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(54) **Title**: KERATIN FIBRE BLEACHING COMPOSITION IN COMPRESSED FORM WITH PERSULFATE AND PARTICULAR CATIONIC POLYMER

(57) **Abstract**: The subject of the present invention is a composition for bleaching keratin fibres which is in compressed form, comprising at least one persulfate and at least one polymer chosen from cationic polymers having a charge density greater than or equal to 4 milliequivalents per gram (meq/g), amphoteric polymers and mixtures thereof.

Keratin fibre bleaching composition in compressed form with persulfate and particular cationic polymer

The present invention relates to a composition for bleaching keratin fibres, in particular the hair, in compressed form, comprising at least one persulfate and at least one particular amphoteric or cationic polymer.

The bleaching of human keratin fibres, and more particularly the hair, is performed by oxidation of the "melanin" pigment resulting in the dissolution and the partial or total removal of this pigment.

To bleach the hair, use is in particular made of bleaching powders containing a peroxygenated reagent, such as ammonium persulfates, perborates and percarbonates or alkali metal persulfates, perborates and percarbonates, which is combined, at the time of use, with an aqueous hydrogen peroxide composition.

Since peroxygenated salts and hydrogen peroxide are relatively inefficient in acidic medium, it is often necessary to activate them at basic pH in order to obtain an adequate formation of active oxygen. It is thus common practice to add to the bleaching powders alkaline compounds such as alkali metal or alkaline-earth metal silicates and dibasic or tribasic phosphates, and in particular alkali metal metasilicates, optionally in the presence of ammonia precursors such as ammonium salts.

However, bleaching powders have a tendency to form dust during their handling, transportation and storage.

Now, the products of which they are composed (alkali metal persulfates and silicates) are aggressive and in particular irritant to the eyes, the respiratory pathways and mucous membranes.

To overcome the problem of the volatility of bleaching powders, less volatile powders have been developed by adding additives for reducing the content of fine particles, and pastes have been developed comprising said pulverulent agents (peroxygenated salts, alkaline agents, thickeners) in an organic inert liquid support. However, these less volatile powders and these pastes may prove to be less effective than the simple starting powders. Moreover, pastes, just like powders, nevertheless require certain precautions during their handling, in particular as regards weighing them out in order to mix them with the oxidizing composition, so as to avoid staining clothing.

The aim of the present invention is to provide a composition for bleaching keratin fibres that can solve the problems of the handling of the compositions known in the prior art, in particular a composition for bleaching keratin fibres that is in compressed form comprising a persulfate and a particular amphoteric or cationic polymer, to be mixed directly at the time of use with an aqueous composition.

This composition makes it possible to avoid the handling problems linked to the volatility of the powders or the weighing-out problems by proposing a product in a solid compact and ready-to-use form, without a step of metering out. It also makes it possible to improve the resistance of the composition for bleaching keratin fibres to temperature variations, and in particular makes it possible to avoid the problem of destabilization on storage at low temperatures and during transportation including temperature cycles. It also makes it possible to avoid losses of lightening power.

These objectives are achieved with the present invention, the subject of which is a composition for bleaching keratin fibres, which is in compressed form, comprising at least one persulfate and at least one polymer chosen from cationic polymers having a charge density greater than or equal to 4 milliequivalents per gram (meq/g), amphoteric polymers and mixtures thereof,

with the proviso that said composition is different from the following composition :

Urea	3.5
Sodium persulfate	8
Ammonium chloride	4.5
Potassium persulfate	47
Ethylenediaminetetraacetic acid	1
Sodium metasilicate	12
Magnesium oxide	1
Anatase titanium oxide	2
Kaolinite	5
Vinylpyrrolidone/vinyl acetate copolymer (65/35)	1.8
Guar gum	2.7
Hydrogenated polydecene (MW 549)	1.7
Polyquaternium 22 (Merquat 280 SD from Nalco)	0.5

Cetylhydroxy cellulose (Natrosol Plus 330 CS from Ashland)	1
Copolymer of polyethylene glycol containing 136 mol of ethylene oxide, stearyl alcohol polyoxyethylenated with 100 mol of ethylene oxide and hexamethylene diisocyanate (HDI) (Rheolate FX 1100® from Elementis)	3
Sodium cetostearyl sulfate	1
Sodium lauryl sulfate	2.3
Magnesium stearate	2

The composition according to the invention is in compressed or compacted form, i.e. it has been obtained via a process of compression (or compacting) of particles, in particular by compression or compacting of a powder or of granules.

In particular, the composition is obtained by application of a compression force, which value may range, for example, from 0.1 to 500 MPa and in particular from 0.2 to 100 MPa.

Preferably, the bleaching composition in compressed form according to the invention has at least one dimension greater than 6 mm, preferably greater than or equal to 8 mm and preferably greater than or equal to 10 mm.

In particular, it has at least one smaller dimension and at least one larger dimension, the larger dimension being greater than 6 mm, preferably greater than or equal to 8 mm and preferably greater than or equal to 10 mm.

The composition according to the invention may be in compressed form, in particular in the form of a lozenge, a pastille, a pebble, etc., which may have flat or curved, concave or convex upper and lower faces and of round, oval, square, rectangular, octagonal or polygonal shape.

According to one embodiment, the composition in compressed form may be, for example, in the form of a pastille or tablet of round shape, and may have a diameter ranging from 0.5 to 5 cm and in particular from 2 to 4 cm and a thickness ranging from 1 to 20 mm and in particular from 3 to 10 mm.

According to one embodiment, the composition in compressed form may be, for example, in the form of a lozenge, and may have a length ranging from 1 to 10

cm, a width ranging from 0.5 to 5 cm and a thickness ranging from 0.5 to 20 mm and in particular from 1 to 10 mm.

The composition in compressed form according to the invention may have a mass ranging from 0.5 to 20 grams and preferably from 5 to 15 grams.

The composition according to the invention in compressed form may also be in the form of a pastille or tablet of round shape, and may then have a diameter ranging from 0.5 to 3 cm and in particular from 1 to 2 cm and a thickness ranging from 1 to 20 mm and in particular from 3 to 10 mm. It may thus have a mass ranging from 0.5 to 10 grams.

A subject of the present invention is also a process for bleaching keratin fibres, which consists in applying to the keratin fibres the bleaching composition defined above, in the presence of an aqueous composition.

A subject of the present invention is also a multi-compartment device comprising

- a bleaching composition which is in compressed form, comprising at least one persulfate and at least one polymer chosen from cationic polymers having a charge density greater than or equal to 4 milliequivalents per gram (meq/g), amphoteric polymers and mixtures thereof,

  with the proviso that said composition is different from the following composition :

Urea	3.5
Sodium persulfate	8
Ammonium chloride	4.5
Potassium persulfate	47
Ethylenediaminetetraacetic acid	1
Sodium metasilicate	12
Magnesium oxide	1
Anatase titanium oxide	2
Kaolinite	5
Vinylpyrrolidone/vinyl acetate copolymer (65/35)	1.8
Guar gum	2.7
Hydrogenated polydecene (MW 549)	1.7

Polyquaternium 22 (Merquat 280 SD from Nalco)	0.5
Cetylhydroxy cellulose (Natrosol Plus 330 CS from Ashland)	1
Copolymer of polyethylene glycol containing 136 mol of ethylene oxide, stearyl alcohol polyoxyethylenated with 100 mol of ethylene oxide and hexamethylene diisocyanate (HDI) (Rheolate FX 1100® from Elementis)	3
Sodium cetostearyl sulfate	1
Sodium lauryl sulfate	2.3
Magnesium stearate	2

and

- an aqueous composition,

said compositions being packaged in separate compartments.

Unless otherwise indicated, the limits of the ranges of values that are given in the context of the present invention are included in these ranges.

In the text hereinabove or hereinbelow, the term "at least one" is equivalent to "one or more".

Persulfates

The bleaching composition according to the invention comprises at least one persulfate as peroxygenated salt. Preferably, the persulfate(s) is (are) chosen from sodium persulfates, potassium persulfates and ammonium persulfates, and mixtures thereof.

The persulfate concentration in the composition in accordance with the invention is generally between 10% and 80% by weight, preferably between 20% and 70% by weight and better still between 40% and 65% by weight relative to the total weight of the composition.

Cationic and amphoteric polymers

The composition of the invention contains at least one polymer chosen from cationic polymers having a charge density greater than or equal to 4 milliequivalents per gram (meq/g), amphoteric polymers and mixtures thereof.

In the composition of the invention, the polymer(s) chosen from cationic polymers having a charge density greater than or equal to 4 milliequivalents per gram (meq/g) and the amphoteric polymers can represent from 0.01% to 10%, better still from 0.05% to 7% and even more preferentially from 0.1% to 5% by weight, relative to the total weight of the composition.

Cationic polymer

Preferably, the cationic polymer has a charge density greater than or equal to 5 milliequivalents per gram (meq/g), preferably ranging from 5 to 20 meq/g and more particularly from 5.5 to 10 meq/g.

The cationic charge density of a polymer corresponds to the number of moles of cationic charges per unit weight of polymer under conditions in which it is totally ionized. It may be determined by calculation if the structure of the polymer is known, i.e. the structure of the monomers constituting the polymer and their mole proportion or weight proportion. It may also be determined experimentally via the Kjeldahl method, generally at a pH of about 7 at ambient temperature.

The cationic polymers with a cationic charge density greater than 4 meq/g, which may be used in accordance with the present invention, may be chosen from any polymer already known per se as improving the cosmetic properties of hair treated with compositions, i.e. in particular those described in patent application EP-A-0 337 354 and in French patent applications FR-A-2 270 846, 2 383 660, 2 598 611, 2 470 596 and 2 519 863.

In general, for the purposes of the present invention, the term “cationic polymer” denotes any polymer comprising cationic groups and/or groups that are ionizable into cationic groups.

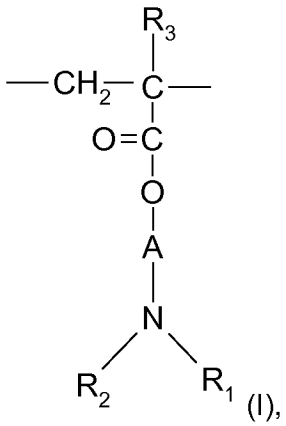
The cationic polymers are chosen from those which comprise units comprising primary, secondary, tertiary and/or quaternary amine groups that either may form part of the main polymer chain or may be borne by a side substituent directly attached thereto.

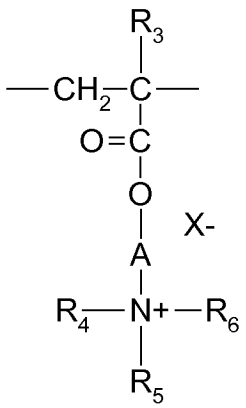
The cationic polymers used generally have a number-average molar weight of between 500 and 5×10^6 approximately and preferably between 10^3 and 3×10^6 approximately.

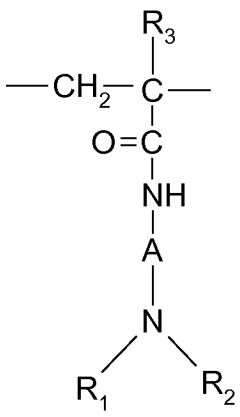
Among the cationic polymers that may more particularly be mentioned are polymers of the polyamine, polyaminoamide and polyquaternary ammonium type.

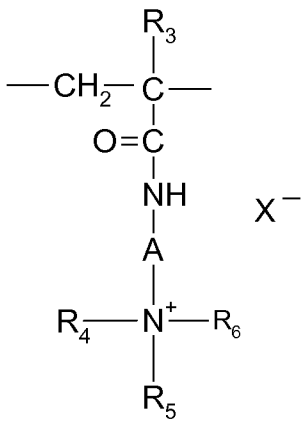
Among these polymers, mention may be made of:

(1) homopolymers or copolymers derived from acrylic or methacrylic esters or amides and comprising at least one of the units of formulae (I) to (IV) below:


(I),


(II)


(III)


(IV)

in which:

R_3, which may be identical or different, denote a hydrogen atom or a CH_3 radical;

A, which may be identical or different, represent a linear or branched alkyl group of 1 to 6 carbon atoms, preferably 2 or 3 carbon atoms, or a hydroxyalkyl group of 1 to 4 carbon atoms;

R_4, R_5 and R_6, which may be identical or different, represent an alkyl group containing from 1 to 18 carbon atoms or a benzyl radical, and preferably an alkyl group containing from 1 to 6 carbon atoms;

R_1 and R_2, which may be identical or different, represent hydrogen or an alkyl group containing from 1 to 6 carbon atoms and preferably methyl or ethyl;

X^- denotes an anion derived from an inorganic or organic acid, in particular a methosulfate anion or a halide, in particular chloride or bromide.

