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(71) Déposant *(pour tous les États désignés sauf US)* : **L'OREAL** [FR/FR]; 14 rue Royale, F-75008 Paris (FR).

(72) Inventeur; et
(75) Inventeur/Déposant *(pour US seulement)* : **DU-MOUSSEAUX, Christophe** [FR/JP]; 3-19-4 Ichigaya - Sadohara-cho, Shinjukn, Tokyo (JP).

(74) Mandataire : **NONY & ASSOCIES**; 3 rue de Penthièvre, F-75008 Paris (FR).

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(54) **Title:** COMPOSITION INTENDED TO BE APPLIED TO THE SKIN AND THE INTEGUMENTS

(54) **Titre :** COMPOSITION DESTINEE A ETRE APPLIQUEE SUR LA PEAU ET LES TEGUMENTS

(57) **Abstract:** The present invention relates to a composition intended to be applied to the skin, the lips and/or the integuments, comprising, in a physiologically acceptable medium, at least one composite pigment comprising:- a mineral core,- at least one organic pigment at least partially covering the mineral core,and- at least one binder for fixing the organic pigment onto the mineral core.

(57) **Abrégé :** La présente invention porte sur une composition destinée à être appliquée sur la peau, les lèvres et/ou les téguments, et comprenant dans un milieu acceptable d'un point de vue physiologique, au moins un pigment composite renfermant un noyau minéral, au moins un pigment organique recouvrant au moins partiellement le noyau minéral et au moins un liant destiné à fixer le pigment organique sur le noyau minéral.

WO 2004/030640 A1

Composition intended to be applied to the skin and the integuments

The present invention relates to compositions intended to be applied to the skin, including mucous membranes, especially the lips, and the integuments, especially the nails, the eyelashes, the eyebrows and the hair.

It is known practice to incorporate organic pigments into cosmetic compositions, these pigments making it possible to obtain colours with high saturation. However, their covering power is poor, which leads to mineral pigments being added to the composition.

The presence in the composition of a mixture of pigments of different nature entails a risk of variability of the properties, especially when different shades are produced by changing the proportions of organic and mineral pigments. This is because the behaviour of the organic and mineral pigments towards the other constituents of the composition is not the same, which results in difficulties of formulation. Thus, the sticks of a range of shades of lipsticks will have variable hardnesses.

Furthermore, the behaviour of the organic and mineral pigments towards the other constituents of the composition is liable to be not the same, which results in difficulties of formulation and a risk of modification of the makeup result over time, for example when a volatile compound evaporates. Thus, for example, certain lipsticks comprise mineral pigments such as TiO_2 and an oily phase; the TiO_2 particles may become white when they are no longer coated with the oily phase, which changes the colour of the composition applied and poses a problem of stability of the colour over time.

Finally, when lakes are used, the organic dye used in the lake is liable to transfer onto the support and stain it. The pigments conventionally used in cosmetic formulations are about one micrometre or larger in size. This large size, combined with a high density, results in sedimentation and stability problems in liquid formulations. It also prevents the production of transparency effects associated with a large saturation of the colour.

There is a need to benefit from a composition, especially a cosmetic composition, for solving all or some of the abovementioned drawbacks.

One subject of the invention is thus, among others, a composition intended to be applied to the skin, the lips and/or the integuments, comprising, in a physiologically acceptable medium, at least one composite pigment comprising:

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- a mineral core,
- at least one organic pigment at least partially covering the mineral core, and
- at least one binder for fixing the organic pigment onto the mineral core.

The invention makes it possible to benefit from cosmetic compositions comprising at least one composite pigment that has both relatively strong covering power and the advantages of an organic pigment, especially relatively high colour saturation. The binder can allow the organic pigment to fix onto the mineral core without any covalent bonds between the two.

The composite pigment may have a density higher than that of the organic pigment alone, on account of the presence of the mineral core, the density of the said core possibly being higher than that of the organic pigment.

A suitable shade may be obtained by mixing composite pigments according to the invention, or alternatively by mixing organic pigments into the composite pigment or with successive layers of binders and organic pigments in the composite pigment.

The invention may thus make it possible to prepare compositions without mixing organic and mineral pigments and/or not comprising any pigment having the sensitivity of lakes, which may facilitate the formulation and avoid the drawbacks associated with the use of lakes.

In addition, by appropriately selecting the organic pigment, and especially its colour, it is possible, where appropriate, to reinforce the colour of the mineral core. For example, it is possible to obtain a deep black, for example by combining a black iron oxide and an organic pigment. The size of the mineral core may be readily varied so as to modify the size of the final composite pigment. For example, coloured pigments of nanometric size may be obtained. These correctly dispersed nanometric-sized pigments make it possible especially to avoid the sedimentation problems observed on pigments of larger size. The refractive index of the composite pigment may also be readily modified by varying the index of the mineral core. The presence of the binder makes it possible both to fix the organic pigment onto the surface during the manufacture of the pigment, and to reduce any transfer of the pigment onto the support.

The term "physiologically acceptable medium" denotes a non-toxic medium that may be applied to human skin, lips or integuments. The physiologically acceptable

medium will be adapted to the nature of the support onto which the composition is to be applied, and also to the form in which the composition is intended to be packaged, especially solid, semi-solid or fluid at room temperature and atmospheric pressure.

The term "cosmetic composition" denotes a composition as defined in Directive 93/35/EEC of the Council of 14 June 1993.

The organic pigment may be chosen from particulate compounds that are insoluble in the physiologically acceptable medium of the composition.

The organic pigment may be chosen especially from the nitroso, nitro, azo, xanthene, quinoline, anthraquinone, phthalocyanin and carmine families, and carbon black.

