MAKUP OR CARE KIT FOR NAILS

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The present disclosure relates to a makeup or care kit for nails, comprising: i) at least one first liquid composition, and ii) at least one flexible polymeric film, said film and said first liquid composition being such that, when the at least one film is applied to the nail coated with the at least one first liquid composition, the film adheres to the nail. The invention also relates to a method for making up or caring for nails.
MAKEUP OR CARE KIT FOR NAILS

[0001] This application claims benefit of U.S. Provisional Application No. 60/604,715, filed Aug. 27, 2004, the contents of which are incorporated herein by reference. This application also claims benefit of priority under 35 U.S.C. § 119 to French Patent Application No. 04 51879, filed Aug. 20, 2004, the contents of which are also incorporated herein by reference.

[0002] The present disclosure relates to a makeup and/or care kit for nails or false nails and to a method for making up nails or false nails.

[0003] In general, making up nails or false nails can be restrictive since it can require a considerable amount of time. For instance, the nail varnish user may apply several coats of varnish that must be left to dry. After 3 to 5 days, the varnish may chip and the gloss may decrease, therefore the nail varnish user may have to remove the makeup from the nails and make them up again.

[0004] Consequently, in the interests of creating makeup compositions for nails, or false nails, that may last better and/or longer, nail varnish compositions in the form of a kit comprising two liquid nail varnish compositions have been proposed. However, they may still only last moderately and the application of several layers may be considered even more restrictive.

[0005] In addition, when the nail varnish is colored, its application can remain tricky and lengthy because of the risk of the varnish spilling over onto the outline of the nail.

[0006] Accordingly, the present disclosure relates to a makeup and/or care kit for nails or false nails that can make it possible to overcome at least one of the aforementioned drawbacks, i.e. that can last better on the nail over time and/or that is easy and rapid to apply.

[0007] For example, the present disclosure relates to a makeup or care kit for nails, comprising:

[0008] i) at least one first liquid composition;

[0009] ii) at least one flexible polymeric film, wherein said at least one film and said at least one first liquid composition are chosen such that, when the at least one film is applied to a nail coated with said at least one first composition, the at least one film adheres to the nail.

[0010] According to one embodiment of the present disclosure, the makeup kit comprises at least one polymeric film and at least one first liquid composition in separate packaging.

[0011] Another embodiment of the present disclosure is the use of a kit as described above, for obtaining a film deposited on the nail, having improved lasting properties and/or improved resistance to wear.

[0012] Still another embodiment of the present disclosure is a method for making up nails, comprising:

[0013] applying to a nail at least one layer of at least one first liquid composition, and

[0014] applying to said layer a flexible polymeric film capable of adhering to the nail via said first liquid composition.

[0015] Another aspect of the present disclosure is a method for making up nails, comprising applying to a nail at least one flexible polymeric film, wherein the face of the polymeric film intended to be in contact with the nail has been coated beforehand with at least one layer of at least one first liquid composition, said at least one film and said first liquid composition being chosen such that, when the film is applied to the nail, the at least one film adheres to the nail.

[0016] The flexible polymeric film, and for example, the excess film, can be precut or cut, before or after its application, according to the size and the shape desired, with small scissors or nail clippers, or by scraping the film.

[0017] According to one embodiment of the present disclosure, at least one additional layer of at least one second liquid composition, such as a conventional nail varnish, comprising at least one film-forming polymer and an organic solvent medium, or “topcoat,” can be applied to the polymeric film in order to improve the gloss thereof.

[0018] The at least one polymeric film of the kit in accordance with the present disclosure is flexible and exhibits sufficient flexibility to conform to the profile of the nail. It differs in this respect from a false nail, which does not exhibit such flexibility.

[0019] As used herein, the term “flexible” is understood to mean sufficient flexibility of the at least one polymeric film of the kit according to the present disclosure to conform to the profile of a nail. For example, this flexible film is able to lend itself to mechanical deformations of the stretching type in order to adjust itself to the surface of a nail. This deformability is, for example, characterized by the parameter of ultimate strain εu, discussed hereinafter.

[0020] The at least one flexible polymeric film according to the present disclosure differs from an article of the false nail type, which is characterized by a rigidity that is incompatible with such a mechanical deformation.