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

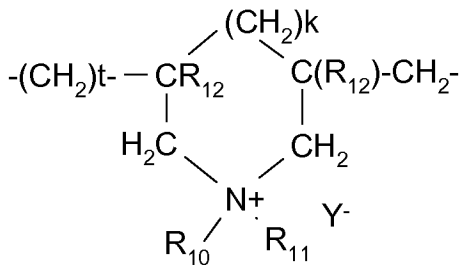
Thus, among these copolymers of family (1), mention may be made of:

- copolymers of acrylamide and of dimethylaminoethyl methacrylate quaternized with dimethyl sulfate or with a dimethyl halide,
- copolymers of acrylamide and of methacryloyloxyethyltrimethylammonium chloride described, for example, in patent application EP-A-080 976,
- copolymers of acrylamide and of methacryloyloxyethyltrimethylammonium methosulfate,
- quaternized or non-quaternized vinylpyrrolidone/dialkylaminoalkyl acrylate or methacrylate copolymers. These polymers are described in detail in French patent Nos. 2 077 143 and 2 393 573,
- dimethylaminoethyl methacrylate/vinylcaprolactam/vinylpyrrolidone terpolymers,
- vinylpyrrolidone/methacrylamidopropyldimethylamine copolymers,
- quaternized vinylpyrrolidone/dimethylaminopropylmethacrylamide copolymers,

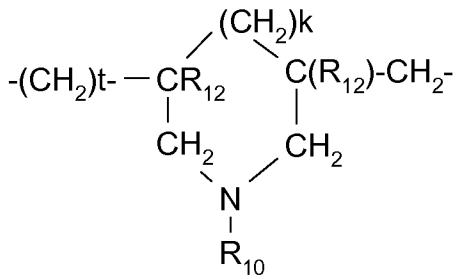
- and crosslinked polymers of methacryloyloxy(C_1-C_4)alkyltri(C_1-C_4)alkylammonium salts such as the polymers obtained by homopolymerization of dimethylaminoethyl methacrylate quaternized with methyl chloride, or by copolymerization of acrylamide with dimethylaminoethyl methacrylate quaternized with methyl chloride, the homo- or copolymerization being followed by crosslinking with an olefinically unsaturated compound, in particular methylenebisacrylamide. A crosslinked acrylamide/methacryloyloxyethyltrimethylammonium chloride copolymer (20/80 by weight) in the form of a dispersion containing 50% by weight of said copolymer in mineral oil may be used more particularly. This dispersion is sold under the name Salcare® SC 92 by the company Ciba. A crosslinked methacryloyloxyethyltrimethylammonium chloride homopolymer containing about 50% by weight of the homopolymer in mineral oil or in a liquid ester can also be used. These dispersions are sold under the names Salcare® SC 95 and Salcare® SC 96 by the company Ciba;

and mixtures thereof;

(2) cyclopolymers of alkyldiallylamine or of dialkyldiallylammonium, such as the homopolymers or copolymers containing, as constituent of the chain, units corresponding to formula (V) or (VI):



(V)



(VI)

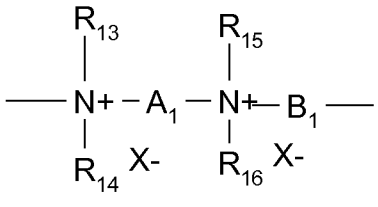
in which formulae k and t are equal to 0 or 1, the sum k + t being equal to 1; R_{12} denotes a hydrogen atom or a methyl radical; R_{10} and R_{11}, independently of one another, denote an alkyl group having from 1 to 6 carbon atoms, a hydroxyalkyl group in which the alkyl group has preferably 1 to 5 carbon atoms, a lower (C_1-C_4) amidoalkyl group, or R_{10} and R_{11} may denote, together with the nitrogen atom to which they are attached, heterocyclic groups, such as piperidyl or morpholinyl; Y^- is an anion such as bromide, chloride, acetate, borate, citrate, tartrate, bisulfate, bisulfite, sulfate or phosphate. These polymers are in particular described in French patent 2 080 759 and in its Certificate of Addition 2 190 406.

R_{10} and R_{11}, independently of one another, preferably denote an alkyl group containing from 1 to 4 carbon atoms.

Among the polymers defined above, mention may be made more particularly of the dimethyldiallylammonium salt (for example chloride) homopolymers sold in particular under the name Merquat 100 by the company Nalco (and its homologues of low weight-average molar mass) and the product provided under the name Alcofix 131 by the company BASF;

(3) quaternary copolymers of vinyllactam (vinylpyrrolidone and/or vinylcaprolactam) and of vinylimidazole;

(4) diquaternary ammonium polymers containing repeating units corresponding to formula (VII):



(VII)

in which formula (VII):

R_{13}, R_{14}, R_{15} and R_{16}, which may be identical or different, represent aliphatic, alicyclic or arylaliphatic radicals containing from 1 to 20 carbon atoms, or C_1-C_6 lower hydroxyalkylaliphatic radicals, or else R_{13}, R_{14}, R_{15} and R_{16},

together or separately, constitute, with the nitrogen atoms to which they are attached, heterocycles optionally comprising a second heteroatom other than the nitrogen, or else R_{13}, R_{14}, R_{15} and R_{16} represent a linear or branched C_1-C_6 alkyl radical which is substituted with a nitrile, ester, acyl, amide or -CO-O-R_{17}-D or -CO-NH-R_{17}-D group in which R_{17} is an alkylene and D is a quaternary ammonium group;

A_1 and B_1 represent polymethylene groups containing from 2 to 20 carbon atoms, which groups may be linear or branched, saturated or unsaturated, and which may contain, linked to or intercalated in the main chain, one or more aromatic rings or one or more oxygen or sulfur atoms or sulfoxide, sulfone, disulfide, amino, alkylamino, hydroxyl, quaternary ammonium, ureido, amide or ester groups, and

X^- denotes an anion derived from an inorganic or organic acid;

A_1, R_{13} and R_{15} may form, with the two nitrogen atoms to which they are attached, a piperazine ring; in addition, if A_1 denotes a saturated or unsaturated, linear or branched alkylene or hydroxyalkylene radical, B_1 may also denote a group $(CH_2)_n$-CO-D-OC-$(CH_2)_p$-

in which:

n and p, which may be identical or different, are integers ranging from 2 to 20 approximately,

D denotes:

a) a glycol residue of formula: -O-Z-O-, where Z denotes a linear or branched hydrocarbon-based radical or a group corresponding to one of the following formulae:

$-(CH_2-CH_2-O)_x-CH_2-CH_2-$

$-[CH_2-CH(CH_3)-O]_y-CH_2-CH(CH_3)-$

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

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

c) a bis-primary diamine residue of formula: -NH-Y-NH-, where Y denotes a linear or branched hydrocarbon-based radical, or alternatively the divalent radical

$-CH_2-CH_2-S-S-CH_2-CH_2-$;

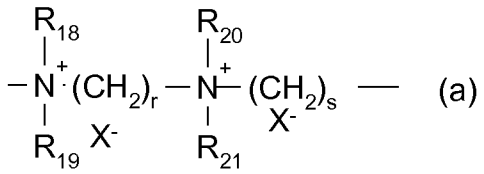
d) a ureylene group of formula: -NH-CO-NH-;

Preferably, X^- is an anion such as chloride or bromide.

These polymers have a number-average molecular weight of generally between 1000 and 100 000.

Polymers of this type are described in particular in French patents 2 320 330, 2 270 846, 2 316 271, 2 336 434 and 2 413 907 and US patents 2 273 780, 2 375 853, 2 388 614, 2 454 547, 3 206 462, 2 261 002, 2 271 378, 3 874 870, 4 001 432, 3 929 990, 3 966 904, 4 005 193, 4 025 617, 4 025 627, 4 025 653, 4 026 945 and 4 027 020.

It is more particularly possible to use polymers that are formed essentially from repeating units corresponding to the formula:

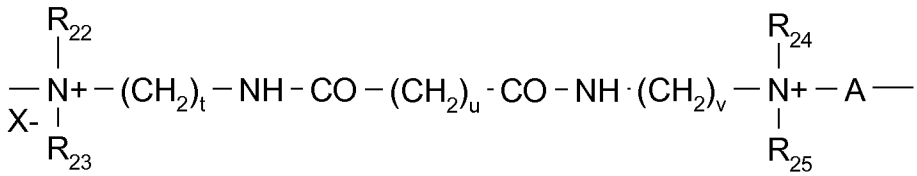


(a)

in which R_{18}, R_{19}, R_{20} and R_{21}, which may be identical or different, denote an alkyl or hydroxyalkyl radical containing from 1 to 4 carbon atoms approximately, r and s are integers ranging from 2 to 20 approximately, and X- is an anion derived from an inorganic or organic acid.

One particularly preferred compound of formula (a) is that for which R_{18}, R_{19}, R_{20} and R_{21} represent a methyl radical and r = 3, s = 6 and X = Cl, which is called Hexadimethrine chloride according to INCI nomenclature (CTFA);

(5) polyquaternary ammonium polymers consisting of units of formula (VIII):



(VIII)

in which formula (VIII):

R_{22}, R_{23}, R_{24} and R_{25}, which may be identical or different, represent a hydrogen atom or a methyl, ethyl, propyl, β-hydroxyethyl, β-hydroxypropyl or -$CH_2CH_2(OCH_2CH_2)_pOH$ radical,

in which p is equal to 0 or to an integer between 1 and 6, with the proviso that R_{22}, R_{23}, R_{24} and R_{25} do not simultaneously represent a hydrogen atom,

t and u, which may be identical or different, are integers between 1 and 6,

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

X^- denotes an anion such as a halide,

A denotes a radical of a dihalide or represents preferably -CH_2-CH_2-O-CH_2-CH_2-.

Such compounds are described in particular in patent application EP-A-122 324.

Among these, mention may be made, for example, of the products Mirapol® A 15, Mirapol® AD1, Mirapol® AZ1 and Mirapol® 175, provided by the company Miranol.

Other cationic polymers that may be used in the context of the invention are polyalkyleneimines, in particular polyethyleneimines, polymers containing vinylpyridine or vinylpyridinium units, condensates of polyamines and of epichlorohydrin, polyquaternary ureylenes and chitin derivatives.

Among all the cationic polymers that may be used in the context of the present invention, cationic cyclopolymers are preferably used, in particular the dimethyldiallylammonium chloride homopolymers sold under the name Alcofix 131 by the company BASF (and its homologues of low weight-average molar mass), polymers containing units of formula (VII), and mixtures thereof.

In one variant of the invention, the cationic polymer(s) having a charge density greater than 4 meq/g, used in the composition according to the invention, is (are) in the form of powders, i.e., where appropriate, in dehydrated and/or desolvated form.

According to the invention, the cationic polymer(s) having a charge density greater than 4 meq/g may represent from 0.01% to 10% by weight, preferably from 0.05% to 5% by weight and even more preferentially from 0.1% to 3% by weight relative to the total weight of the composition.

Amphoteric polymer

The amphoteric (or zwitterionic) polymers that may be used in accordance with the invention may be chosen from polymers comprising units B and C distributed statistically in the polymer chain, where B denotes a unit derived from a monomer comprising at least one basic nitrogen atom and C denotes a unit derived from an acid monomer comprising one or more carboxylic or sulfonic groups, or alternatively B and C may denote groups derived from carboxybetaine or sulfobetaine zwitterionic monomers.

B and C can also denote a cationic polymer chain comprising primary, secondary, tertiary or quaternary amine groups, in which at least one of the amine groups bears a carboxylic or sulfonic group connected via a hydrocarbon-based radical, or alternatively B and C form part of a chain of a polymer comprising an α,β-dicarboxylic ethylene unit in which one of the carboxylic groups has been made to react with a polyamine comprising one or more primary or secondary amine groups.