The pigment may be chosen from the following non-limiting list, which refers to the Color Index, as does Directive 93/35/EEC:

- blue pigment: CI 42090, 69800, 69825, 73000, 74100, 74160;
- yellow pigment: CI 11680, 11710, 15985, 19140, 20040, 21100, 21108, 47000, 47005;
- green pigment: CI 61565, 61570, 74260;
- orange pigment: CI 11725, 15510, 45370, 71105;
- red pigment: CI 12085, 12120, 12370, 12420, 12490, 14700, 15525, 15580, 15620, 15630, 15800, 15850, 15865, 15880, 17200, 26100, 45380, 45410, 58000, 73360, 73915, 75470;
- black pigment: CI 77266.

The binder may be of any type provided that it allows the organic pigment to adhere to the surface of the mineral core.

The binder may be chosen especially from the non-limiting list comprising silicone compounds, polymeric or oligomeric compounds or the like, and in particular from alkoxysilanes, fluoroalkylsilanes and polysiloxanes, and also various couplers, such as couplers based on silane, on titanates, on aluminates or on zirconates, and mixtures thereof.

As mentioned above, the mineral core may be coloured, i.e., for example, non-transparent, this core possibly being, for example, white or black.

Among the materials that may be used, mention may be made of metal salts and metal oxides, especially of titanium, zirconium, cerium, zinc, iron, ferric blue and chromium, barium sulphate, aluminas, glasses, ceramics, graphite, silicas, silicates, especially aluminosilicates and borosilicates, and synthetic mica, and mixtures thereof.

Titanium oxides TiO_2 and iron oxides Fe_2O_3 may be most particularly suitable for use.

The mass proportion of the organic pigment may be between 1 and 500 parts by weight per 100 parts by weight of the core, for example.

The size of the composite pigment particles may be between 0.001 and 150 μm, especially between 0.01 and 50 μm, for example between 0.01 and 25 μm or between about 0.05 μm and about 10 μm. The size of the pigment particles may especially be less than 2 μm, or even less than or equal to 1 μm. The term "size" denotes the dimension given by the statistical particle-size distribution to half of the population, known as the D50.

Out of concern for aesthetics, it is generally preferable for the composite pigment particles to be not at all perceptible, or not readily perceptible, to the naked eye, at the surface of the composition applied to its support. It is also desirable for the composite pigment particles not to have sizes such that they create a sensation of discomfort on the support. The use of particles less than or equal to 250 μm and better still less than or equal to 150 μm in size, for example less than 15 μm, is thus preferred. The particle size may also depend on the nature of the support onto which the composition is intended to be applied; certain parts of the body or face may, for example, tolerate larger sizes more readily than others without experiencing discomfort.

The composite pigment particles may have varied forms. These particles may especially be in the form of platelets or globules, in particular in spherical form, and may be hollow or solid. The expression "in the form of platelets" denotes particles in which the ratio of the largest dimension to the thickness is greater than or equal to 5.

The composition may comprise only composite pigments as defined above or, as a variant, comprise composite pigments and also pigments having another structure, especially mineral pigments, interference pigments, lakes or organic pigments. The composition may especially be free of uncoated TiO_2 particles.

The composition may comprise one or more composite pigments in a mass proportion that may be between 0.1% and 20%, in particular between 0.1% and 15% and better still between 0.5% and 10%, especially by weight relative to the total weight of the composition.

The composition may comprise at least one aqueous or organic solvent.

When the composition comprises one or more organic solvents, these solvents may be present in an amount ranging from 0 to 99% relative to the total weight of the composition.

In general, the amount of solvent(s), especially organic solvent(s), will depend on the nature of the support onto which the composition is intended to be applied.

In the case of a nail varnish, for example, the organic solvent may be present in the composition in a content ranging, for example, from 30% to 99% by weight and preferably from 60% to 90% by weight relative to the total weight of the composition.

The composition may comprise at least one organic solvent chosen from the following list:

- ketones that are liquid at room temperature, such as methyl ethyl ketone, methyl isobutyl ketone, diisobutyl ketone, isophorone, cyclohexanone or acetone;
- alcohols that are liquid at room temperature, such as ethanol, isopropanol, diacetone alcohol, 2-butoxyethanol or cyclohexanol;
- glycols that are liquid at room temperature, such as ethylene glycol, propylene glycol, pentylene glycol or glycerol;
- propylene glycol ethers that are liquid at room temperature, such as propylene glycol monomethyl ether, propylene glycol monomethyl ether acetate or dipropylene glycol mono-n-butyl ether;
- short-chain esters (containing from 3 to 8 carbon atoms in total) such as ethyl acetate, methyl acetate, propyl acetate, n-butyl acetate or isopentyl acetate;
- alkanes that are liquid at room temperature, such as decane, heptane, dodecane or cyclohexane.

The composition may also comprise water or a mixture of water and hydrophilic organic solvents commonly used in cosmetics, for instance alcohols and especially linear or branched lower monoalcohols containing from 2 to 5 carbon atoms, for instance ethanol, isopropanol or n-propanol, polyols, for instance glycerol, diglycerol, propylene glycol, sorbitol, pentylene glycol or polyethylene glycols. The composition may also contain hydrophilic C_2 ethers and C_2-C_4 aldehydes. Water or a mixture of water and of hydrophilic organic solvents may be present in the composition in a content ranging, for example, from 0% to 90%, especially 0.1% to 90% by weight, preferably from 0% to 60%

by weight and especially 0.1% to 60% by weight, relative to the total weight of the composition.

The composition, especially when it is intended to be applied to the lips, may comprise a fatty phase and especially at least one fatty substance that is liquid at room temperature (25°C) and/or a fatty substance that is solid at room temperature, such as waxes, pasty fatty substances, and gums, and mixtures thereof. The fatty phase may also contain lipophilic organic solvents.

The composition may have, for example, a continuous fatty phase, which may contain less than 5% water and especially less than 1% water relative to its total weight, and in particular may be in anhydrous form.