[0021] Another difference between the at least one flexible polymeric film in accordance with the present disclosure and a false nail lies in the sensitivity of this film with respect to polar organic solvents of the acetone, ester and/or short alcohol type. The at least one polymeric film has an ability to swell, which, for instance, can result in an increase in its weight when it is brought into contact with at least one organic solvent. A typical false nail can be completely devoid of such sensitivity. This ability to swell can be beneficial for its removal when it is applied at the surface of a nail or of a false nail. In fact, according to one embodiment, the at least one polymeric film can be readily removed by simple makeup removal using a conventional dissolving agent, as opposed to a false nail. For example, the at least one polymeric film can be removed with organic solvents, such as alkyl acetates and mixtures thereof.

[0022] According to one embodiment, the nail makeup of the present disclosure can last significantly over time, for example, on a scale of at least 5 days, and such as a week. According to one embodiment, the nail makeup of the disclosure exhibits one or more of resistance to water, resistance to rubbing and to impacts, no significant wear, and no significant chipping during this period. According to one embodiment, the nail makeup of the present disclosure exhibits all of these characteristics.
According to another embodiment, the at least one flexible polymeric film in accordance with the present disclosure can be in various shapes, such as a star, a square, a circle, etc.

First Liquid Composition

According to one embodiment of the present disclosure, the at least one first composition comprises an adhesive material and a solvent phase, for example comprising at least one organic solvent.

Adhesive Material

As used herein, the term “material” is understood to mean a polymer or a polymeric system that may comprise at least one polymer chosen from those of different natures. The at least one adhesive material can be in the form of a solution of polymer or of a dispersion of polymer particles in a solvent. The at least one adhesive material can also comprise at least one plasticizer as defined below. The at least one adhesive material should have a certain bonding capacity defined by its viscoelastic properties.

The viscoelastic properties of a material are conventionally defined by two characteristic values, which are as follows:

1. the elastic modulus, which represents the elastic behavior of the material for a given frequency and which is conventionally written as $G'$, and
2. the viscous modulus, which represents the viscous behavior of the material for a given frequency and which is conventionally written as $G''$.

These magnitudes are defined, for example, in the “Handbook of Pressure Sensitive Adhesive Technology” 3rd edition, D. Satas, chap. 9, pp. 155 to 157.

The adhesive materials that can be used according to the present disclosure exhibit viscoelastic properties that are measured at a reference temperature of 35°C and in a certain frequency range.

In the case of adhesive materials in the form of a solution or of a dispersion of polymer in a volatile solvent (such as water, a short ester, a short alcohol, acetone, etc.), the viscoelastic properties of this adhesive material are measured under conditions in which the adhesive material has a volatile solvent present in an amount less than 30%, such as a volatile solvent present in an amount less than or equal to 20%.

The elastic modulus of the adhesive material can be measured, for instance, at three different frequencies:

1. at low frequency, i.e. at $2 \times 10^{-2}$ Hz,
2. at an intermediate frequency, i.e. at 0.2 Hz,
3. at high frequency, i.e. at 2 Hz,

and the viscous modulus is measured at the frequency of 0.2 Hz.

These measurements make it possible to evaluate the change in the bonding capacity of the adhesive material over time.

These viscoelastic properties are measured during dynamic tests under sinusoidal stresses of low amplitude (small deformations) performed at 35°C over a frequency range from $2 \times 10^{-2}$ to 20 Hz on a rheometer of “Haake RS50®” type under a torsional/shear stress, for example in cone-plate geometry (for example with a cone angle of 1°).

In one embodiment, the at least one adhesive material according to the present disclosure corresponds to the following conditions:

$G'(2$ Hz, $35°C) \leq 10^9$ Pa, and

$G'(35°C) \leq 10^8$ Pa,

for instance $G'(35°C) \leq 10^7$ Pa,

$G'(2 \times 10^{-2}$ Hz, $35°C) \leq 5 \times 10^5$ Pa,

wherein:

$G'(2$ Hz, $35°C)$ is the elastic shear modulus of the at least one adhesive material, measured at the frequency of 2 Hz and at the temperature of 35°C,

$G'(35°C)$ is the elastic shear modulus of the at least one adhesive material, measured at the temperature of 35°C, for any frequency of between $2 \times 10^{-2}$ and 2 Hz,

$G'(2 \times 10^{-2}$ Hz, $35°C)$ is the elastic shear modulus of the at least one adhesive material, measured at the frequency of $2 \times 10^{-2}$ Hz and at the temperature of 35°C.