The amphoteric polymers corresponding to the definition given above that are more particularly preferred are chosen from the following polymers:

(1) polymers comprising, as monomers, at least one monomer derived from a vinyl compound bearing a carboxylic group such as, more particularly, acrylic acid, methacrylic acid, maleic acid, α-chloroacrylic acid, and at least one basic monomer derived from a substituted vinyl compound containing at least one basic atom chosen in particular from:

a) dialkylaminoalkyl methacrylates, dialkylaminoalkyl acrylates, dialkylaminoalkylmethacrylamides and dialkylaminoalkylacrylamides. Such compounds are described in US patent No. 3 836 537;

b) trialkylaminoalkyl methacrylate salts, trialkylaminoalkyl acrylate salts, trialkylaminoalkylmethacrylamide salts and trialkylaminoalkylacrylamide salts.

Mention may in particular be made of the acrylic acid/acrylamidopropyltrimethylammonium chloride copolymer provided by

the company Stockhausen under the name Polymer W3794. Mention may also be made of the acrylic acid/acrylamidopropyltrimethylammonium chloride/acrylamide copolymers provided by the company Nalco under the name Merquat 2001 and Merquat 2003;

(2) polymers comprising units deriving from:

a) at least one monomer chosen from acrylamides and methacrylamides substituted on the nitrogen with an alkyl radical,

b) at least one acidic comonomer containing one or more reactive carboxylic groups, and

c) at least one basic comonomer such as esters containing primary, secondary, tertiary and quaternary amine substituents of acrylic and methacrylic acids and the product of quaternization of dimethylaminoethyl methacrylate with dimethyl or diethyl sulfate.

The N-substituted acrylamides or methacrylamides that are more particularly preferred according to the invention are groups in which the alkyl radicals contain from 2 to 12 carbon atoms and more particularly N-ethylacrylamide, N-tert-butylacrylamide, N-tert-octylacrylamide, N-octylacrylamide, N-decylacrylamide, N-dodecylacrylamide and the corresponding methacrylamides.

The acidic comonomers are chosen more particularly from acrylic acid, methacrylic acid, crotonic acid, itaconic acid, maleic acid and fumaric acid and alkyl monoesters, having 1 to 4 carbon atoms, of maleic or fumaric acids or anhydrides.

The preferred basic comonomers are aminoethyl, butylaminoethyl, N,N'-dimethylaminoethyl and N-tert-butylaminoethyl methacrylates.

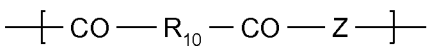
The copolymers of which the CTFA (4th edition, 1991) name is Octylacrylamide/acrylates/butylaminoethyl methacrylate copolymer, such as the products sold under the name Amphomer LV by National Starch, are particularly used;

(3) copolymers comprising, as monomers, at least one monomer derived from a vinyl compound bearing a carboxylic group, such as, more particularly, acrylic acid, methacrylic acid, maleic acid, α-chloroacrylic acid, and at least one

monomer of diallyldialkylammonium salt type, the alkyl groups having from 1 to 6 carbon atoms. Preferably, the alkyl group is a methyl group.

Among these polymers, the copolymers comprising, as monomers, dimethyldiallylammonium chloride and acrylic acid, optionally combined with acrylamide, are particularly preferred. Mention may in particular be made of the compounds provided by the company Nalco under the names Merquat 280, Merquat 295 , Merquat 3330, Merquat 3331 and Merquat 3333;

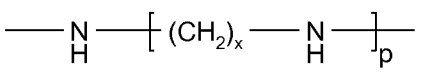
(4) crosslinked and alkylated polyamino amides partially or totally derived from polyamino amides of general formula:



(IX)

in which R_{10} represents a divalent radical derived from a saturated dicarboxylic acid, a mono- or dicarboxylic aliphatic acid containing an ethylenic double bond, an ester of a lower alkanol having 1 to 6 carbon atoms of these acids, or a radical derived from the addition of any one of said acids to a bis(primary) or bis(secondary) amine, and Z denotes a radical from a bis(primary), mono- or bis(secondary) polyalkylene-polyamine and preferably represents:

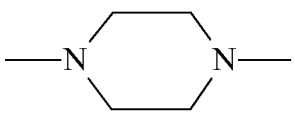
a) in proportions of from 60 to 100 mol%, the radical



(X)

where x = 2 and p = 2 or 3, or alternatively x = 3 and p = 2,
this radical being derived from diethylenetriamine, from triethylenetetramine or from dipropylenetriamine;

b) in proportions of from 0 to 40 mol%, the radical (X) above in which x = 2 and p = 1 and which is derived from ethylenediamine, or the radical derived from piperazine:



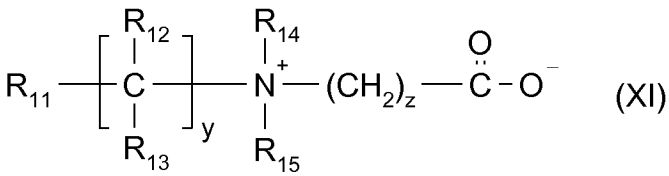
c) in proportions of from 0 to 20 mol%, the radical $-NH(CH_2)_6-NH-$ being derived from hexamethylenediamine, these polyamino amines being crosslinked

by addition of a difunctional crosslinking agent chosen from epihalohydrins, diepoxides, dianhydrides and bis-unsaturated derivatives, using from 0.025 to 0.35 mol of crosslinking agent per amine group of the polyamino amide and alkylated by the action of acrylic acid, chloroacetic acid or an alkane sultone, or salts thereof.

The saturated carboxylic acids are preferably chosen from acids containing 6 to 10 carbon atoms, such as adipic acid, 2,2,4-trimethyladipic acid and 2,4,4-trimethyladipic acid, terephthalic acid, and acids containing an ethylenic double bond, for instance acrylic acid, methacrylic acid and itaconic acid.

The alkane sultones used in the alkylation are preferably propane sultone or butane sultone, the salts of the alkylating agents are preferably the sodium or potassium salts;

(5) polymers comprising zwitterionic units of formula:



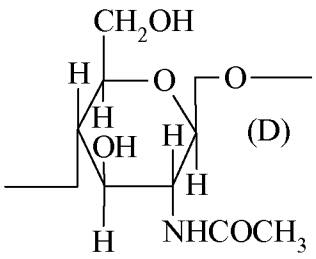
(XI)

in which R_{11} denotes a polymerizable unsaturated group such as an acrylate, methacrylate, acrylamide or methacrylamide group, y and z represent an integer from 1 to 3, R_{12} and R_{13} represent a hydrogen atom, methyl, ethyl or propyl, R_{14} and R_{15} represent a hydrogen atom or an alkyl radical such that the sum of the carbon atoms in R_{14} and R_{15} does not exceed 10.

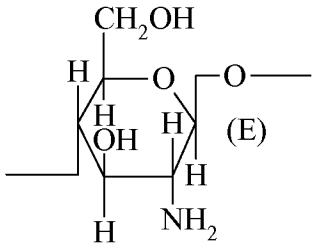
The polymers comprising such units may also comprise units derived from non-zwitterionic monomers such as dimethyl- or diethylaminoethyl acrylate or methacrylate or alkyl acrylates or methacrylates, acrylamides or methacrylamides or vinyl acetate.

By way of example, mention may be made of the methyl methacrylate/methyl dimethylcarboxymethylammonioethyl methacrylate copolymer such as the product sold under the name Diaformer Z301 by the company Sandoz;

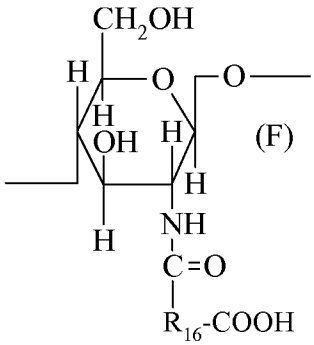
(6) polymers derived from chitosan comprising monomer units corresponding to the following formulae:



(D)

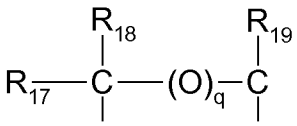


(E)



(F)

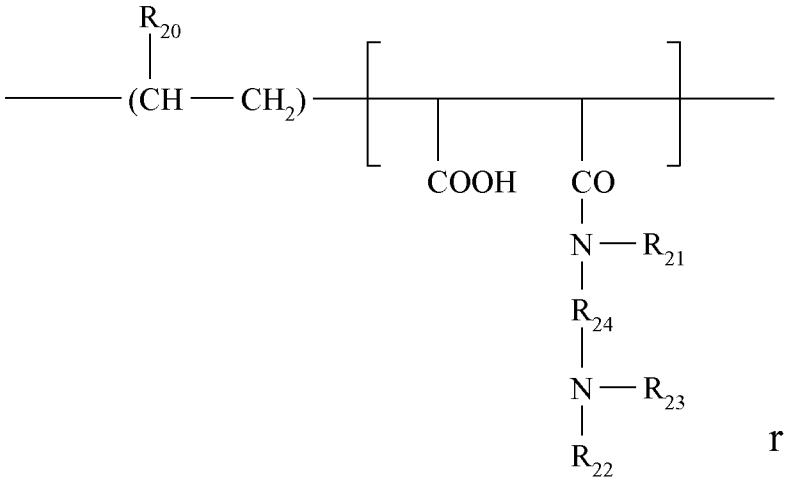
the unit D being present in proportions of between 0 and 30%, the unit E in proportions of between 5% and 50% and the unit F in proportions of between 30% and 90%, it being understood that, in this unit F, R_{16} represents a radical of formula:



in which, if q = 0, R_{17}, R_{18} and R_{19}, which may be identical or different, each represent a hydrogen atom, a methyl, hydroxyl, acetoxy or amino residue, a monoalkylamine residue or a dialkylamine residue that are optionally interspersed with one or more nitrogen atoms and/or optionally substituted with one or more amine, hydroxyl, carboxyl, alkylthio or sulfonic groups, or an alkylthio residue in which the alkyl group bears an amino residue, at least one of the radicals R_{17}, R_{18} and R_{19} being, in this case, a hydrogen atom;
or, if q = 1, R_{17}, R_{18} and R_{19} each represent a hydrogen atom, and also the salts formed by these compounds with bases or acids;

(7) polymers derived from the N-carboxyalkylation of chitosan, such as N-carboxymethyl chitosan or N-carboxybutyl chitosan, provided under the name Evalsan powder by the company Jan Dekker;

(8) polymers containing units corresponding to general formula (XII) are described in French patent 1 400 366:



(XII)

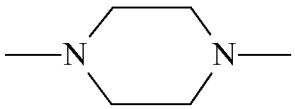
in which R_{20} represents a hydrogen atom, a CH_3O, CH_3CH_2O or phenyl radical, R_{21} denotes a hydrogen atom or a lower alkyl radical such as methyl or ethyl, R_{22} denotes a hydrogen atom or a lower alkyl radical such as methyl or ethyl, R_{23} denotes a lower alkyl radical such as methyl or ethyl or a radical corresponding to the formula: $-R_{24}-N(R_{22})_2$, R_{24} representing a group $-CH_2-CH_2-$, $-CH_2-CH_2-CH_2-$, $-CH_2-CH(CH_3)-$, R_{22} having the meanings mentioned above, and also the higher homologues of these radicals, containing up to 6 carbon atoms;

(9) amphoteric polymers of the -D-X-D-X type chosen from:

a) polymers obtained by the action of chloroacetic acid or sodium chloroacetate on compounds comprising at least one unit of formula:

-D-X-D-X-D- (XIII)

where D denotes a radical



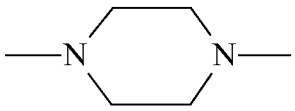
and X denotes the symbol E or E', E or E', which may be identical or different, denote a divalent radical that is an alkylene radical with a straight or branched chain containing up to 7 carbon atoms in the main chain, which is unsubstituted or substituted with hydroxyl groups and which can comprise, in addition to oxygen, nitrogen and sulfur atoms, 1 to 3 aromatic and/or heterocyclic rings; the oxygen, nitrogen and sulfur atoms being present in the form of ether, thioether, sulfoxide, sulfone, sulfonium, alkylamine or alkenylamine groups, hydroxyl,

benzylamine, amine oxide, quaternary ammonium, amide, imide, alcohol, ester and/or urethane groups;

b) polymers of formula:

-D-X-D-X- (XIV)

where D denotes a radical



and X denotes the symbol E or E' and at least once E'; E having the meaning given above and E' is a divalent radical that is an alkylene radical with a straight or branched chain having up to 7 carbon atoms in the main chain, which is unsubstituted or substituted with one or more hydroxyl radicals and containing one or more nitrogen atoms, the nitrogen atom being substituted with an alkyl chain that is optionally interrupted by an oxygen atom and necessarily comprising one or more carboxyl functions or one or more hydroxyl functions and betainized by reaction with chloroacetic acid or sodium chloroacetate;

(10) (C_1-C_5)alkyl vinyl ether/maleic anhydride copolymers partially modified by semiamidation with an N,N-dialkylaminoalkylamine such as N,N-dimethylaminopropylamine or by semiesterification with an N,N-dialkanolamine. These copolymers can also comprise other vinyl comonomers such as vinylcaprolactam,

and mixtures thereof.