As fatty substances that are liquid at room temperature, often referred to as "oils", mention may be made of: hydrocarbon-based plant oils such as liquid triglycerides of fatty acids of 4 to 10 carbon atoms, for instance heptanoic or octanoic acid triglycerides, or sunflower oil, maize oil, soybean oil, grapeseed oil, sesame seed oil, apricot oil, macadamia oil, castor oil, avocado oil, caprylic/capric acid triglycerides, jojoba oil or shea butter; linear or branched hydrocarbons of mineral or synthetic origin, such as liquid paraffins and derivatives thereof, petroleum jelly, polydecenes, and hydrogenated polyisobutene such as parleam; synthetic esters and ethers, especially of fatty acids, for instance purcellin oil, isopropyl myristate, 2-ethylhexyl palmitate, 2-octyldodecyl stearate, 2-octyldodecyl erucate or isostearyl isostearate; isononyl isonanoate; hydroxylated esters, for instance isostearyl lactate, octyl hydroxystearate, octyldodecyl hydroxystearate, diisostearyl malate, triisocetyl citrate or fatty alkyl heptanoates, octanoates and decanoates; polyol esters, for instance propylene glycol dioctanoate, neopentyl glycol diheptanoate or diethylene glycol diisononanoate; and pentaerythritol esters; fatty alcohols containing from 12 to 26 carbon atoms, for instance octyldodecanol, 2-butyloctanol, 2-hexyldecanol, 2-undecylpentadecanol or oleyl alcohol; partially hydrocarbon-based and/or silicone-based fluoro oils; silicone oils, for instance volatile or non-volatile, linear or cyclic polymethylsiloxanes (PDMSs) that are liquid or pasty at room temperature, for instance cyclomethicones, dimethicones, optionally comprising a phenyl group, for instance phenyl trimethicones, phenyltrimethylsiloxydiphenylsiloxanes, diphenylmethyldimethyl-trisiloxanes, diphenyl dimethicones, phenyl dimethicones and polymethylphenylsiloxanes;

and mixtures thereof. The oils may be present in a content ranging from 0.01% to 90% and better still from 0.1% to 85% by weight, relative to the total weight of the composition.

The pasty fatty substances are generally hydrocarbon-based compounds with a melting point of between 25 and 60°C and preferably between 30 and 45°C, and/or a hardness of between 0.001 and 0.5 MPa and preferably between 0.005 and 0.4 MPa, for instance lanolins and derivatives thereof.

The waxes may be solid at room temperature (25°C), with a reversible solid/liquid change of state, having a melting point of greater than 30°C which may be up to 200°C, a hardness of greater than 0.5 MPa, and having in solid form an anisotropic crystal organization. In particular, the waxes may have a melting point of greater than 25°C and better still greater than 45°C. The waxes may be hydrocarbon-based waxes, fluoro waxes and/or silicone waxes and may be of plant, mineral, animal and/or synthetic origin. As waxes that may be used, mention may be made of beeswax, carnauba wax or candelilla wax, paraffin, microcrystalline waxes, ceresin or ozokerite; synthetic waxes, such as polyethylene wax or Fischer-Tropsch wax, and silicone waxes, for instance alkyl- or alkoxydimethicones containing from 16 to 45 carbon atoms. The composition may contain from 0 to 50% by weight of waxes, or even from 1% to 30% by weight of waxes, relative to the total weight of the composition.

The gums that may be used are generally high molecular weight polydimethylsiloxanes (PDMSs) or cellulose gums or polysaccharides.

The composition may also comprise, for example, a film-forming polymer, especially in the case of a mascara or a nail varnish. The term "film-forming polymer" denotes a polymer capable, by itself or in the presence of an auxiliary film-forming agent, of forming a continuous film that adheres to a support and especially to keratin materials.

Among the film-forming polymers that may be used in a composition according to the invention, mention may be made, inter alia, of synthetic polymers, of free-radical type or of polycondensate type, polymers of natural origin, such as nitrocellulose or cellulose esters, and mixtures thereof.

The film-forming polymers of free-radical type may especially be vinyl polymers or copolymers, especially acrylic polymers.

The vinyl film-forming polymers may result from the polymerization of ethylenically unsaturated monomers containing at least one acid group and/or esters of

these acidic monomers and/or amides of these acidic monomers, for instance α,β-ethylenic unsaturated carboxylic acids such as acrylic acid, methacrylic acid, crotonic acid, maleic acid or itaconic acid.

The vinyl film-forming polymers may also result from the homopolymerization or copolymerization of monomers chosen from vinyl esters, for instance vinyl acetate, vinyl neodecanoate, vinyl pivalate, vinyl benzoate and vinyl t-butylbenzoate, and styrene monomers, for instance styrene and α-methylstyrene.

Among the film-forming polycondensates that may be mentioned are polyurethanes, polyesters, polyesteramides, polyamides and polyureas, this list not being limiting.

The optionally modified polymers of natural origin may be chosen from shellac resin, sandarac gum, dammar resins, elemi gums, copal resins, cellulose-based polymers, such as nitrocellulose, ethylcellulose or nitrocellulose esters chosen, for example, from cellulose acetate, cellulose acetobutyrate and cellulose acetopropionate, and mixtures thereof.

The film-forming polymer may be present in the form of particles in aqueous or oily dispersion, generally known as latices or pseudolatices. The film-forming polymer may comprise one or more stable dispersions of particles of generally spherical polymers of one or more polymers, in a physiologically acceptable liquid fatty phase. These dispersions are generally known as polymer NADs (Non-Aqueous Dispersions), as opposed to latices, which are aqueous polymer dispersions. These dispersions may especially be in the form of polymer nanoparticles in stable dispersion in the said fatty phase. The nanoparticles are preferably between 5 and 600 nm in size. The techniques for preparing these dispersions are well known to those skilled in the art.