In another embodiment of the present disclosure, the at least one adhesive material also corresponds to the following condition:

the ratio $G'/G''(0.2$ Hz, $35°C) \geq 0.35$,

wherein:

$G'(0.2$ Hz, $35°C)$ is the viscous shear modulus of the at least one adhesive material, measured at the frequency of 0.2 Hz and at the temperature of 35°C,

$G''(0.2$ Hz, $35°C)$ is the elastic shear modulus of the at least one adhesive material, measured at the frequency of 0.2 Hz and at the temperature of 35°C.

In yet another embodiment of the present disclosure, the at least one adhesive material corresponds to the following condition:

$G'(2$ Hz, $35°C) \geq 5 \times 10^9$ Pa, for instance $G'(2$ Hz, $35°C) \geq 10^9$ Pa.

In still another embodiment of the present disclosure, the at least one adhesive material corresponds to the following condition:

$G'(2 \times 10^{-2}$ Hz, $35°C) \leq 5 \times 10^8$ Pa.

For example, according to one embodiment, the at least one adhesive material that can be used according to the present disclosure may correspond to the following four conditions:

$G'(2$ Hz, $35°C) \geq 10^9$ Pa, and

$G'(35°C) \leq 10^8$ Pa, for instance $G'(35°C) \leq 10^7$ Pa,

$G'(2 \times 10^{-2}$ Hz, $35°C) \leq 5 \times 10^5$ Pa, and

$G'/G''(0.2$ Hz, $35°C) \geq 0.35$.

For example, adhesive materials that may be used according to the present disclosure can be chosen from adhesives of “Pressure Sensitive Adhesives” type, such as those cited in the “Handbook of Pressure Sensitive Adhesive Technology” 3rd edition, D. Satas.

The at least one adhesive material according to the present disclosure can be a polymer chosen from block or
random copolymers comprising at least one monomer or a combination of monomers for which the resulting polymer has a glass transition temperature of below ambient temperature (25° C), it being possible for these monomers or combinations of monomers to be chosen from, for instance, butadiene, ethylene, propylene, isoprene, isobutylene, a silicone, and mixtures thereof. Non-limiting examples of such materials are block copolymers of styrene-butadiene-styrene, styrene-(ethylene-butylene)-stereore or styrene-isoprene-styrene type, such as those sold under the trade names “Kraton®” from Shell Chemical Co. or “Vector®” from Exxon.

For example, the at least one adhesive material according to one embodiment of the present disclosure can be chosen from adhesive polymers including:

- polyurethanes,
- acrylic polymers,
- silicones,
- butyl rubbers, such as polyisobutylene,
- ethylene-vinyl acetate polymers,
- polyamides optionally modified with fatty chains,
- natural rubbers,

and blends thereof.

The at least one adhesive material may also be chosen from, for example, adhesive copolymers that derive from the copolymerization of vinyl monomers with polymeric entities, for example those described in U.S. Pat. No. 6,136,296. Adhesive copolymers that may also be suitable for use according to the present disclosure include those described, for example, in U.S. Pat. No. 5,929,173 that have a polymeric backbone and a Tg ranging from 0° C to 45° C, and are grafted with chains that derive from acrylic and/or methacrylic monomers and have a Tg ranging from 50° C to 200° C. The adhesive materials can be, for example, chosen from polyisobutylene having a relative molar mass Mw of greater than or equal to 10,000 and less than or equal to 150,000. For example, this relative molar mass can be greater than or equal to 18,000 and less than or equal to 150,000.

Among the commercial products that are suitable for the present disclosure, non-limiting mention may be made of the polyisobutylene of respective relative molar masses Mw of 40,000, 55,000 and 85,000 sold under the respective trade names “Oppanol B 10B,” “Oppanol B 12B” and “Oppanol B 15B” by the company BASF, and blends thereof.

Film-Forming Polymer

According to another embodiment of the present disclosure, the at least one first liquid composition is a liquid nail varnish composition comprising an organic and/or aqueous solvent phase and at least one film-forming polymer.