The amphoteric polymers that are particularly preferred according to the invention are those of families (1) and (3).

Mention may in particular be made of the amphoteric polymers chosen from acrylic acid/acrylamidopropyltrimethylammonium chloride copolymers, acrylic acid/acrylamidopropyltrimethylammonium chloride/acrylamide copolymers, copolymers comprising, as monomers, dimethyldiallylammonium chloride and acrylic acid, optionally combined with acrylamide, and mixtures thereof.

Preference will most particularly be given to the compounds of family (1) and, among these, the acrylic acid/acrylamidopropyltrimethylammonium chloride copolymer.

In one variant of the invention, the amphoteric polymer(s) used in the composition according to the invention is (are) in the form of powders, i.e., where appropriate, in dehydrated and/or desolvated form.

In the composition of the invention, the amphoteric polymer(s) preferably represent(s) from 0.01% to 10%, better still from 0.05% to 7% and even more preferentially from 0.1% to 5% by weight relative to the total weight of the composition.

Alkaline agent

The bleaching composition according to the invention may comprise at least one alkaline agent.

The alkaline agent(s) may be chosen, for example, from water-soluble silicates such as alkali metal or alkaline-earth metal silicates, such as the dibasic or tribasic ammonium phosphate, sodium disilicate, sodium metasilicate, dibasic or tribasic alkali metal or alkaline-earth metal phosphates or carbonates of alkali metals or alkaline-earth metals, such as lithium, sodium, potassium, magnesium, calcium and barium, and mixtures thereof. Preferably, the alkaline agent(s) are chosen from water-soluble silicates such as alkali metal or alkaline-earth metal silicates, dibasic or tribasic alkali metal or alkaline-earth metal phosphates, and alkali metal or alkaline-earth metal carbonates, and mixtures thereof.

In the context of the invention, the term "water-soluble silicate" is understood to mean a silicate which has a solubility in water of greater than 0.5% and preferably greater than 1% by weight at 25°C. These water-soluble silicates differ from aluminium silicates and derivatives thereof, in particular clays, such as mixed silicates of natural or synthetic origin that are insoluble in water.

When they are present in the composition in accordance with the invention, the concentration of alkaline agents generally ranges from 0.1% to 40% by weight,

preferably from 0.5% to 30% by weight and better still from 1% to 25% by weight relative to the total weight of the composition.

Rheology modifiers

According to one embodiment, the bleaching composition according to the invention advantageously comprises at least one rheology modifier chosen from hydrophilic thickeners, amphiphilic polymers comprising at least one hydrophobic chain, and fillers, and mixtures thereof.

The rheology modifier(s) may be present in a content ranging from 0.01% to 30% by weight, relative to the total weight of the composition, and preferably from 0.1% to 10% by weight.

These agents are distinct from the amphoteric and cationic polymer(s) having a charge density greater than or equal to 4 meq/g, described above.

As examples of hydrophilic thickeners, i.e. thickeners not comprising a C_6-C_{30} hydrocarbon-based fatty chain, which may be used according to the invention, mention may be made in particular of:

- thickening polymers of natural origin such as

a) algal extracts, such as alginates (for instance alginic acid and sodium alginates), carrageenans and agar agars, and mixtures thereof. Examples of carrageenans that may be mentioned include Satiagum UTC30® and UTC10® from the company Degussa; an alginate that may be mentioned is the sodium alginate sold under the name Kelcosol® by the company ISP;

b) gums, such as xanthan gum, guar gum and non-ionic derivatives thereof (hydroxypropyl guar), gum arabic, konjac gum or mannan gum, gum tragacanth, ghatti gum, karaya gum or locust bean gum; agar gum, and scleroglucan gums, and mixtures thereof;

c) starches, preferably modified starches, such as those derived, for example, from cereals such as wheat, corn or rice, from legumes such as yellow peas, from tubers such as potatoes or manioc, and tapioca starches; carboxymethylstarch. Examples of starches that may be mentioned include the corn starch Starx 15003 sold by the company

Staley, the pregelatinized starch sold under the name Lycatab PGS by the company Roquette; the sodium carboxymethylstarch sold under the reference Explotab by the company Roquette;

d) dextrins, such as dextrin extracted from corn;

e) celluloses such as microcristalline cellulose, amorphous cellulose, and cellulose derivatives, in particular hydroxy(C_1-C_6)alkylcelluloses and carboxy(C_1-C_6)alkylcelluloses, which are in particular crosslinked; mention may in particular be made of methylcelluloses, hydroxyalkylcelluloses, ethylhydroxyethylcelluloses and carboxymethylcelluloses. As examples, mention may be made of the microcrystalline cellulose sold under the name Avicel PH 100 or PH102 by the company FMC Biopolymers;

f) pectins;

g) chitosan and derivatives thereof;

h) anionic polysaccharides other than starch and cellulose derivatives, in particular of biotechnological origin, such as anionic polysaccharide bearing as repeating unit a tetrasaccharide composed of L-fucose, D-glucose and glucuronic acid, such as the product bearing the INCI name Biosaccharide Gum-4 sold under the reference Glycofilm 1.5P by the company Solabia;

i) soybean polysaccharides,

and mixtures thereof;

- synthetic polymers, such as crosslinked or non-crosslinked polyvinylpyrrolidone, for instance crosslinked polyvinylpyrrolidone, for instance Kollindon CL sold by the company BASF, acrylic acid polymers and salts thereof, for instance crosslinked polyacrylates, such as the product sold by the company Rohm and Haas under the reference Acusol 772, polyacrylamides, crosslinked or non-crosslinked poly(2-acrylamidopropanesulfonic acid) polymers (in particular homopolymers), for instance non-crosslinked poly(2-acrylamidopropanesulfonic acid) (Simugel® EG from the company Seppic), crosslinked poly(2-acrylamido-2-methylpropanesulfonic acid), which is free or partially neutralized with aqueous ammonia (Hostacerin® AMPS from the company Clariant), blends of non-crosslinked poly(2-acrylamido-2-methylpropanesulfonic acid) with hydroxyalkylcellulose ethers or with poly(ethylene oxide)s, as described in patent US 4 540 510; blends of poly(meth)acrylamido(C_1-C_4alkyl)sulfonic acid, which is

preferably crosslinked, with a crosslinked copolymer of maleic anhydride and of a (C_1-C_5)alkyl vinyl ether (Stabileze QM from the company ISF),

and mixtures thereof;

The amount of hydrophilic thickeners present in the composition according to the invention may be between 0.01% and 30% and preferably between 0.1% and 15% by weight and better still between 0.1% and 10% by weight relative to the total weight of the composition.

The composition according to the invention may comprise at least one amphiphilic polymer comprising at least one hydrophobic chain, distinct from the amphoteric and cationic polymer(s) described above.

More especially, if they are present, these amphiphilic polymers are of non-ionic, anionic, cationic or amphoteric type. They are preferably of non-ionic, anionic or cationic nature.

Said amphiphilic polymers comprise, more particularly, as hydrophobic chain, a saturated or unsaturated, aromatic or non-aromatic, linear or branched C_6-C_{30} hydrocarbon-based fatty chain, attached to optionally one or more oxyalkylene (oxyethylene and/or oxypropylene) units.

Among the cationic amphiphilic polymers comprising a hydrophobic chain are cationic polyurethanes or cationic copolymers comprising vinyllactam and in particular vinylpyrrolidone units.

Even more preferentially, the amphiphilic polymers comprising a hydrophobic chain are of non-ionic or anionic nature.

Examples of hydrophobic-chain non-ionic amphiphilic polymers that may be mentioned, inter alia, include celluloses comprising a hydrophobic chain (Natrosol Plus Grade 330 CS® from the company Aqualon; Bermocoll EHM 100® from the company Berol Nobel; Amercell Polymer HM-1500® from the company Amerchol); hydroxypropyl guars modified with one or more hydrophobic groups (Jaguar XC-95/3®, RE210-18, RE205-1 from the company Rhodia Chimie; Esaflor HM 22® from the company Lamberti); copolymers of vinylpyrrolidone and of hydrophobic-chain monomers (certain products of the Antaron® and Ganex® ranges from the company ISP); copolymers of C_1-C_6 alkyl (meth)acrylates and of amphiphilic monomers comprising a hydrophobic chain; copolymers of hydrophilic (meth)acrylates and of monomers comprising at least one

hydrophobic chain (polyethylene glycol methacrylate/lauryl methacrylate copolymer); polymers with an aminoplast ether backbone containing at least one fatty chain (Pure Thix® from the company Süd-Chemie); polyether polyurethanes, of linear (block structure), grafted or star form, comprising in their chain at least one hydrophilic block and at least one hydrophobic block (as described in the article by G. Fonnum, J. Bakke and Fk. Hansen - Colloid Polym. Sci 271, 380.389 (1993); in particular the polyether polyurethane which can be obtained by polycondensation of at least three compounds comprising (i) at least one polyethylene glycol comprising from 150 to 180 mol of ethylene oxide, (ii) a polyoxyethylented stearyl alcohol comprising 100 mol of ethylene oxide and (iii) a diisocyanate, as sold in particular by the company Elementis under the name Rheolate FX 1100®, which is a polycondensate of polyethylene glycol comprising 136 mol of ethylene oxide, of polyoxyethylented stearyl alcohol comprising 100 mol of ethylene oxide and of hexamethylene diisocyanate (HDI) having a weight-average molecular weight of 30 000 (INCI name: PEG-136/Steareth-100/SMDI Copolymer). Mention may also be made of Rheolate® 205, 208, 204 or 212 from the company Rheox; Elfacos® T210, T212 from the company Akzo).

As examples of anionic amphiphilic polymers comprising at least one hydrophobic chain that may be used in the context of the present invention, mention may be made of crosslinked or non-crosslinked polymers comprising at least one hydrophilic unit derived from one or more ethylenically unsaturated monomers comprising a carboxylic acid function, which is free or partially or totally neutralized, and at least one hydrophobic unit derived from one or more ethylenically unsaturated monomers bearing a hydrophobic side chain, and optionally at least one crosslinking unit derived from one or more polyunsaturated monomers.

Mention may be made in particular of copolymers of (meth)acrylic acid and of C_{10}-C_{30} alkyl (meth)acrylates, which are crosslinked or non-crosslinked, such as those described in US 3 915 921 and US 4 509 949, or copolymers of (meth)acrylic acid and of fatty alcohol allyl ethers such as those described in EP 216 479.

In addition, the products Carbopol ETD-2020® and 1382®, Pemulen TR1® and TR2® from the company Goodrich; the methacrylic acid/ethyl acrylate/oxyethylenated stearyl methacrylate copolymer (55/35/10); the

(meth)acrylic acid/ethyl acrylate/oxyethylenated behenyl methacrylate 25 EO copolymer; the methacrylic acid/ethyl acrylate/steareth-10 allyl ether crosslinked copolymer, are polymers that are suitable for use in the invention.

If these amphiphilic polymers are present, their total content represents from 0.01% to 30% by weight and preferably from 0.1% to 10% by weight relative to the weight of the composition.

"Fillers" should be understood as meaning solid particles which are insoluble in the medium of the composition, whatever the temperature at which the composition is manufactured.

The fillers may be colourless or white and inorganic or organic, of any physical shape (platelet, spherical or oblong) and of any crystallographic form (for example sheet, cubic, hexagonal, orthorhombic, etc.). The fillers may be porous or non-porous.

Fillers that may be mentioned include inorganic fillers such as hydrophobic or hydrophilic silicas, clays other than those mentioned above, ceramic beads, calcium carbonate, titanium oxides, magnesium oxides, aluminium silicates and derivatives thereof, in particular clays, such as mixed silicates of natural or synthetic origin, in particular magnesium aluminium silicates, which are in particular hydrated, natural hydrated aluminium silicates, such as bentonite or kaolin, talc, organic fillers such as Nylon, microspheres based on a copolymer of vinylidene chloride/acrylonitrile/methacrylonitrile containing isobutane, and expanded, such as those sold under the name Expancel 551 DE® by the company Expancel, micronized plant powder (such as the fruit powders from the company Lessonia) or non-micronized plant powder, or alternatively rice grain husk powder, and mixtures thereof.