Aqueous dispersions of film-forming polymers that may be used include the acrylic dispersions sold under the names Neocryl XK-90®, Neocryl A-1070®, Neocryl A-1090®, Neocryl BT-62®, Neocryl A-1079® and Neocryl A-523® by the company Avecia-Neoresins, Dow Latex 432® by the company Dow Chemical, Daitosol 5000 AD® by the company Daito Kasei Kogyo; or the aqueous polyurethane dispersions sold under the names Neorez R-981® and Neorez R-974® by the company Avecia-Neoresins, Avalure UR-405®, Avalure UR-410®, Avalure UR-425®, Avalure UR-450®, Sancure 875®, Sancure 861®, Sancure 878® and Sancure 2060® by the company Goodrich,

Impranil 85® by the company Bayer and Aquamere H-1511® by the company Hydromer; the sulphopolyesters sold under the brand name Eastman AQ by the company Eastman Chemical Products.

The composition according to the invention may also comprise an auxiliary film-forming agent that promotes the formation of a film with the film-forming polymer.

The composition may also comprise fillers. The term "fillers" denotes particles of any form, which are insoluble in the medium of the composition, irrespective of the temperature at which the composition is manufactured. These fillers may serve especially to modify the rheology or texture of the composition. The nature and amount of the solid substances depend on the desired mechanical properties and textures.

Examples of fillers that may be mentioned, inter alia, include talc, mica, silica, kaolin, sericite, polyamide powder, polyethylene powder, polytetrafluoroethylene powder, polymethyl methacrylate powder, polyurethane powder, starch powders and silicone resin beads.

The composition may comprise at least one cosmetic or dermatological active agent. As cosmetic, dermatological, hygiene or pharmaceutical active agents that may be used in the compositions of the invention, mention may be made of moisturizers (polyols, for instance glycerol), vitamins (C, A, E, F, B or PP), essential fatty acids, essential oils, ceramides, sphingolipids, liposoluble sunscreens or sunscreens in the form of nanoparticles, and specific skin-treating active agents (protective agents, antibacterial agents, anti-wrinkle agents, etc.). These active agents may be used, for example, in concentrations of from 0 to 20% and especially from 0.001 to 15% relative to the total weight of the composition.

The cosmetic composition may also contain ingredients commonly used in cosmetics, for instance thickeners, surfactants, trace elements, moisturizers, softeners, sequestering agents, fragrances, acidifying or basifying agents, preserving agents, antioxidants, UV-screening agents or dyes, or mixtures thereof.

The cosmetic composition may also comprise, depending on the type of application envisaged, constituents conventionally used in the fields under consideration, which are present in an amount that is suitable for the desired presentation form.

The composition may be in various forms, depending on its intended use. The cosmetic composition may thus be in any presentation form normally used for topical

application and especially in anhydrous form, in the form of an oily or aqueous solution, an oily or aqueous gel, an oil-in-water, water-in-oil, wax-in-water or water-in-wax emulsion, a multiple emulsion, or a dispersion of oil in water by means of vesicles located at the oil/water interface.

The composition may be in the form of a cast product, especially in the form of a stick in the case of a lipstick or a lipcare product.

The composition may also be in various other forms, for example in the form of a more or less viscous liquid, a gel or a paste.

The composition may also be in the form of a semi-solid or a solid, for example a cake to be moistened at the time of use, so as to allow it to be disintegrated.

The cosmetic composition may constitute, inter alia, a lipstick, a liquid gloss, a lipstick paste, a makeup rouge, a lip pencil, a solid or fluid foundation, a concealer product or eye-contour product, an eyeliner, a mascara, a nail varnish, an eyeshadow, a body or hair makeup product or an antisun product or skin-colouring product.

A subject of the invention is thus also a liquid or semi-solid lipstick comprising a composition as defined above.

A subject of the invention is also a foundation comprising a composition as defined above.

A subject of the invention is also a nail varnish comprising a composition as defined above.

A subject of the invention is also a mascara comprising a composition as defined above.

A subject of the invention is also a product for dyeing hair fibres, comprising a composition as defined above.

A subject of the invention is also the use of a composition as defined above for making up the skin, the lips or the integuments.

COMPOSITE PIGMENT

The composite pigment according to the invention may be prepared, for example, by one of the processes described in European patent applications EP 1 184 426 and EP 1 217 046, the contents of which are incorporated herein by reference.

A composite pigment according to the invention may be composed especially of particles comprising:

- a mineral core,
- at least one binder for fixing the organic pigments onto the core, and
- at least one organic pigment at least partially covering the core.

The composite pigments may have, for example, a BET specific surface area of between 0.5 and 500 m^2/g, especially 1.5 to 400 m^2/g, and in particular 2 to 300 m^2/g. The "BET specific surface area" is the value measured by the BET method.

MINERAL CORE

This may be in any form that is suitable for fixing organic pigment particles, for example spherical, granular, polyhedral, acicular, fusiform, in the form of flakes, grains of rice or scales, and also a combination of these forms.

Preferably, the ratio of the largest dimension to the smallest dimension is between 1 and 50.

The mean size may be, for example, between 0.0009 μm and 9.95 μm, especially 0.002 μm and 9.45 μm, or even between 0.009 μm and 8.95 μm. These size values are most particularly suitable when the composite pigment particles are prepared according to the processes described in the abovementioned patents EP 1 184 426 and EP 1 217 046. The term "mean size" denotes the mean value obtained by measuring 350 mineral cores by micrography.

The mineral core may be made of a material chosen from the non-limiting list comprising metal salts and metal oxides, especially titanium oxides, zirconium oxides, cerium oxides, zinc oxides, iron oxides, ferric blue and chromium oxides, glasses, ceramics, graphite, silicas, silicates, especially aluminosilicates and borosilicates, and synthetic mica, and mixtures thereof.

Titanium oxides, especially TiO_2, iron oxides, especially Fe_2O_3, tin oxides, chromium oxides, barium sulphate, silicas and silicates, especially aluminosilicates and borosilicates, are most particularly suitable.

The mineral cores may have a BET specific surface area of between 0.5 and 500 m^2/g, especially between 1 and 400 m^2/g, and in particular between 1.5 and 300 m^2/g.