As used herein, the term “film-forming polymer” is understood to mean a polymer capable of forming, on its own or in the presence of an auxiliary film-forming agent, a macroscopically continuous film on a support, for example keratin materials.

The at least one film-forming polymer of the present disclosure can be chosen from the film-forming polymers mentioned below in the description of the polymeric film.

For example, the at least one film-forming polymer can be chosen from celluloses and cellulose derivatives, for instance nitrocelluloses and/or cellulose esters, such as cellulose acetates, cellulose propionates, cellulose butyrates, cellulose acetylpropionates and cellulose acetobutyrates.

The at least one film-forming polymer can be present in an amount ranging from 1% to 70% by weight, on a solids basis of polymer, with respect to the total weight of the at least one first composition, for instance from 5% to 50%, such as from 10% to 45% by weight.

The at least one first liquid composition can also comprise at least one auxiliary film-forming agent as described below.

The at least one first liquid composition can comprise a liquid organic solvent phase comprising at least one organic solvent. Among the organic solvents that can be used in the composition according to the present disclosure, non-limiting mention may be made of:

- short-chain esters (having from 3 to 8 carbon atoms in total), such as ethyl acetate, methyl acetate, propyl acetate, n-butyl acetate or isopentyl acetate;
- ketones that are liquid at ambient temperature, such as methyl ethyl ketone, methyl isobutyl ketone, diisobutyl ketone, isophorone, cyclohexanone or acetone;
- alcohols that are liquid at ambient temperature, such as ethanol, isopropanol, diacetone alcohol, 2-butoxyethanol or cyclohexanol;
- glycols that are liquid at ambient temperature, such as ethylene glycol, propylene glycol, pentylene glycol or glycerol;
- propylene glycol ethers that are liquid at ambient temperature, such as propylene glycol monomethyl ether, propylene glycol monomethyl ether acetate, or dipropylene glycol mono-n-butyl ether;
- aldehydes that are liquid at ambient temperature, such as benzaldehyde or acetaldehyde;
- carbonates, such as propylene carbonate or diethyl carbonate;
- acetals, such as methylal; and
- mixtures thereof.

For example, the solvent can be a volatile solvent chosen from short-chain esters (having from 3 to 8 carbon atoms in total), such as ethyl acetate, methyl acetate, propyl acetate, n-butyl acetate or isopentyl acetate, and mixtures thereof.

The liquid organic solvent phase (at least one organic solvent or mixture of organic solvents) can be present in an amount ranging from 5% to 95% by weight, relative to the total weight of the composition, such as from 10% to 85% by weight.
The at least one first liquid composition according to the present disclosure can also comprise an aqueous phase comprising water and optionally at least one water-soluble solvent.

The aqueous phase can, in this case, be present in an amount ranging from 5% to 95% by weight, relative to the total weight of the first composition, for instance from 10% to 85% by weight.

According to one embodiment of the present disclosure, the at least one first liquid composition is transparent.

According to another embodiment, the at least one first liquid composition is free of dyestuff and of material with an optical effect and/or relief, as described below.

For example, the at least one first liquid composition and the at least one flexible polymeric film can exhibit compatibility by virtue of their chemical nature and their composition. According to one embodiment, the major organic solvent of the at least one first liquid composition is capable of bringing about an increase in mass of the flexible polymeric film brought into contact with it, such as of at least 10%, or of 20%, after immersion of said film for 60 minutes in said solvent at ambient temperature (25° C.). In other words, this increase results in the film gaining weight.

The weight measurement is carried out according to the following protocol: pieces of 1 cm² cut from the flexible polymeric film are weighed (measurement of the mass M1) and then immersed in the organic solvent for 60 minutes; after immersion, the piece of film is wiped to remove the excess solvent at the surface and then weighed (measurement of the mass M2). The difference M2–M1 corresponds to the amount of solvent absorbed by the film.

According to one embodiment of the present disclosure, the solid film can be soluble in said organic solvent.

The at least one first liquid composition and the at least one flexible polymeric film, for instance, can be chosen such that the at least one polymeric film coated beforehand with the at least one first liquid composition and then applied to the surface of a synthetic or natural nail, or applied to a synthetic or natural nail coated with the at least one first composition; cannot be removed by peeling after having been applied for at least 24 hours.