Among the silicas, mention may also be made in particular of fumed silicas of hydrophilic nature (in particular Aerosil® 90, 130, 150, 200, 300 and 380 from the company Degussa Hüls).

Some of the rheology modifiers mentioned above may also play a role in aiding the disintegration of the bleaching composition in compressed form during its use.

Thus, in one particular embodiment, the composition according to the invention comprises at least one disintegration agent chosen from celluloses, in particular

microcrystalline celluloses, and cellulose derivatives, crosslinked polyacrylates, crosslinked polyvinylpyrrolidone, soybean polysaccharides, alginates, aluminium silicates and derivatives thereof, and silicas, in particular hydrophilic silicas, and mixtures thereof.

Surfactants

The composition according to the invention may advantageously comprise at least one surfactant.

The surfactant(s) may be chosen indiscriminantly, alone or as mixtures, from anionic, amphoteric, non-ionic, zwitterionic and cationic surfactants, in particular from anionic and/or non-ionic surfactants.

The surfactants suitable for implementing the present invention are in particular the following:

Among the non-ionic surfactants, mention may be made of alcohols, alpha-diols and alkyl phenols, each of these compounds being polyethoxylated and/or polypropoxylated, and containing at least one hydrocarbon-based chain comprising, for example, from 8 to 30 carbon atoms and preferably from 8 to 18 carbon atoms, the number of ethylene oxide and/or propylene oxide groups possibly ranging in particular from 2 to 200.

Mention may also be made of copolymers of ethylene oxide and propylene oxide, condensates of ethylene oxide and/or of propylene oxide with fatty alcohols; polyethoxylated fatty amides preferably having from 2 to 30 mol of ethylene oxide; oxyethylenated fatty acid esters of sorbitan containing from 2 to 30 mol of ethylene oxide; fatty acid esters of sucrose, fatty acid esters of polyethylene glycol, alkylpolyglycosides, N-alkylglucamine derivatives, etc.

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

The anionic surfactant(s) that may be used in the compositions of the invention 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) are in salt form, it (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 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.

Use is preferably made of alkali metal or alkaline-earth metal salts, in particular sodium or magnesium salts.

Use is preferably made of (C_6-C_{24})alkyl sulfates and (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, alkaline-earth metal salts, ammonium salts or amino alcohol salts. More preferentially, the anionic surfactant(s) is (are) chosen from (C_{10}-$_{20}$) alkyl

sulfates in the form of alkali metal or alkaline-earth metal salts, and in particular sodium lauryl sulfate and sodium cetostearyl sulfate, and mixtures thereof.

The amphoteric or zwitterionic surfactant(s) that may 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, for instance a carboxylate, sulfonate, sulfate, phosphate or phosphonate group. In particular, mention may be made of (C_8-C_{20})alkylbetaines, sulfobetaines, (C_8-C_{20} alkyl)amido(C_3-C_8 alkyl)betaines or (C_8-C_{20} alkyl)amido(C_6-C_8 alkyl)sulfobetaines.

Among the optionally quaternized secondary or tertiary aliphatic amine derivatives that can be used, as defined above, mention may also be made of the compounds of respective structures (B1) and (B2) below:

Ra-C(O)-NH-CH_2-CH_2-N+(Rb)(Rc)-CH_2C(O)O-, M+, X-

(B1)

in which formula:

- Ra represents a C_{10}-C_{30} alkyl or alkenyl group derived from an acid Ra-COOH preferably present in hydrolysed coconut oil, or a heptyl, nonyl or undecyl group;
- Rb represents a β-hydroxyethyl group; and
- Rc represents a carboxymethyl group;
- M+ represents a cationic counterion derived from an alkali metal or alkaline-earth metal, such as sodium, an ammonium ion or an ion derived from an organic amine, and
- X- represents an organic or inorganic anionic counterion, such as that chosen from halides, acetates, phosphates, nitrates, (C_1-C_4)alkyl sulfates, (C_1-C_4)alkyl- or (C_1-C_4)alkylarylsulfonates, in particular methyl sulfate and ethyl sulfate; or alternatively M+ and X- are absent;

Ra'-C(O)-NH-CH_2-CH_2-N(B)(B') (B2)

in which formula:

- B represents the group -CH_2-CH_2-O-X';
- B' represents the group -$(CH_2)_z$Y', with z = 1 or 2;

- X' represents the group $-CH_2-C(O)OH$, $-CH_2-C(O)OZ'$, $-CH_2-CH_2-C(O)OH$ or
  $-CH_2-CH_2-C(O)OZ'$, or a hydrogen atom;
- Y' represents the group $-C(O)OH$, $-C(O)OZ'$, $-CH_2-CH(OH)-SO_3H$ or the group $-CH_2-CH(OH)-SO_3-Z'$;
- Z' represents a cationic counterion 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'-C(O)OH preferably present in coconut oil or in hydrolysed linseed oil, an alkyl group, in particular of C_{17} 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.

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

Use may also be made of compounds of formula (B'2):

Ra''-NH-CH(Y'')-(CH_2)n-C(O)-NH-(CH_2)n'-N(Rd)(Re)

(B'2)

in which formula:

- Y'' represents the group $-C(O)OH$, $-C(O)OZ''$, $-CH_2-CH(OH)-SO_3H$ or the group $-CH_2-CH(OH)-SO_3-Z''$;
- Rd and Re, independently of one another, represent a C_1-C_4 alkyl or hydroxyalkyl radical;
- Z'' represents a cationic counterion 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''-C(O)OH preferably present in coconut oil or in hydrolysed linseed oil;
- n and n' denote, independently of one another, an integer ranging from 1 to 3.

Among the compounds of formula (B'2), mention may be made of the compound classified in the CTFA dictionary under the name sodium diethylaminopropyl cocoaspartamide and sold by the company Chimex under the name Chimexane HB.

Among the amphoteric or zwitterionic surfactants mentioned above, use is preferably made of (C_8-C_{20})alkylbetaines such as cocobetaine, (C_8-C_{20})alkylamido(C_3-C_8)alkylbetaines such as cocoamidopropylbetaine, and mixtures thereof, and the compounds of formula (B'2) such as the sodium salt of diethylaminopropyl laurylaminosuccinamate (INCI name: sodium diethylaminopropyl cocoaspartamide).

More preferentially, the amphoteric or zwitterionic surfactant(s) is (are) chosen from cocoamidopropylbetaine and cocobetaine, the sodium salt of diethylaminopropyl laurylaminosuccinamate, or mixtures thereof.

The amounts of surfactants present in the composition according to the invention may range from 0.01% to 30%, preferably from 0.1% to 20% by weight and better still from 0.5% to 10% by weight relative to the total weight of the composition.

Organic inert phase

The composition in accordance with the invention may comprise at least one organic inert phase.

The term "inert" is understood to mean not causing a rapid destruction of the persulfates, i.e. not causing a decrease in the persulfate level of more than 50% in 24 hours at ambient temperature. Preferably, the organic inert phase is a fatty phase consisting of one or more fatty substances.

The term "*fatty substance*" is understood to mean an organic compound that is insoluble in water at ordinary temperature (25°C) and at atmospheric pressure (760 mmHg) (solubility of less than 5%, preferably less than 1% and even more preferentially less than 0.1%).

The fatty substances 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 generally soluble in organic solvents under the same temperature and pressure conditions, for instance chloroform,

dichloromethane, carbon tetrachloride, ethanol, benzene, toluene, tetrahydrofuran (THF), liquid petroleum jelly or decamethylcyclopentasiloxane.

The fatty substances of the invention do not contain any salified carboxylic acid groups.

In particular, the fatty substances of the invention are also not (poly)oxyalkylenated or (poly)glycerolated ethers.

Preferably, the composition comprises a liquid organic inert phase (liquid fatty phase), comprising oils as fatty substances. For the purposes of the present invention, the term “liquid phase” is understood to mean any phase that is capable of flowing at ambient temperature, generally between 15°C and 40°C, and at atmospheric pressure, under the action of its own weight.

The term "*oil*" is understood to mean a "*fatty substance*" that is liquid at ambient temperature (25°C) and at atmospheric pressure (760 mmHg).

The organic inert liquid phase can in particular be chosen from the polydecenes of formula $C_{10n}H_{[(20n)+2]}$ in which n ranges from 3 to 9 and preferably from 3 to 7, liquid fatty alcohols, esters of fatty alcohols or of fatty acids, sugar esters or diesters of C_{12}-C_{24} fatty acids, cyclic ethers or cyclic esters, silicone oils, mineral oils or plant oils, or mixtures thereof.

The compounds of formula $C_{10n}H_{[(20n)+2]}$ in which n ranges from 3 to 9 correspond to the name “polydecene” of the CTFA dictionary, 7th edition, 1997 of the Cosmetic, Toiletry and Fragrance Association, USA, and also to the same INCI name in the USA and in Europe. These are poly-1-decene hydrogenation products.

Among these compounds, those for which, in the formula, n ranges from 3 to 7 are preferred.

Examples that may be mentioned include the product sold under the name Silkflo® 366 NF Polydecene by the company Amoco Chemical, and those sold under the name Nexbase® 2002 FG, 2004 FG, 2006 FG and 2008 FG by the company Fortum.

As regards the esters of fatty alcohols or of fatty acids, examples that may be mentioned include:

- esters of saturated, linear or branched C_3-C_6 lower monoalcohols with monofunctional C_{12}-C_{24} fatty acids, these fatty acids possibly being linear or branched, saturated or unsaturated and chosen in particular from oleates, laurates, palmitates, myristates, behenates, cocoates, stearates, linoleates, linolenates, caprates and arachidonates, or mixtures thereof, and in particular oleo-palmitates, oleo-stearates and palmito-stearates. Among these esters, it is more particularly preferred to use isopropyl palmitate, isopropyl myristate and octyldodecyl stearate,

- esters of linear or branched C_3-C_8 monoalcohols with difunctional C_8-C_{24} fatty acids, these fatty acids possibly being linear or branched, and saturated or unsaturated, for instance the isopropyl diester of sebacic acid, also known as diisopropyl sebacate,

- esters of linear or branched C_3-C_8 monoalcohols with difunctional C_2-C_8 fatty acids, these fatty acids possibly being linear or branched, and saturated or unsaturated, for instance dioctyl adipate and dicaprylyl maleate,

- the ester of a trifunctional acid, for instance triethyl citrate.

As regards the sugar esters and diesters of C_{12}-C_{24} fatty acids, the term “sugar” is understood to mean compounds containing several alcohol functions, with or without an aldehyde or ketone function, and which comprise at least 4 carbon atoms. These sugars can be monosaccharides, oligosaccharides or polysaccharides.

As sugars that may be used according to the invention, examples that may be mentioned include sucrose (or saccharose), glucose, galactose, ribose, fucose, maltose, fructose, mannose, arabinose, xylose and lactose, and derivatives thereof, in particular alkyl derivatives such as methyl derivatives, for instance methylglucose.

The esters of sugars and of fatty acids that may be used according to the invention may be chosen in particular from the group comprising esters or mixtures of esters of sugars described above and of linear or branched, saturated or unsaturated C_{12}-C_{24} fatty acids.

The esters may be chosen 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, oleo-palmitate, oleo-stearate and palmito-stearate mixed esters.

It is more particularly preferred to use monoesters and diesters and in particular sucrose, glucose or methyl-glucose mono- or dioleates, stearates, behenates, oleopalmitates, linoleates, linolenates and oleo-stearates.

Mention may be made, by way of example, of the product sold under the name Glucate® DO by Amerchol, which is a methylglucose dioleate.

Examples of esters or mixtures of esters of sugar and of fatty acid that may also be mentioned include:

-the products sold under the names F160, F140, F110, F90, F70 and SL40 by the company Crodesta, respectively denoting sucrose palmitostearates formed from 73% monoester and 27% diester and triester, from 61% monoester and 39% diester, triester and tetraester, from 52% monoester and 48% diester, triester and tetraester, from 45% monoester and 55% diester, triester and tetraester, from 39% monoester and 61% diester, triester and tetraester, and sucrose monolaurate;

-the products sold under the name Ryoto Sugar Esters, for example referenced B370 and corresponding to sucrose behenate formed from 20% monoester and 80% diester, triester and polyester;

-the sucrose monodipalmitostearate sold by the company Goldschmidt under the name Tegosoft® PSE.