When the mineral cores are white, their covering power may be greater than 600 cm^2/g. When the said mineral cores are not white, i.e. when they are coloured, transparent or black, their covering power may be less than 600 cm^2/g.

BINDER

The binder may be of any type provided that it allows the organic pigment to adhere to the surface of the mineral core.

The binder may be chosen especially from a non-limiting list comprising silicone compounds, polymeric or oligomeric compounds or the like, and in particular from organosilanes, fluoroalkyl organosilanes and polysiloxanes, and also various couplers, such as couplers based on silanes, on titanates, on aluminates or on zirconates, and mixtures thereof.

The silicone compound may be chosen from a non-limiting list especially comprising:

- the organosilanes (1) obtained from alkoxysilanes,
- the modified or unmodified polysiloxanes (2) chosen from a non-limiting list comprising:
  - the modified polysiloxanes (2A) comprising at least one radical chosen especially from polyethers, polyesters and epoxy compounds (these will be referred to as "modified polysiloxanes"),
  - the polysiloxanes (2B) bearing, on a silicon atom located at the end of the polymer, at least one group chosen from a non-limiting list comprising carboxylic acids, alcohols and hydroxyl groups, and
  - the fluoroalkyl organosilane compounds (3) obtained from fluoroalkylsilanes.

The organosilane compounds (1) may be obtained from alkoxysilane compounds represented by formula (I):

$$R^1_a \, Si \, X_{4-a} \quad (I)$$

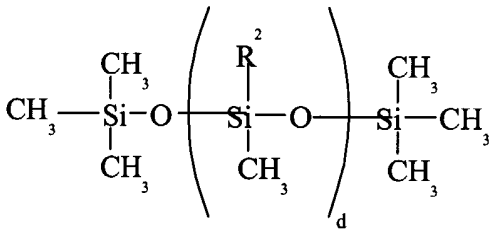
in which:

- R^1 represents C_6H_5-, $(CH_3)_2 CH CH_2$- or n- $C_b H_{2b+1}$- (in which b ranges from 1 to 18),
- X represents CH_3O- or C_2H_5O-, and

- a ranges from 0 to 3.

Specific examples of alkoxysilane compounds may include alkoxysilanes chosen from: methyltriethoxysilane, dimethyldiethoxysilane, phenyltriethyoxysilane, diphenyldiethoxysilane, methyltrimethoxysilane, dimethyldimethoxysilane, phenyltrimethoxysilane, diphenyldimethoxysilane, isobutyltrimethoxysilane, decyltrimethoxysilane and the like, in particular from methyltriethoxysilane, phenyltriethyoxysilane, methyltrimethoxysilane, dimethyldimethoxysilane and isobutyltrimethoxysilane, and even better still methyltriethoxysilane, methyltrimethoxysilane or phenyltriethyoxysilane.

The polysiloxanes (2) may especially correspond to formula (II):



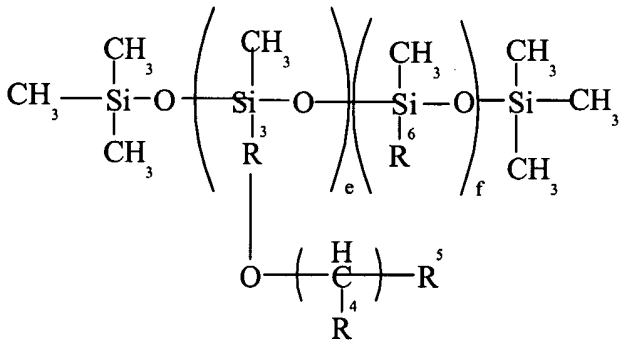
(II)

in which R^2 represents H- or CH_3- and d ranges from 15 to 450.

Among these polysiloxanes, those for which R^2 represents H are preferred.

The modified polysiloxanes (2A) may especially correspond to the following formulae:

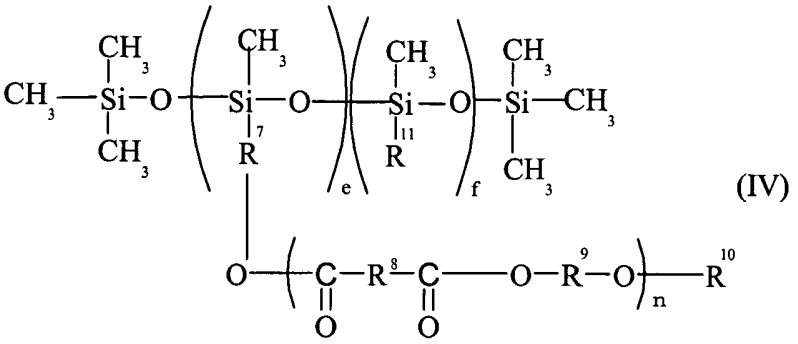
- (a^1) modified polysiloxanes bearing polyethers, represented by formula (III)



(III)

in which R^3 represents $-(CH_2)_h-$; R^4 represents $-(CH_2)_i-CH_3$; R^5 represents –OH, -COOH, -CH = CH_2, -C (CH_3) = CH_2 or $-(CH_2)_j-CH_3$; R^6 represents $-(CH2)_k-CH_3$; g and h ranging independently from 1 to 15; j and k ranging independently from 0 to 15; and e ranging from 1 to 50 and f ranging from 1 to 300,

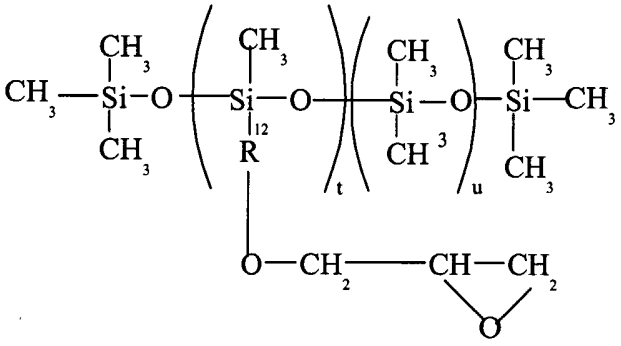
- (a^2) modified polysiloxanes bearing polyesters, represented by formula (IV):