Flexible Polymeric Film

The at least one flexible polymeric film can derive, for example, from the crosslinking of a crosslinkable composition and/or from the evaporation of the organic or aqueous solvent phase of a solution or dispersion of at least one film-forming polymer.

Solids Content

The at least one flexible polymeric film of the kit according to the present disclosure is a non-liquid film that comprises a high solids content. For instance, it can have an amount of dry material of greater than or equal to 80%, for instance greater than or equal to 85%, such as greater than 90% by weight, relative to its total weight. In other words, the at least one volatile solvent is present in an amount of less than or equal to 20%, for example, less than or equal to 15%, such as less than or equal to 10% by weight, relative to the total weight of the polymeric film.

The amount of dry material, for instance, commonly referred to as “solids content” of the films according to the present disclosure is measured by heating the sample with infrared rays with a wavelength ranging from 2 μm to 3.5 μm. The substances in the film that have a high vapour pressure evaporate under the effect of this radiation. The measurement of the weight loss of the sample makes it possible to determine the “solids content” of the film. These measurements are carried out by means of an LP16 commercial infrared desiccator from Mettler. This technique is completely described in the documentation for the device provided by Mettler.

The measurement protocol is as follows:

Approximately 10 g of a sample are placed on a metal cupel. Once this has been placed in the desiccator, it is subjected to a set temperature of 120° C. for one hour. The wet mass of the sample, corresponding to the initial mass, and the dry mass of the sample, corresponding to the mass after exposure to the radiation, are measured by means of a precision balance.

The content of dry material is calculated in the following way:

\[
\text{Solids content}=100\times(\text{dry mass}/\text{wet mass})
\]

According to one embodiment of the present disclosure, the at least one polymeric film is not completely dry, it is said to be partially dry. As used herein, the term “partially dry” is understood to mean that the polymeric film obtained after evaporation of the organic or aqueous solvent phase of a solution or dispersion of at least one film-forming polymer, or by crosslinking of a crosslinkable composition, is not completely free of residual solvent. For example, it can have a dry material content of less than or equal to 80%, for instance less than or equal to 75%, such as less than or equal to 70% by weight, relative to its total weight.

According to one embodiment of the present disclosure, the at least one polymeric film of the kit according to the present disclosure is in a reservoir, for instance a pouch, that may or may not be flexible, capable of comprising a product in a leakproof manner. It can, for instance, impermeable to air and/or to solvents. The packaging can make it possible to keep the film from completely and prematurely drying out before its use.

Water Uptake

The at least one flexible polymeric film of the kit according to the present disclosure can be characterized, in the dry state, by an uptake of water brought to 25° C. of less than or equal to 20%, such as less than or equal to 16%, and for example less than or equal to 10%.

As used herein, the expression “water uptake of the film” is understood to mean the percentage of water absorbed by the polymeric film after immersion for 60 minutes in water at 25° C. (ambient temperature). The water uptake is measured for pieces of approximately 1 cm² cut out from the dry polymeric film, which are weighed (measurement of the mass M1) and then immersed in water for 60 minutes; after immersion, the piece of film is wiped to remove the excess water at the surface and then weighed (measurement of the mass M2). The difference M2–M1 corresponds to the amount of water absorbed by the film.
[0099] The water uptake is equal to \([\frac{(M_2-M_1)}{M_1}] \times 100\) and is expressed as percentage weight relative to the weight of the film.

[0100] Storage Modulus E

[0101] The at least one polymeric film of the kit according to the present disclosure can have, for example, a storage modulus \(E^\prime\) of greater than or equal to 1 MPa, for instance ranging from 1 MPa to 5,000 MPa, such as greater than or equal to 5 MPa, for instance ranging from 5 MPa to 1,000 MPa, such as greater than or equal to 10 MPa, for example ranging from 10 MPa to 500 MPa, at a temperature of 30°C and a frequency of 0.1 Hz.

[0102] The storage modulus is measured by DMTA (Dynamic and Mechanical Temperature Analysis).

[0103] Viscoelasticity tests are carried out using a DMTA apparatus from Polymer TA Instruments (model DMA2980), on a sample of polymeric film. Test pieces are cut out (for example using a hole punch). These test pieces typically have a thickness of approximately 150 \(\mu\)m, a width ranging from 5 mm to 10 mm, and a working length ranging from 10 mm to 15 mm.