As regards the cyclic ethers and cyclic esters, γ-butyrolactone, dimethyl isosorbide and diisopropyl isosorbide are in particular suitable.

Silicone oils may also be used as inert organic liquid phase.

More particularly, the silicone oils that are suitable are liquid, non-volatile silicone fluids with a viscosity of less than or equal to 10 000 mPa.s at 25°C, the viscosity of the silicones being measured according to ASTM standard 445 Appendix C.

Silicone oils are defined in greater detail in Walter Noll's "Chemistry and Technology of Silicones" (1968) - Academic Press.

Among the silicone oils that may be used according to the invention, mention may be made in particular of the silicone oils sold under the names DC-200 Fluid

– 5 mPa.s, DC-200 Fluid - 20 mPa.s, DC-200 Fluid – 350 mPa.s, DC-200 Fluid - 1000 mPa.s and DC-200 Fluid – 10 000 mPa.s by the company Dow Corning.

Mineral oils may also be used as inert organic liquid phase, for instance liquid paraffin.

Plant oils may also be suitable for use, and in particular avocado oil, olive oil or liquid jojoba wax.

Preferably, the inert organic liquid phase is chosen from the group formed by polydecenes of formula $C_{10n}H_{[(20n)+2]}$ in which n ranges from 3 to 9 and preferably from 3 to 7, and esters of fatty alcohols or of fatty acids, and mixtures thereof.

According to one particular embodiment of the invention, the content of organic inert phase, which is preferably liquid, ranges from 0.1% to 30% by weight, preferably from 0.5% to 20% by weight and even more preferentially from 1% to 10% by weight relative to the weight of the composition according to the invention.

According to one embodiment, the composition in compressed form according to the invention comprises at least one hydrogen peroxide-generating agent.

As hydrogen peroxide-generating agent that is of use in the present invention, mention may be made of polymeric complexes that can release hydrogen peroxide, such as polyvinylpyrrolidone/H_2O_2 in particular in the form of powders, and the other polymeric complexes described in US 5 008 093; US 3 376 110; US 5 183 901. Mention may also be made of urea peroxide and alkali metal, alkaline-earth metal or ammonium perborates and percarbonates. Alkali metal or alkaline-earth metal percarbonates and in particular sodium percarbonate are preferably used.

It may be noted that alkali metal, alkaline-earth metal or ammonium persulfates are not included in these precursors since, in the redox mechanisms using these persulfates, there is no release of hydrogen peroxide.

In this embodiment, the hydrogen peroxide-generating agent(s) may represent from 0.1% to 40% by weight, preferably from 0.5% to 20% by weight and better still from 1% to 10% by weight relative to the total weight of the composition.

The bleaching composition according to the invention which is in compressed form is preferably anhydrous.

In the context of the present invention, a composition is anhydrous when it has a water content of less than 1% by weight and preferably less than 0.5% by weight relative to the total weight of the composition. Preferably, the composition according to the invention is free of water.

The composition in accordance with the present invention may also comprise various additives conventionally used in cosmetics.

The composition in accordance with the present invention may thus comprise lubricants, for instance polyol stearates or alkali metal or alkaline-earth metal stearates, pigments, colouring agents, additives such as urea, ammonium chloride, antioxidants, penetrants, sequestrants such as EDTA or EDDS, buffers, dispersants, film-forming agents, preservatives, opacifiers, vitamins, fragrances, anionic, non-ionic, amphoteric or zwitterionic polymers other than the rheology modifiers already mentioned and distinct from the amphoteric polymer described above, conditioning agents, for instance cationic polymers distinct from the cationic polymer having a charge density greater than or equal to 4 meq/g described above, ceramides and amino silicones.

In particular, the composition may comprise at least one colouring agent chosen from oxidation dye precursors, direct dyes or mixtures thereof, which will be detailed below.

The oxidation dye precursors are generally chosen from oxidation bases, couplers, and mixtures thereof.

By way of example, the oxidation bases are chosen from para-phenylenediamines, bis(phenyl)alkylenediamines, para-aminophenols, ortho-aminophenols, heterocyclic bases, for instance pyridine derivatives, pyrimidine derivatives and pyrazole derivatives, and the addition salts thereof.

The composition according to the invention may optionally comprise one or more couplers advantageously chosen from those conventionally used in the dyeing of keratin fibres.

Mention may in particular be made, among these couplers, of meta-phenylenediamines, meta-aminophenols, meta-diphenols, naphthalene-based couplers and heterocyclic couplers, and also the addition salts thereof.

In general, the addition salts of the oxidation bases and couplers that can be used within the context of the invention are in particular chosen from the addition salts with an acid such as the hydrochlorides, hydrobromides, sulfates, citrates, succinates, tartrates, lactates, tosylates, benzenesulfonates, phosphates and acetates.

The oxidation dye precursor(s) each advantageously represent(s) from 0.0001% to 10% by weight relative to the total weight of the composition, and preferably from 0.005% to 5% by weight relative to the total weight of the composition.

The term "direct dye" is understood to mean natural and/or synthetic dyes, different from oxidation dyes and which therefore have an intrinsic colouring power, i.e. not requiring a chemical conversion in order to colour. The direct dye may be chosen from neutral (non-ionic), acidic (or anionic) and basic (or cationic) dyes, and mixtures thereof.

Examples of suitable direct dyes that may be mentioned include azo direct dyes; methine direct dyes; carbonyl direct dyes; azine direct dyes; nitro(hetero)aryl direct dyes; tri(hetero)arylmethane direct dyes; porphyrin direct dyes; phthalocyanine direct dyes, and natural direct dyes, alone or as mixtures.

The direct dye(s) may represent from 0.0001% to 10% by weight, relative to the total weight of the composition, and preferably from 0.005% to 5% by weight.

Needless to say, a person skilled in the art will take care to select this or these optional additional compound(s) such that the advantageous properties intrinsically associated with the composition in accordance with the invention are not, or are not substantially, adversely affected by the envisaged addition(s).

The composition in compressed form may be obtained according to known compression or compacting (or pelleting) processes, for instance direct compression. The composition may in particular be provided in the form of a powder that is compacted, for example in a pelletizer, by application of a compression force. The value of the compression force may range, for example, from 0.1 to 500 MPa and in particular from 0.2 to 100 MPa.

The composition in compressed form according to the invention may be single-layer or multilayer.

According to one embodiment, it may comprise at least one layer comprising the bleaching composition comprising at least one persulfate and at least one "additional" layer which may comprise, for example, breakdown agents intended to accelerate the disintegration of the tablet, alkaline agents as mentioned above, and cosmetic active agents, and mixtures thereof. Breakdown (or disintegration) agents that may in particular be mentioned include celluloses and cellulose derivatives, in particular hydroxyalkylcelluloses, amphiphilic polyurethanes, crosslinked polyacrylates, crosslinked polyvinylpyrrolidone, gums, such as guar gum, soybean polysaccharides, alginates, aluminium silicates and derivatives thereof, and silicas, in particular hydrophilic silicas, and mixtures thereof.

According to one embodiment, the composition in compressed form comprises at least one layer comprising the bleaching composition comprising at least one persulfate, at least one additional layer comprising at least one breakdown agent intended to accelerate the disintegration of the tablet, and at least one additional layer comprising at least one alkaline agent.

According to one embodiment, the composition in compressed form comprising at least one persulfate comprises at least one inclusion, for example in bead form, comprising a powder or a liquid encapsulated in a water-soluble film.

The composition in compressed form according to the invention may be in a ready-to-use single-dose form. According to one embodiment, it may be splittable and may comprise on at least one of its faces at least one splitting bar indicating a division of the tablet into two parts (for example two halves) or several parts, in order to enable metering of the amount of bleaching composition to be used in the process.

The composition in compressed form according to the invention may be conditioned in individual form or grouped in a hermetic, moisture-proof sachet.

The present invention also relates to a process for bleaching keratin fibres, which consists in applying to the keratin fibres a bleaching composition which is in compressed form, comprising at least one persulfate and at least one polymer chosen from cationic polymers having a charge density greater than or equal to 4

milliequivalents per gram (meq/g), amphoteric polymers and mixtures thereof, in the presence of an aqueous composition.

The composition in compressed form is generally added to the aqueous composition just at the time of use, i.e. just before application to the keratin fibres.

The step of dissolution of the bleaching composition in compressed form may take a few seconds to a few minutes, and may be performed with or without stirring.

A subject of the present invention is also a multi-compartment device comprising:

- at least one bleaching composition which is in compressed form, comprising at least one persulfate and at least one polymer chosen from cationic polymers having a charge density greater than or equal to 4 milliequivalents per gram (meq/g), amphoteric polymers, and mixtures thereof, and
- at least one aqueous composition, said compositions being packaged separately.

The suitable medium for the aqueous composition generally consists of water or a mixture of water and at least one organic solvent to dissolve the compounds that are not sufficiently water-soluble. Examples of organic solvents that may be mentioned include C_1-C_4 lower alkanols, such as ethanol and isopropanol; polyols such as propylene glycol, glycerol, dipropylene glycol and polyol ethers, for instance 2-butoxyethanol, propylene glycol monomethyl ether, and also aromatic alcohols, for instance benzyl alcohol or phenoxyethanol, similar products and mixtures thereof.

The solvents may be present in proportions preferably of between 1% and 40% by weight and more preferably still between 5% and 30% by weight approximately relative to the total weight of the aqueous composition.

According to one embodiment, the aqueous composition comprises at least one oxidizing agent.

The oxidizing agents that may be used in the aqueous composition are preferably chosen from hydrogen peroxide and compounds that release hydrogen peroxide by hydrolysis, such as urea peroxide. Hydrogen peroxide is preferably used.

The oxidizing agent may represent from 0.5% to 70% by weight, preferably from 1% to 60% by weight and better still from 5% to 20% by weight relative to the total weight of the aqueous composition.

The aqueous composition comprising at least one oxidizing agent preferably has a pH of less than 7.

The aqueous composition may be in any form suitable to allow good dilution of the composition in compressed form, preferably in liquid form.

The composition may also contain various additives conventionally used in cosmetics, such as those described previously.

It may also comprise agents for controlling the release of oxygen, such as magnesium carbonate or oxide.

The additives and the oxygen-release control agents as defined previously may be present in an amount, for each of them, of between 0.01% and 40% by weight and preferably between 0.1% and 30% by weight relative to the total weight of the aqueous composition.

The invention will be illustrated more fully with the aid of the non-limiting examples that follow. Unless otherwise mentioned, the amounts indicated are expressed in grams.

EXAMPLES

Example 1

The following bleaching composition in powder form can be prepared:

Potassium persulfate (KPS from United Initiators)	48.4
Ammonium persulfate (APS from United Initiators)	14.5
Sodium metasilicate (Simet AP from Woellner)	14.5

Ethylenediaminetetraacetic acid	1
Sodium lauryl sulfate (Texapon Z95P from Cognis)	1
Hydroxypropyl guar gum (Jaguar HP 105 from Rhodia)	2
Microcristalline cellulose (Avicel PH 105 from FMC Corp)	17.2
Polyquaternium-6 (Alcofix 131 from BASF)	1.4

Lozenges of 10 g each can be prepared from the obtained powder using a Specac compacting machine.

The resulting composition in lozenge form can be mixed with an aqueous composition of hydrogen peroxide at 20, 30 or 40 volumes (oxidizing agent) in a ratio of 1/1.5 to 1/2, i.e. 4 lozenges (40 g) for 60 to 80 g of oxidizing agent.

Example 2

The following bleaching composition in powder form can be prepared:

Potassium persulfate (KPS from United Initiators)	48.4
Ammonium persulfate (APS from United Initiators)	14.5
Sodium metasilicate (Simet AP from Woellner)	14.5
Ethylenediaminetetraacetic acid	1
Sodium lauryl sulfate (Texapon Z95P from Cognis)	1
Hydroxypropyl guar gum (Jaguar HP 105 from Rhodia)	2
Microcristalline cellulose (Avicel PH 105 from FMC Corp)	16.6
Acrylic acid/acrylamidopropyltrimethylammonium chloride copolymer (Estesol LF from Stockhausen)	2

Lozenges of 10 g each can be prepared from the obtained powder using a Specac compacting machine.