(IV)

in which R^7, R^8 and R^9 independently represent $-(CH_2)_q-$; R^{10} represents –OH; -COOH, $-CH=CH_2$, $-C(CH_3)=CH_2$ or $-(CH_2)_r-CH_3$; R^{11} represents $-(CH_2)_s-CH_3$; n and q ranging independently from 1 to 15, r and s ranging independently from 0 to 15; e ranging from 1 to 50 and f ranging from 1 to 300,

- (a^3) modified polysiloxanes bearing epoxy radicals represented by formula (V):

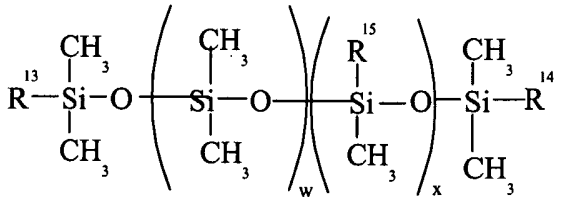


(V)

in which R^{12} represents $-(CH_2)_v-$; v ranging from 1 to 15; t ranging from 1 to 50 and u ranging from 1 to 300; or mixtures thereof.

Among the modified polysiloxanes (2A), the modified polysiloxanes bearing polyethers of formula (III) are preferred.

The polysiloxanes modified on the end portion (2B) may correspond to formula (VI):



(VI)

in which R^{13} and R^{14} may represent –OH, R^{16} OH or R^{17} COOH, independently of each other; R^{15} represents $-CH_3$ or $-C_6H_5$; R^{16} and R^{17} represent $-(CH_2)_y-$; y ranging from 1 to 15; w ranging from 1 to 200 and x ranging from 0 to 100.

Among these polysiloxanes modified on at least one end, those bearing at least radical (R^{16} and/or R^{17}) bearing a carboxylic acid group on at least one terminal silicon atom are more preferred.

The fluoroalkyl organosilane compounds (3) may be obtained from fluoroalkyl silanes represented by formula (VII):

$$CF_3(CF_2)_zCH_2CH_2\ (R^{18})_a\,SiX_{4-a} \qquad (VII)$$

in which:

- R^{18} represents CH_3-, C_2H_5-, CH_3O- or C_2H_5O-,
- X represents CH_3O- or C_2H_5O-,
- Z ranges from 0 to 15 and a ranges from 0 to 3.

The fluoroalkyl silanes may be chosen especially from a non-limiting list especially comprising trifluoropropyltrimethoxysilane, tridecafluorooctyltrimethoxysilane, heptadecafluorodecyltrimethoxysilane, heptadecafluorodecylmethyldimethoxysilane, trifluoropropyltriethoxysilane, tridecafluorooctyltriethoxysilane, heptadecafluorodecyltriethoxysilane, heptadecafluorodecylmethyldiethoxysilane and the like, in particular trifluoropropyltrimethoxysilane, tridecafluorooctyltrimethoxysilane and heptadecafluorodecyltrimethoxysilane, and even better still trifluoropropyltrimethoxysilane and tridecafluorooctyltrimethoxysilane.

The silane-based couplers may be chosen from a non-limiting list especially comprising vinyltrimethoxysilane, vinyltriethoxysilane, γ-aminopropyltriethoxysilane, γ-glycidoxypropyltrimethoxysilane, γ-mercaptopropyltrimethoxysilane, γ-methacryloxypropyltrimethoxysilane, N-β-(aminoethyl)-γ-aminopropyltrimethoxysilane, γ-glycidoxypropylmethyldimethoxysilane and γ-chloropropyltrimethoxysilane, and the like.

The titanate-based couplers may be chosen from the list comprising isopropylstearoyl titanate, isopropyltris(dioctyl pyrophosphate) titanate, isopropyltris(N-aminoethylaminoethyl) titanate, tetraoctylbis(ditridecyl phosphate) titanate, tetrakis(2,2-diaryloxymethyl-1-butyl)bis(ditridecyl)phosphate titanate, bis(dioctyl pyrophosphate)oxyacetate titanate and bis(dioctyl pyrophosphate)ethylene titanate, and the like.

The aluminate-based couplers may be chosen from acetoalkoxyaluminium diisopropoxide, aluminium diisopropoxymonoethylacetoacetate, aluminium trisethylacetoacetate and aluminium trisacetylacetonate, and the like.

The zirconate-based couplers may be chosen from a list especially comprising zirconium tetrakisacetylacetonate, zirconium dibutoxybisacetylacetonate, zirconium tetrakisethylacetoacetate, zirconium tributoxymonoethylacetoacetate and zirconium tributoxyacetylacetonate, and the like.

The compounds used as binder may especially have a molecular mass that may range between 300 and 100 000.

In order to obtain a coat that covers the mineral cores uniformly, the binder is preferably in a form that is liquid or soluble in water or in various solvents.

The amount of binder may range from 0.01 to 15%, especially from 0.02% to 12.5% and in particular from 0.03 to 10% by weight (calculated relative to C or Si) relative to the weight of the particles comprising the core and the binder. For further details regarding the way of calculating the relative amount of the binder, reference may be made to patent application EP 1 184 426 A2.

ORGANIC PIGMENT

The organic pigment may be chosen, for example, from aniline black, azo yellow, quinacridone, carmine, phthalocyanin blue, sorghum red, blue pigment: CI 42090, 69800, 69825, 73000, 74100, 74160; yellow pigment: CI 11680, 11710, 15985, 19140, 20040, 21100, 21108, 47000, 47005; green pigment: CI 61565, 61570, 74260; orange pigment: CI 11725, 15510, 45370, 71105; red pigment: CI 12085, 12120, 12370, 12420, 12490, 14700, 15525, 15580, 15620, 15630, 15800, 15850, 15865, 15880, 17200, 26100, 45380, 45410, 58000, 73360, 73915, 75470; black pigment: CI 77266.