[0104] The measurements are carried out at a constant temperature of 30°C.

[0105] The sample is subjected to tensile stress and to small deformation stresses (a sinusoidal displacement of \(\pm 8\ \mu\)m is, for example, imposed thereon) during a frequency sweep, the frequency ranging from 0.1 Hz to 20 Hz. The procedures are thus carried out in the linear range, under small levels of deformation.

[0106] These measurements make it possible to determine the complex modulus \(E^\prime=E^\prime+iE^\prime\prime\) of the film of composition tested, \(E^\prime\) being the storage modulus and \(E^\prime\prime\) the "loss" modulus.

Ultimate Strain and/or Energy at Break

[0107] The at least one flexible polymeric film according to the present disclosure has, for example, in the dry state, an ultimate strain \(\varepsilon_u\) of greater than or equal to 5%, for instance ranging from 5% to 500%, such as greater than or equal to 15%, for example ranging from 15% to 400%, and/or an energy at break per unit volume \(W_b\) of greater than or equal to 0.2 J/cm², such as ranging from 0.2 J/cm² to 100 J/cm², for instance greater than or equal to 1 J/cm², such as ranging from 1 J/cm² to 50 J/cm².

[0108] The ultimate strain and the energy at break per unit volume are determined by means of tensile tests performed on a flexible polymeric film approximately 200 \(\mu\)m thick.

[0109] To perform these tests, the film is cut into dumbbell-shaped test pieces with a working length of 33±1 mm and a working width of 6 mm. The cross section \(S\) of the test piece is then defined as: \(S=\text{width} \times \text{thickness} \ (\text{cm}^2)\); this cross section will be used to calculate the stress.

[0110] The tests are performed, for example, on a tensile testing device sold under the name Lloyd® LR5K. The measurements are performed at ambient temperature (20°C). The test pieces are drawn at a draw rate of 33 mm/min, corresponding to a rate of 100% elongation per minute.

[0111] A draw speed is thus applied and the elongation \(\Delta L\) of the test piece and the force \(F\) required to impose this elongation are simultaneously measured. From these data \(\Delta L\) and \(F\), the stress \(\sigma\) and strain \(\varepsilon\) parameters are determined.

[0112] A curve of stress \(\sigma=(F/S)\) as a function of the strain \(\varepsilon=(\Delta L/L_0)\times 100\) is thus obtained, the test being carried out until the test piece fails, \(L_0\) being the initial length of the test piece.

[0113] The ultimate strain \(\varepsilon_u\) is the maximum strain of the sample before the point at which it breaks (as %).

[0114] The energy at break per unit volume \(W_b\) in J/cm² is defined as being the surface area under this stress/strain curve such that:

\[W_b = \int_0^{\varepsilon_u} \sigma \, \varepsilon \, d\varepsilon\]

[0115] The at least one polymeric film of the makeup kit according to the present disclosure can be obtained by the crosslinking of a crosslinkable composition and/or by evaporation of the organic or aqueous solvent phase of a solution or dispersion of at least one film-forming polymer.

[0116] Crosslinked Film

[0117] As used herein, a film described as crosslinked is understood to mean a film that may be completely or partially crosslinked. In the case of partial crosslinking, the latter is, of course, sufficient to form the expected film.

[0118] Of course, the compounds brought together are chosen, for example, according to the nature of the functions that they respectively possess, so as to be capable of interacting under the conditions of the crosslinking reaction in question.

[0119] This crosslinking can thus be carried out thermally, photochemically and/or chemically, in the presence or absence of a catalyst. The performing of this crosslinking falls within the competence of those skilled in the art.

[0120] According to one embodiment of the present disclosure, the crosslinking reaction is similar to a polyaddition or polycondensation reaction carried out in the presence or in the absence of catalyst. According to this embodiment, the organic film can, for example, derive from the crosslinking of a reactive system made up of:

[0121] at least one first compound (A) comprising at least two functional groups (X), and

[0122] at least one second compound (B) comprising at least two functional groups (Y), that are reacted with respect to the functional groups X.

[0123] For instance, the reactive system can have an average functionality (total number of functional groups X and Y/total number of molecules of compounds (A) and (B)) of greater than 2, so as to provide a three-dimensional network.