The resulting composition in lozenge form can be mixed with an aqueous composition of hydrogen peroxide at 20, 30 or 40 volumes (oxidizing agent) in a ratio of 1/1.5 to 1/2, i.e. 4 lozenges (40 g) for 60 to 80 g of oxidizing agent.

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CLAIMS

1. Composition for bleaching keratin fibres, which is in compressed form, comprising at least one persulfate and at least one polymer chosen from cationic polymers having a charge density greater than or equal to 4 milliequivalents per gram (meq/g), amphoteric polymers and mixtures thereof, with the proviso that said composition is different from the following composition :

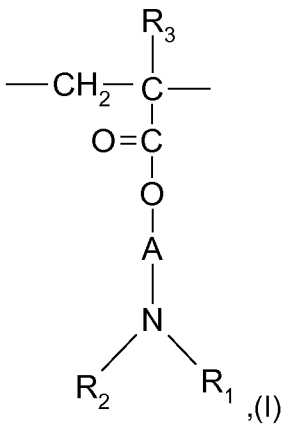
Urea	3.5
Sodium persulfate	8
Ammonium chloride	4.5
Potassium persulfate	47
Ethylenediaminetetraacetic acid	1
Sodium metasilicate	12
Magnesium oxide	1
Anatase titanium oxide	2
Kaolinite	5
Vinylpyrrolidone/vinyl acetate copolymer (65/35)	1.8
Guar gum	2.7
Hydrogenated polydecene (MW 549)	1.7
Polyquaternium 22 (Merquat 280 SD from Nalco)	0.5
Cetylhydroxy cellulose (Natrosol Plus 330 CS from Ashland)	1
Copolymer of polyethylene glycol containing 136 mol of ethylene oxide, stearyl alcohol polyoxyethylenated with 100 mol of ethylene oxide and hexamethylene diisocyanate (HDI) (Rheolate FX 1100® from Elementis)	3
Sodium cetostearyl sulfate	1
Sodium lauryl sulfate	2.3
Magnesium stearate	2

2. Composition according to Claim 1, in which the persulfate(s) is (are) chosen from sodium persulfates, potassium persulfates and ammonium persulfates, and mixtures thereof.

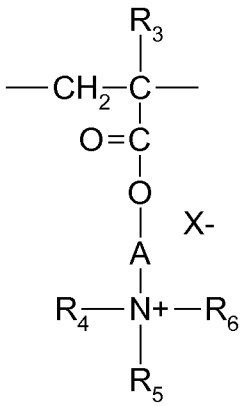
3. Composition according to Claim 1 or 2, characterized in that the persulfate concentration is between 10% and 80% by weight, preferably between 20% and 70% by weight and better still between 40% and 65% by weight relative to the total weight of the composition.

4. Composition according to any one of the preceding claims, characterized in that the cationic polymer(s) having a charge density greater than or equal to 4 meq/g are chosen from:

(1) homopolymers or copolymers derived from acrylic or methacrylic esters or amides and comprising at least one of the units of formulae (I) to (III) below:



,(I)



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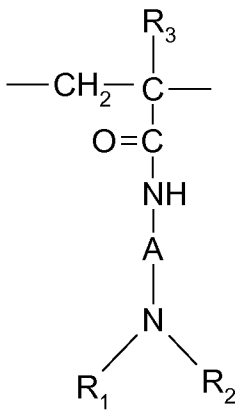

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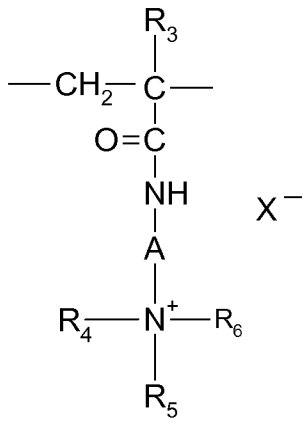


(IV)

in which:

R_3, which may be identical or different, denote a hydrogen atom or a CH_3 radical;

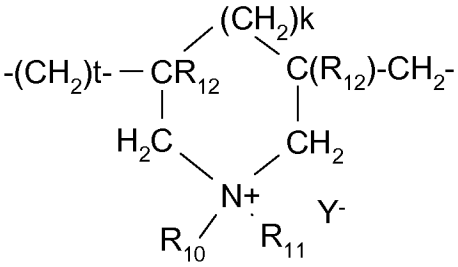
A, which may be identical or different, represent a linear or branched alkyl group of 1 to 6 carbon atoms or a hydroxyalkyl group of 1 to 4 carbon atoms;

R_4, R_5 and R_6, which may be identical or different, represent an alkyl group containing from 1 to 18 carbon atoms or a benzyl radical;

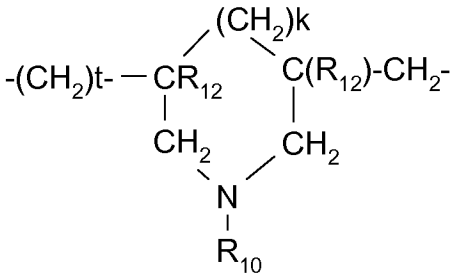
R_1 and R_2, which may be identical or different, represent hydrogen or an alkyl group containing from 1 to 6 carbon atoms;

X^- denotes an anion derived from an inorganic or organic acid;

(2) cyclopolymers of alkyldiallylamine or of dialkyldiallylammonium, such as the homopolymers or copolymers containing, as constituent of the chain, units corresponding to formula (V) or (VI):



(V)



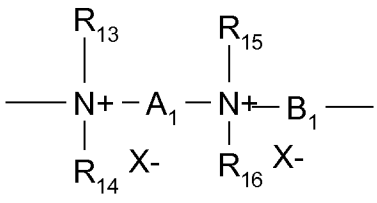
(VI)

in which formulae k and t are equal to 0 or 1, the sum k + t being equal to 1; R_{12} denotes a hydrogen atom or a methyl radical; R_{10} and R_{11}, independently of one another, denote an alkyl group having from 1 to 6 carbon atoms, a hydroxyalkyl group in which the alkyl group has preferably 1 to 5 carbon atoms, a lower (C_1-C_4) amidoalkyl group, or R_{10} and R_{11} may denote, together with the nitrogen atom to which they are attached, heterocyclic groups, such as piperidinyl or morpholinyl; Y^- is an anion such as bromide, chloride, acetate, borate, citrate, tartrate, bisulfate, bisulfite, sulfate or phosphate,

R_{10} and R_{11}, independently of one another, preferably denote an alkyl group containing from 1 to 4 carbon atoms;

(3) quaternary polymers of vinylpyrrolidone and of vinylimidazole;

(4) the diquaternary ammonium polymer containing repeating units corresponding to the formula:



(VII)

in which formula (VII):

R_{13}, R_{14}, R_{15} and R_{16}, which may be identical or different, represent aliphatic, alicyclic or arylaliphatic radicals containing from 1 to 20 carbon atoms, or C_1-C_6 lower hydroxyalkylaliphatic radicals, or else R_{13}, R_{14}, R_{15} and R_{16}, together or separately, constitute, with the nitrogen atoms to which they are attached, heterocycles optionally comprising a second heteroatom other than the nitrogen, or else R_{13}, R_{14}, R_{15} and R_{16} represent a linear or branched C_1-C_6 alkyl radical which is substituted with a nitrile, ester, acyl, amide or -CO-O-R_{17}-D or -CO-NH-R_{17}-D group in which R_{17} is an alkylene and D is a quaternary ammonium group;

A_1 and B_1 represent polymethylene groups containing from 2 to 20 carbon atoms, which groups may be linear or branched, saturated or unsaturated, and which may contain, linked to or intercalated in the main chain, one or more aromatic rings or one or more oxygen or sulfur atoms or sulfoxide, sulfone, disulfide, amino, alkylamino, hydroxyl, quaternary ammonium, ureido, amide or ester groups, and

X^- denotes an anion derived from an inorganic or organic acid;

A_1, R_{13} and R_{15} may form, with the two nitrogen atoms to which they are attached, a piperazine ring; in addition, if A_1 denotes a saturated or unsaturated, linear or branched alkylene or hydroxyalkylene radical, B_1 may also denote a group $(CH_2)_n$-CO-D-OC-$(CH_2)_p$-

in which:

n and p, which may be identical or different, are integers ranging from 2 to 20 approximately,

D denotes:

a) a glycol residue of formula: -O-Z-O-, where Z denotes a linear or branched hydrocarbon-based radical or a group corresponding to one of the following formulae:

-$(CH_2$-CH_2-$O)_x$ -CH_2-CH_2-

-$[CH_2$-$CH(CH_3)$-$O]_y$-CH_2-$CH(CH_3)$-

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

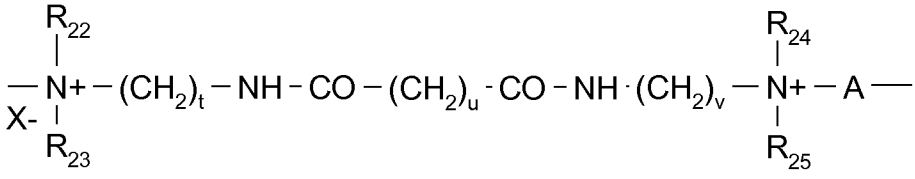
b) a bis-secondary diamine residue such as a piperazine derivative;

c) a bis-primary diamine residue of formula: -NH-Y-NH-, where Y denotes a linear or branched hydrocarbon-based radical, or alternatively the divalent radical:

$-CH_2-CH_2-S-S-CH_2-CH_2-$;

d) a ureylene group of formula: -NH-CO-NH-;

(5) polyquaternary ammonium polymers consisting of units of formula (VIII):



(VIII)

in which formula:

R_{22}, R_{23}, R_{24} and R_{25}, which may be identical or different, represent a hydrogen atom or a methyl, ethyl, propyl, β-hydroxyethyl, β-hydroxypropyl or $-CH_2CH_2(OCH_2CH_2)_pOH$ radical,

in which p is equal to 0 or to an integer between 1 and 6, with the proviso that R_{22}, R_{23}, R_{24} and R_{25} do not simultaneously represent a hydrogen atom,

t and u, which may be identical or different, are integers between 1 and 6,

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

X^- denotes an anion such as a halide,

A denotes a radical of a dihalide or represents preferably $-CH_2-CH_2-O-CH_2-CH_2-$;

(6) polyalkyleneimines, in particular polyethyleneimines, polymers comprising vinylpyridine or vinylpyridinium units, condensates of

polyamines and of epichlorohydrin, quaternary polyureylenes and chitin derivatives,

and mixtures thereof.

5. Composition according to the preceding claim, in which the cationic polymer(s) having a charge density greater than or equal to 4 meq/g is (are) chosen from cationic cyclopolymers, polymers containing units of formula (VII), and mixtures thereof.

6. Composition according to any one of the preceding claims, in which the cationic polymer(s) having a charge density greater than or equal to 4 meq/g is (are) chosen from dimethyldiallylammonium chloride homopolymers.

7. Composition according to any one of the preceding claims, in which the cationic polymer(s) having a charge density greater than or equal to 4 meq/g are present in an amount ranging from 0.01% to 10% by weight, preferably from 0.05% to 5% by weight and even more preferentially from 0.1% to 3% by weight relative to the total weight of the composition.