The mass proportion of the organic pigment may be, for example, between 1 and 500 parts by weight, especially 1 and 400 parts by weight, better still 1 and 300 parts by weight, even better still 1 to 200 parts by weight, in particular 1 to 100 parts by weight, or even 1 to 75 parts by weight, for example 1 to 50 parts by weight, per 100 parts by weight of mineral core.

PREPARATION OF THE COMPOSITE PIGMENT

The composite pigment may advantageously be prepared by the method described in patent application EP 1 184 426 A2.

To begin with, the particles intended to make up the mineral core are mixed with the binder.

In order for the binder to adhere uniformly to the surface of the mineral core, it is preferable to pretreat these particles in a mill, so as to disintegrate them.

The mixing and stirring conditions are chosen such that the core is uniformly covered with binder. These conditions may be regulated such that the linear charge is between 19.6 and 19 160 N/cm, in particular between 98 and 14 170 N/cm and better still between 147 and 980 N/cm; the treatment time is especially between 5 minutes and 24 hours and better still from 10 minutes to 20 hours; the spin speed may be between 2 and 1000 rpm, in particular between 5 and 1000 rpm and better still between 10 and 800 rpm.

After the binder has covered the mineral core, the organic pigment is added and mixed with stirring to adhere to the layer of binder.

The addition methods may be, for example, an addition in large amount, continuously or in small amount.

The mixing and stirring, whether they are mineral cores with the binder or organic pigment with the mineral cores covered with binder, may be performed using a machine capable of applying a spatular and/or compressive shearing force to the powder mixture. Such machines are, for example, wheel blenders, blade blenders and the like. Wheel blenders are most particularly suitable. A list of machines that may be suitable is given in patent application EP 1 184 426 A2.

EXAMPLES

Cosmetic compositions comprising composite pigments with the formulations below may be prepared, these compositions being prepared according to the preparation processes conventionally used in cosmetics.

Example 1: Nail varnish (solvent-based)

Nitrocellulose	19%
N ethyl o,p toluenesulphonamide	6%
Tributyl acetyl citrate	6%
Rheology agent (hectorite)	1.2%
Composite pigment(s) according to the invention	2%

Isopropanol	8%
Ethyl acetate / butyl acetate	qs 100%

Example 2: Nail varnish (water-based)

Latex (PU, 35% solids content)	72.5%
Gelling agent (Laponite XLS)	1.2%
Composite pigment(s) according to the invention	1%
Water	qs 100%

Example 3: Lipstick

Microcrystalline wax	2%
Ozokerite	5%
Candelilla wax	7%
Carnauba wax	3%
Capric/caprylic acid triglycerides	18%
Octyldodecanol	10%
Lanolin oil	6%
Acetylated lanolin oil	6%
Composite pigment(s) according to the invention	9%
Fragrance	0.5%
Castor oil	qs 100%

Example 4: Foundation

Oily phase

- Surfactant sold under the trade name "Abil WE 09" by the company Goldschmidt	8%
- Cyclomethicone	23%
- Isododecane	10%
- Composite pigment(s) according to the invention	10%
- Nylon powder	5%

Aqueous phase

- Demineralized water 42%
- Magnesium sulphate 1%
- Preserving agents 1%

Example 5: Mascara

- Paraffin wax 2%
- Carnauba wax 4%
- Beeswax 8%
- Polylvinyl laurate (Mexomer PP from Chimex) 0.8%
- Vinyl acetate/allyl stearate copolymer (65/35) 2%
- Rice starch 1%
- Bentone 4%
- Propylene carbonate 2%
- Composite pigment(s) according to the invention 4%
- Preserving agents qs
- Isododecane qs 100%

Example 6: Hair dye

- Composite pigment(s) according to the invention 0.5%
- Hydroxylethylcellulose 0.768%
- Nonionic surfactant: Alkyl (50/50 C8/C10) polyglucoside as an aqueous 60% solution 6%
- Benzyl alcohol 8%
- Polyethylene glycol (8EO) 12%
- Aqueous ammonia solution qs pH 9%
- Preserving agents qs
- Demineralized water qs 100%

A composite pigment comprising a titanium dioxide mineral core may be used, for example, the mineral pigment being azo yellow and the binder methyltriethoxysilane.

Needless to say, the invention is not limited to the working examples that have just been given.

It is especially possible to use composite pigments according to the invention to prepare cosmetic compositions having formulations other than those given above.

The composite pigment may also be used to colour a dermatological composition.

Throughout the description, including the claims, the term "comprising one" should be understood as being synonymous with "comprising at least one", unless the opposite is specified.

The ranges given should be understood as being inclusive of the limits, unless the opposite is specified.

CLAIMS

1. Composition intended to be applied to the skin, the lips and/or the integuments, comprising, in a physiologically acceptable medium, at least one composite pigment comprising:

- a mineral core,
- at least one organic pigment at least partially covering the mineral core, and
- at least one binder for fixing the organic pigment onto the mineral core.

2. Composition according to Claim 1, characterized in that the organic pigment is chosen from the group consisting of the following pigments (listed according to their Color Index): blue pigment: CI 42090, 69800, 69825, 73000, 74100, 74160; yellow pigment: CI 11680, 11710, 15985, 19140, 20040, 21100, 21108, 47000, 47005; green pigment: CI 61565, 61570, 74260; orange pigment: CI 11725, 15510, 45370, 71105; red pigment: CI 12085, 12120, 12370, 12420, 12490, 14700, 15525, 15580, 15620, 15630, 15800, 15850, 15865, 15880, 17200, 26100, 45380, 45410, 58000, 73360, 73915, 75470; black pigment: CI 77266.

