

3. Process according to either one of claims 1 or 2, characterized in that it also comprises a step of pre-drying the keratin fibres before the heating step.

4. Process according to any one of claims 1 to 3, characterized in that it is a hair straightening process.

5. Cosmetic composition for treating keratin fibres, in particular human keratin fibres such as the hair, comprising one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight relative to the total weight of the composition and one or more inorganic thickeners in the form of particles having a primary number-average size ranging from 0.1 to 500 μm, the composition comprising no colouring agent.

6. Cosmetic composition according to claim 5, characterized in that the non-silicone fatty substances are liquid at ambient temperature and atmospheric pressure.

7. Cosmetic composition according to claim 6, characterized in that the liquid non-silicone fatty substances are chosen from

hydrocarbons, fatty alcohols, esters of fatty acid and/or of fatty alcohol, fatty acids, alkoxysilanes having a fatty chain, and mixtures thereof.

8. Cosmetic composition according to claim 7, characterized in that the liquid non-silicone fatty substances are chosen from hydrocarbons, in particular linear or branched C_6-C_{16} alkanes and linear or branched hydrocarbons, of mineral, animal or synthetic origin, with more than 16 carbon atoms, such as liquid parafins, and derivatives thereof, petroleum jelly, liquid petroleum jelly, fatty alcohols, fatty acid esters, in particular oils of plant origin and esters of C_4-C_{22} dicarboxylic or tricarboxylic acids and of C_1-C_{22} alcohols.

9. Cosmetic composition according to claim 5, characterized in that the non-silicone fatty substances are non-liquid at ambient temperature and atmospheric pressure.

10. Cosmetic composition according to claim 9, characterized in that the non-liquid fatty substances are chosen from fatty alcohols, fatty acid and/or fatty alcohol esters, non-silicone waxes and fatty ethers, which are non-liquid and preferably solid.

11. Cosmetic composition according to claim 10, characterized in that the non-liquid fatty alcohols are chosen from saturated or unsaturated and linear or branched alcohols comprising from 8 to 30 carbon atoms, such as cetyl alcohol, stearyl alcohol, and a mixture thereof.

12. Cosmetic composition according to any one of claims 5 to 11, characterized in that the non-silicone fatty substance(s) is (are) chosen from liquid petroleum jelly, isoparaffins, isododecane, undecane, tridecane, avocado oil, olive oil, camellia oil, apricot kernel oil, 1,3-propanediol dicaprylate, and mixtures thereof.

13. Cosmetic composition according to any one of claims 5 to 12, characterized in that the inorganic thickeners in particle form have

an average size ranging from 0.1 to 200 μm, and even more preferentially ranging from 1 to 100 μm.

14. Cosmetic composition according to any one of claims 5 to 13, characterized in that the thickeners are chosen from clays, which are preferably organophilic, and silicas, which are preferably untreated and natural.

15. Cosmetic composition according to any one of claims 5 to 14, characterized in that the organophilic clays are chosen from modified hectorites with distearyldimethylammonium chloride and from modified hectorites with stearylbenzyldimethylammonium chloride.

16. Cosmetic composition according to any one of claims 5 or 15, characterized in that it also comprises one or more surfactants, preferably non-ionic surfactants.

17. Cosmetic composition according to any one of claims 5 or 16, characterized in that it is anhydrous.

18. Kit comprising a cosmetic composition containing one or more non-silicone fatty substances in a content of greater than or equal to 40% by weight and one or more inorganic thickeners, and an iron that can provide a temperature ranging from 60 to 250°C.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/056631

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61K8/25 A61K8/31 A61K8/34 A61K8/37 A61K8/92
A61K8/96 A61Q5/04
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61K A61Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 958 539 A1 (OREAL [FR]) 14 October 2011 (2011-10-14) page 3, line 13 - line 17 page 4, line 4 - line 19 page 30, line 24 - line 26 page 33, line 17 - page 34, line 10 page 42, line 14 - line 23 page 44 - page 45; example 1 page 45, line 1 - page 46, line 18 -----	1-8, 12-14, 16-18
X	US 4 605 018 A (DE LA GUARDIA MARIO [US] ET AL) 12 August 1986 (1986-08-12) column 1, line 24 - line 48 column 3, line 13 - line 25 column 6, line 19 - line 60 ----- -/--	5-17

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 April 2013	07/05/2013

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Olausson Boulois, J

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Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2008 303178 A (MANDOM CORP) 18 December 2008 (2008-12-18) cited in the application abstract paragraph [0001] paragraph [0048]; example 1 paragraph [0050]; example 3 paragraph [0049]; example 2	5-14,16, 17
Y	DATABASE GNPD [Online] MINTEL; 1 July 2009 (2009-07-01), "Flat Iron Serum - Gllendex Natural Lise System", XP002657281, Database accession no. 1134090 the whole document	1-18
Y	WO 2009/040149 A1 (HENKEL AG & CO KGAA [DE]; KLEEN ASTRID [DE]; TERRIER JANIE [DE]; AKRAM) 2 April 2009 (2009-04-02) page 4, paragraph 2 - paragraph 3 page 7	1-18
A	Anonymous: "The benefits of hectorite vs. silicain underarm products", Elementis Specialties , 31 December 2009 (2009-12-31), pages 1-16, XP002689069, Retrieved from the Internet: URL:http://www.elementis.com/esweb/webprod literature.nsf/allbydocid/B48DE7E10D00FE35 8525760500630 8C6/$FILE/The%20Benefits%20of %20Hectorite%20Clay%20vs%20Silica%20in%20U nderarm%20Products.pdf [retrieved on 2012-12-10] the whole document	1-18
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2013/056631

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		WO 2011128308 A1	20-10-2011
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WO 2009040149 A1	02-04-2009	DE 102007045974 A1	09-04-2009
		EP 2190402 A1	02-06-2010
		WO 2009040149 A1	02-04-2009
FR 2968546 A1	15-06-2012	FR 2968546 A1	15-06-2012
		WO 2012080231 A1	21-06-2012