8. Composition according to one of the preceding claims, characterized in that the amphoteric polymer(s) is (are) chosen from the following compounds:
(1) polymers comprising, as monomers, at least one monomer derived from a vinyl compound bearing a carboxylic group, preferably acrylic acid, methacrylic acid, maleic acid, α-chloroacrylic acid, and at least one basic monomer derived from a substituted vinyl compound containing at least one basic atom chosen from:

a) dialkylaminoalkyl methacrylates, dialkylaminoalkyl acrylates, dialkylaminoalkylmethacrylamides and dialkylaminoalkylacrylamides,

b) trialkylaminoalkyl methacrylate salts, trialkylaminoalkyl acrylate salts, trialkylaminoalkylmethacrylamide salts and trialkylaminoalkylacrylamide salts;

(2) polymers comprising units deriving from:

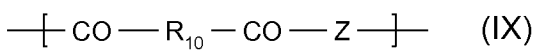
a) at least one monomer chosen from acrylamides or methacrylamides substituted on the nitrogen with an alkyl radical preferably containing from 2 to 12 carbon atoms,

b) at least one acidic comonomer containing one or more reactive carboxylic groups, preferably chosen from acrylic acid, methacrylic acid, crotonic acid, itaconic acid, maleic acid and fumaric acid and also from alkyl monoesters, having 1 to 4 carbon atoms, of maleic or fumaric acids or anhydrides,

c) at least one basic comonomer such as esters containing primary, secondary, tertiary and quaternary amine substituents of acrylic and methacrylic acids and the product of quaternization of dimethylaminoethyl methacrylate with dimethyl or diethyl sulfate;

(3) copolymers comprising, as monomers, at least one monomer derived from a vinyl compound bearing a carboxylic group, such as, more particularly, acrylic acid, methacrylic acid, maleic acid, α-chloroacrylic acid, and at least one monomer of diallyldialkylammonium salt type, the alkyl groups having from 1 to 6 carbon atoms;

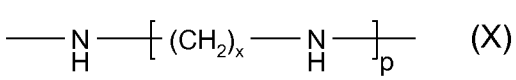
(4) crosslinked and alkylated polyamino amides partially or totally derived from polyamino amides of general formula:



(IX)

in which R_{10} represents a divalent radical derived from a saturated dicarboxylic acid, a mono- or dicarboxylic aliphatic acid containing an ethylenic double bond, an ester of a lower alkanol having 1 to 6 carbon atoms of these acids, or a radical derived from the addition of any one of said acids to a bis(primary) or bis(secondary) amine, and Z denotes a radical from a bis(primary), mono- or bis(secondary) polyalkylene-polyamine and preferably represents:

a) in proportions of from 60 to 100 mol%, the radical

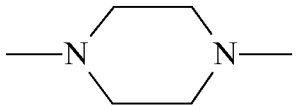


(X)

where x = 2 and p = 2 or 3, or alternatively x = 3 and p = 2,

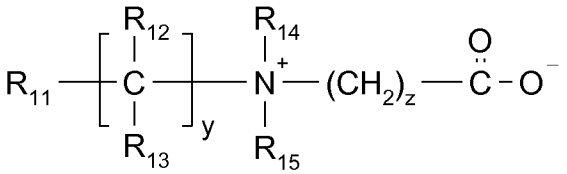
this radical being derived from diethylenetriamine, from triethylenetetramine or from dipropylenetriamine;

b) in proportions of from 0 to 40 mol%, the radical (X) above in which x = 2 and p = 1 and which is derived from ethylenediamine, or the radical derived from piperazine:



c) in proportions of from 0 to 20 mol%, the radical $-NH(CH_2)_6-NH-$ being derived from hexamethylenediamine, these polyamino amines being crosslinked by addition of a difunctional crosslinking agent chosen from epihalohydrins, diepoxides, dianhydrides and bis-unsaturated derivatives, using from 0.025 to 0.35 mol of crosslinking agent per amine group of the polyamino amide and alkylated by the action of acrylic acid, chloroacetic acid or an alkane sultone, or salts thereof;

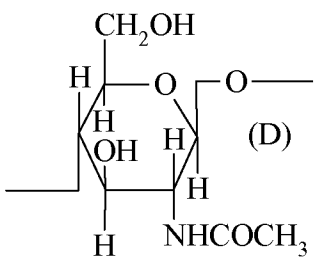
(5) polymers comprising zwitterionic units of formula:



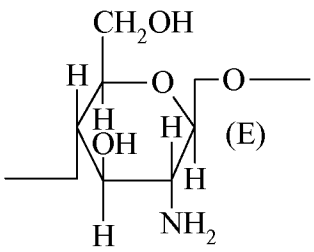
(XI)

in which R_{11} denotes a polymerizable unsaturated group such as an acrylate, methacrylate, acrylamide or methacrylamide group, y and z represent an integer from 1 to 3, R_{12} and R_{13} represent a hydrogen atom, methyl, ethyl or propyl, R_{14} and R_{15} represent a hydrogen atom or an alkyl radical such that the sum of the carbon atoms in R_{14} and R_{15} does not exceed 10;

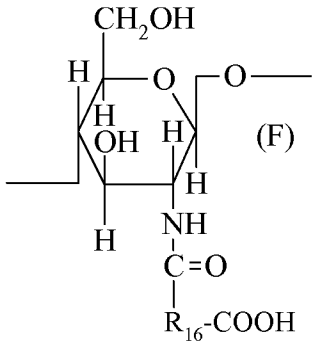
(6) polymers derived from chitosan comprising monomer units corresponding to the following formulae:



(D)

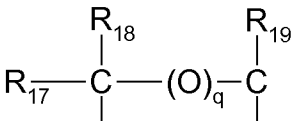


(E)



(F)

the unit D being present in proportions of between 0 and 30%, the unit E in proportions of between 5% and 50% and the unit F in proportions of between 30% and 90%, it being understood that, in this unit F, R_{16} represents a radical of formula:

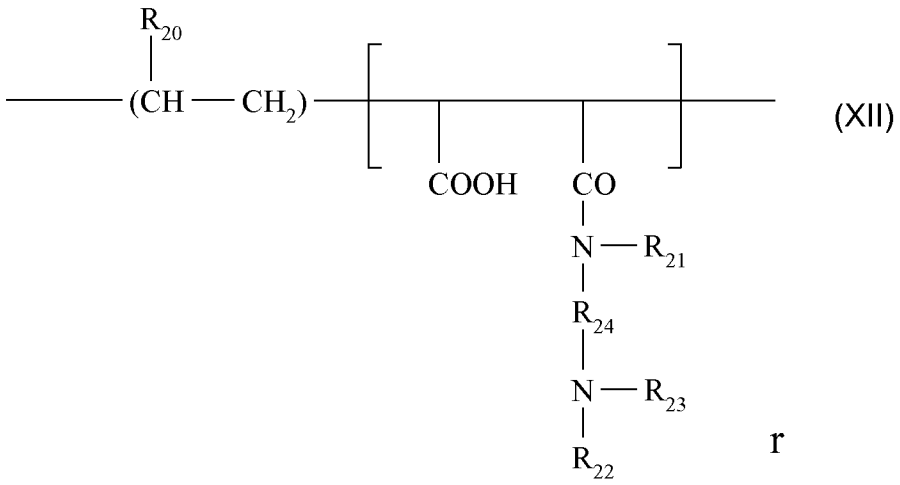


in which, if q = 0, R_{17}, R_{18} and R_{19}, which may be identical or different, each represent a hydrogen atom, a methyl, hydroxyl, acetoxy or amino residue, a monoalkylamine residue or a dialkylamine residue that are optionally interrupted with one or more nitrogen atoms and/or optionally substituted with one or more amine, hydroxyl, carboxyl, alkylthio or sulfonic groups, or an alkylthio residue in which the alkyl group bears an amino residue, at least one of the radicals R_{17}, R_{18} and R_{19} being, in this case, a hydrogen atom;

or, if q = 1, R_{17}, R_{18} and R_{19} each represent a hydrogen atom, and also the salts formed by these compounds with bases or acids;

(7) polymers derived from the N-carboxyalkylation of chitosan;

(8) polymers containing units corresponding to general formula (XII):



(XII)

in which R_{20} represents a hydrogen atom, a CH_3O, CH_3CH_2O or phenyl radical, R_{21} denotes hydrogen or a lower alkyl radical such as methyl or ethyl, R_{22} denotes hydrogen or a lower alkyl radical such as methyl or ethyl, R_{23} denotes a lower alkyl radical such as methyl or ethyl or a radical corresponding to the formula: $-R_{24}-N(R_{22})_2$, R_{24} representing a group $-CH_2-CH_2-$, $-CH_2-CH_2-CH_2-$ or $-CH_2-CH(CH_3)-$, R_{22} having the meanings mentioned above,

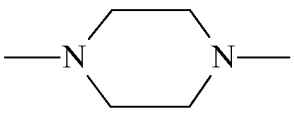
and also the higher homologues of these radicals, containing up to 6 carbon atoms;

(9) amphoteric polymers of the -D-X-D-X type chosen from:

a) polymers obtained by the action of chloroacetic acid or sodium chloroacetate on compounds comprising at least one unit of formula:

-D-X-D-X-D- (XIII)

where D denotes a radical



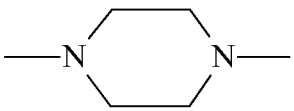
and X denotes the symbol E or E', E or E', which may be identical or different, denote a divalent radical that is an alkylene radical with a straight or branched chain containing up to 7 carbon atoms in the main chain, which is unsubstituted or substituted with hydroxyl groups and which can comprise, in addition to oxygen, nitrogen and sulfur atoms, 1 to

3 aromatic and/or heterocyclic rings; the oxygen, nitrogen and sulfur atoms being present in the form of ether, thioether, sulfoxide, sulfone, sulfonium, alkylamine or alkenylamine groups, hydroxyl, benzylamine, amine oxide, quaternary ammonium, amide, imide, alcohol, ester and/or urethane groups,

b) polymers of formula:

-D-X-D-X- (XIV)

where D denotes a radical



and X denotes the symbol E or E' and at least once E'; E having the meaning given above and E' is a divalent radical that is an alkylene radical with a straight or branched chain having up to 7 carbon atoms in the main chain, which is unsubstituted or substituted with one or more hydroxyl radicals and containing one or more nitrogen atoms, the nitrogen atom being substituted with an alkyl chain that is optionally interrupted by an oxygen atom and necessarily comprising one or more carboxyl functions or one or more hydroxyl functions and betainized by reaction with chloroacetic acid or sodium chloroacetate;

(10) (C_1-C_5)alkyl vinyl ether/maleic anhydride copolymers partially modified by semiamidation with an N,N-dialkylaminoalkylamine or by semiesterification with an N,N-dialkanolamine;
and mixtures thereof.

9. Composition according to any one of the preceding claims, characterized in that the amphoteric polymer(s) is (are) chosen from acrylic acid/acrylamidopropyltrimethylammonium chloride copolymers, acrylic acid/acrylamidopropyltrimethylammonium chloride/acrylamide copolymers, copolymers comprising, as monomers, dimethyldiallylammonium chloride and acrylic acid, optionally combined with acrylamide, and mixtures thereof.

10. Composition according to any one of the preceding claims, characterized in that the amphoteric polymer(s) is (are) chosen from acrylic acid/acrylamidopropyltrimethylammonium chloride copolymers.

11. Composition according to any one of the preceding claims, characterized in that the amphoteric polymer(s) represent(s) from 0.01% to 10%, better still from 0.05% to 7% and even more preferentially from 0.1% to 5% by weight relative to the total weight of the composition.

12. Composition according to any one of the preceding claims, characterized in that it comprises at least one alkaline agent chosen from water-soluble silicates such as alkali metal or alkaline-earth metal silicates, dibasic or tribasic alkali metal or alkaline-earth metal phosphates, and alkali metal or alkaline-earth metal carbonates, and mixtures thereof.

13. Composition according to the preceding claim, characterized in that the alkaline agent(s) is (are) present in an amount ranging from 0.1% to 40%, preferably from 0.5% to 30% by weight and better still from 1% to 20% by weight relative to the total weight of the composition.

14. Composition according to any one of the preceding claims, characterized in that it comprises at least one rheology modifier chosen from hydrophilic thickeners, amphiphilic polymers comprising at least one hydrophobic chain, and fillers, and mixtures thereof.

15. Composition according to any one of the preceding claims, characterized in that it comprises at least one disintegration agent chosen from celluloses and cellulose derivatives, crosslinked polyacrylates, crosslinked polyvinylpyrrolidone, soybean polysaccharides, alginates, aluminium silicates and derivatives thereof, and hydrophilic silicas, and mixtures thereof.

16. Composition according to any one of the preceding claims, characterized in that it comprises an organic inert phase, which is preferably liquid, preferably chosen from the group formed by the polydecenes of formula $C_{10n}H_{[(20n)+2]}$ in

which n ranges from 3 to 9 and preferably from 3 to 7, and esters of fatty alcohols or of fatty acids, and mixtures thereof.

17. Composition according to any one of the preceding claims, characterized in that it comprises at least one surfactant, preferably an anionic or non-ionic surfactant.

18. Process for bleaching keratin fibres, which consists in applying to the keratin fibres a composition according to one of Claims 1 to 17, in the presence of an aqueous composition.

19. Process according to Claim 18, characterized in that the aqueous composition comprises an oxidizing agent, preferably hydrogen peroxide.