3. Composition according to either of the preceding claims, characterized in that the binder is chosen from the group consisting of silicone compounds, polymeric and oligomeric compounds or the like, and in particular from organosilanes, fluoroalkyl organosilanes and polysiloxanes, and also various couplers, such as couplers based on silane, on titanates, on aluminates or on zirconates, and mixtures thereof.

4. Composition according to any one of the preceding claims, characterized in that the mineral core is coloured.

5. Composition according to any one of the preceding claims, characterized in that the mineral core is chosen from the group consisting of: metal salts and metal oxides, especially titanium oxide, zirconium oxide, cerium oxide, zinc oxide, iron oxide, ferric blue and chromium oxide, aluminas, glasses, ceramics, graphite, silicas, silicates, especially aluminosilicates and borosilicates, and synthetic mica, and mixtures thereof.

6. Composition according to any one of the preceding claims, characterized in that the mass proportion of the composite pigment in the composition is between 0.1%

and 20%, especially between 0.1% and 15% and better still between 0.5% and 10% by weight relative to the total weight of the composition.

7. Composition according to any one of the preceding claims, characterized in that it is free of uncoated TiO_2 particles.

8. Composition according to any one of the preceding claims, characterized in that the size of the composite pigment particles is between 0.001 and 150 μm, preferably 0.01 and 50 μm, better still between 0.01 and 25 μm and even better still between 0.05 and 10 μm.

9. Composition according to Claim 8, characterized in that the composite pigment particles are less than 2 μm in size.

10. Composition according to Claim 9, characterized in that the composite pigment particles are less than or equal to 1 μm in size.

11. Composition according to any one of the preceding claims, characterized in that the density of the mineral core is higher than that of the organic pigment.

12. Composition according to Claim 1, characterized in that the density of the composite pigment is higher than that of the organic pigment.

13. Composition according to Claim 1, characterized in that the organic pigment is fixed without any covalent bonds onto the mineral core.

14. Composition according to any one of the preceding claims, characterized in that it comprises at least one cosmetic or dermatological active agent.

15. Composition according to any one of the preceding claims, characterized in that it comprises at least one fatty substance, a wax, a gum or a film-forming polymer.

16. Composition according to any one of the preceding claims, characterized in that it is in a solid or semi-solid form.

17. Composition according to any one of the preceding claims, characterized in that it is in liquid, pasty or gelled form.

18. Use of a composition as defined in any one of the preceding claims, for making up the skin, the lips or the integuments.

19. Lipstick comprising a composition as defined in any one of Claims 1 to 15.

20. Foundation comprising a composition as defined in any one of Claims 1 to 15.

21. Nail varnish comprising a composition as defined in any one of Claims 1 to 15.

22. Mascara comprising a composition as defined in any one of Claims 1 to 15.

23. Product for dyeing hair fibres, comprising a composition as defined in any one of Claims 1 to 15.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 03/04306

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61K7/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61K

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 356 617 A (SCHLOSSMAN DAVID S) 18 October 1994 (1994-10-18) claims	1-3,5,6, 8-18
X	EP 1 184 426 A (TODA KOGYO CORP) 6 March 2002 (2002-03-06) cited in the application examples	1-5,8
X	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 04, 30 April 1999 (1999-04-30) & JP 11 012493 A (KOSE CORP), 19 January 1999 (1999-01-19) abstract	1,5
A	FR 2 594 130 A (SHISEIDO CO LTD) 14 August 1987 (1987-08-14) example 13	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 February 2004	03/03/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Couckuyt, P

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Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Intern al Application No
PCT/IB 03/04306

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INTERNATIONAL SEARCH REPORT

Dem — nternationale No
PC1/1B 03/04306

A. CLASSEMENT DE L'OBJET DE LA DEMANDE
CIB 7 A61K7/02

Selon la classification internationale des brevets (CIB) ou à la fois selon la classification nationale et la CIB

B. DOMAINES SUR LESQUELS LA RECHERCHE A PORTE

Documentation minimale consultée (système de classification suivi des symboles de classement)
CIB 7 A61K

Documentation consultée autre que la documentation minimale dans la mesure où ces documents relèvent des domaines sur lesquels a porté la recherche

Base de données électronique consultée au cours de la recherche internationale (nom de la base de données, et si réalisable, termes de recherche utilisés)
EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERES COMME PERTINENTS

Catégorie °	Identification des documents cités, avec, le cas échéant, l'indication des passages pertinents	no. des revendications visées
X	US 5 356 617 A (SCHLOSSMAN DAVID S) 18 octobre 1994 (1994-10-18) revendications -----	1-3,5,6, 8-18
X	EP 1 184 426 A (TODA KOGYO CORP) 6 mars 2002 (2002-03-06) cité dans la demande exemples -----	1-5,8
X	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 04, 30 avril 1999 (1999-04-30) & JP 11 012493 A (KOSE CORP), 19 janvier 1999 (1999-01-19) abrégé -----	1,5
A	FR 2 594 130 A (SHISEIDO CO LTD) 14 août 1987 (1987-08-14) exemple 13 -----	1

☐ Voir la suite du cadre C pour la fin de la liste des documents

☒ Les documents de familles de brevets sont indiqués en annexe

° Catégories spéciales de documents cités:

"A" document définissant l'état général de la technique, non considéré comme particulièrement pertinent

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"Y" document particulièrement pertinent; l'inven tion revendiquée ne peut être considérée comme impliquant une activité inventive lorsque le document est associé à un ou plusieurs autres documents de même nature, cette combinaison étant évidente pour une personne du métier

"&" document qui fait partie de la même famille de brevets

Date à laquelle la recherche internationale a été effectivement achevée	Date d'expédition du présent rapport de recherche internationale
20 février 2004	03/03/2004

Nom et adresse postale de l'administration chargée de la recherche internationale	Fonctionnaire autorisé
Office Européen des Brevets, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Couckuyt, P

1

INTERNATIONAL SEARCH REPORT

Demande Internationale No
PCT/IB 03/04306

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