[0124] For example, in order to obtain a satisfactory crosslinking effect, the average functionality of the reactive system may be greater than or equal to 2.2, and may range from 2.5 to 100.
Compounds (A) and (B) may be of organic origin, for instance of monomer, oligomer, polymer and/or copolymer type, or may be inorganic in nature like, for example, a mineral particle, in which case they have, at the surface, the two functional groups (X) or (Y) required.

Functional groups (X) and (Y) that are reactive with respect to one another are chosen from functional groups that are said to be reactive and functional groups comprising at least one labile hydrogen.

For example, the reactive functional groups can be chosen from isocyanate functional groups, epoxide functional groups and ethylenic double bonds, and the functional groups comprising at least one labile hydrogen are of the carboxylic, alcohol, such as phenolic alcohol, primary or secondary amine, amide, amino alcohol and/or thiol type.

According to one embodiment, compounds (A) and (B) brought together have, respectively, at least two functional groups said to be reactive of epoxide and/or isocyanate type and at least two functional groups comprising at least one labile hydrogens, for instance of amine or amino alcohol type, and can, for example, be chosen from the compounds mentioned above.

For example, (X) may be an epoxide and/or isocyanate functional group and Y may be chosen from a carboxylic acid functional group and/or an anhydride functional group and/or an amine functional group and/or a thiol functional group and/or a hydroxyl functional group, that can be, for instance, phenolic.

In this embodiment of the present disclosure, the crosslinking can be carried out by bringing together compounds (A) and (B) having functional groups (X) and (Y) in a form that is blocked and capable of being deblocked beforehand or under the reaction conditions selected for the crosslinking. This alternative is known to those skilled in the art and will not be described in detail.

Compounds Comprising Isocyanate Functional Groups

Compounds comprising at least two free isocyanate functional groups are known in the art. They may be polyisocyanates, including disiocyanates or trisiocyanates, that may have a molecular mass of less than 500,000, or even less than or equal to 10,000. These polyisocyanates can be obtained by polyaddition, polycondensation and/or grafting, bearing at least two isocyanate functional groups, either at the chain ends or on side groups.

The polyisocyanates may be linear, branched, aliphatic, cycloaliphatic or aromatic.

Among the polyisocyanates that may be used, non-limiting mention may be made of Desmodur® N from the company Bayer, or Tolonate® HDB-LV from the company Rhodia.

Compounds Comprising Epoxide Functional Groups

Compounds comprising at least two epoxide functional groups are also known from the state of the art. They may be of any chemical nature. They may be diepoxides or polyeoepoxides of low masses (less than or equal to 5,000), or else oligomers or polymers of any chemical nature, obtained by polyaddition, polycondensation and/or grafting, bearing at least two free epoxide functional groups, either at the chain ends or on side groups.

Polymers comprising epoxy functional groups are sold under the names Cyacure® UVR-6110, Cyacure® UVR-6105, Cyacure® ERL-4221E, Cyacure® ERL-4206, Cyacure® UVR 6128, Cyacure® UVR 6216 from the company Union Carbide, DER® 439 from the company Dow Chemical, Epikates® 828, 1001, 1004, 1007 from the company Shell, Araldite® ECN1299 from the company Ciba-Geigy, and Epoxynolac® from the company Dow Chemical.

Compounds Comprising Ethylenic Double Bonds

The compounds bearing ethylenic double bonds may be of any chemical nature. They may be, by way of non-limiting example, chosen from:

- polyesters comprising (meth)acrylate side and/or end groups:
  - such polyesters are sold, for example, by the company UCB under the names Ebecryl® (Ebecryl® 450: molar mass 1,600, on average 6 acrylate functional groups per molecule; Ebecryl® 652: molar mass 1,500, on average 6 acrylate functional groups per molecule; Ebecryl® 800: molar mass 780, on average 4 acrylate functional groups per molecule; Ebecryl® 810: molar mass 1,000, on average 4 acrylate functional groups per molecule; Ebecryl® 50,000: molar mass 1,500, on average 6 acrylate functional groups per molecule;)
- polyurethanes and/or polyureas comprising (meth)acrylate groups, for instance obtained by polycondensation:
  - such polyurethanes/polyureas comprising acrylate groups are sold, for example, under the name SBR 368 (tris(2-hydroxyethyl)isocyanurate triacrylate) or Craynor® 435 by the company Cray Valley, or under the name Ebecryl® by the company UCB (Ebecryl® 210: molar mass 1,500, 2 acrylate functional groups per molecule; Ebecryl® 230: molar mass 5,000, 2 acrylate functional groups per molecule; Ebecryl® 270: molar mass 1,500, 2 acrylate functional groups per molecule; Ebecryl® 8402: molar mass 1,000, 2 acrylate functional groups per molecule; Ebecryl® 8804: molar mass 1,300, 2 acrylate functional groups per molecule; Ebecryl® 220: molar mass 1,000, 6 acrylate functional groups per molecule; Ebecryl® 2220: molar mass 1,200, 6 acrylate functional groups per molecule; Ebecryl® 1290: molar mass 1,000, 6 acrylate functional groups per molecule; Ebecryl® 800: molar mass 800, 6 acrylate functional groups per molecule).
- Non-limiting mention may also be made of the water-soluble diacrylate aliphatic polyurethanes sold under the names Ebecryl® 2000, Ebecryl® 2001 and Ebecryl® 2002, and the diacrylate polyurethanes in aqueous disperion sold under the trade names IRR® 390, IRR® 400, IRR® 422 and IRR® 424 by the company UCB;
- polyethylenes comprising (meth)acrylate groups obtained by esterification, with (meth)acrylic acid, of the end hydroxyl groups of homopolymers or of copolymers of C₃₋₄ alkylene glycols such as polyethylene glycol, polypropylene glycol, copolymers of ethylene oxide and of propylene oxide, for instance having
a weight-average molecular mass of less than or equal to 10,000, polyethoxylated trimethylolpropane or polypropoxylated trimethylolpropane.

[0145] Dif(meth)acrylate polyoxyethyleneles of appropriate molar mass are sold, for example, under the names SR 259, SR 344, SR 610, SR 210, SR 603 and SR 252 by the company Cray Valley or under the name Ebecryl® 11 by UCB. Triacrylates of polyethoxyethyltrimethylolpropane are sold, for example, under the names SR 454, SR 498, SR 502, SR 9035 and SR 415 by the company Cray Valley or under the name Ebecryl® 160 by the company UCB. Triacrylates of polypropoxylated trimethylolpropane are sold, for example, under the names SR 492 and SR 501 by the company Cray Valley;

[0146] epoxyacrylates such as those sold, for example, under the names SR 349, SR 601, CD 541, SR 602, SR 9036, SR 348, CD 540, SR 480 and CD 9038 by the company Cray Valley; under the names Ebecryl® 600, Ebecryl® 609, Ebecryl® 150, Ebecryl® 860 and Ebecryl® 3702 by the company UCB; and under the names Photomer® 3005 and Photomer® 3082 by the company Henkel;

[0147] C1-50 alkyl poly(meth)acrylates comprising at least two functional groups comprising an ethylenic double bond carried by the side and/or end hydrocarbon chains. Such copolymers are sold, for example, under the names IRR® 375, OTA® 480 and Ebecryl® 2047 by the company UCB.

[0148] polyorganosiloxanes comprising (meth)acrylate or (meth)acrylamide groups; for example, ε,ε-Diacrylate polydimethylsiloxanes are available from the company Shin-Etsu under the references X-22-164 B and X-22-164 C;

[0149] hyperbranched dendrimers and polymers bearing (meth)acrylate or (meth)acrylamide end groups, for instance obtained, respectively, by esterification or amidation of hyperbranched dendrimers and polymers comprising hydroxy or amino end functional groups, with (meth)acrylic acid.

[0150] Dendrimers (from the Greek dendron=tree) are "arborescent", i.e. very branched, polymeric molecules invented by D. A. Tomalia and his team at the beginning of the 1990s (Donald A. Tomalia et al., Angewandte Chem., Int. Engl. Ed., vol. 29, No. 2, pages 138-175). They are structures constructed around a central unit that is generally polyvalent. Linked together around this central unit, according to an entirely determined structure, are branched chain extension units, thus giving rise to symmetrical, monodispersed macromolecules having a well-defined chemical and stereochemical structure. Dendrimers of polyamidoamine type are sold, for example, under the name Starburst® by the company Dendritech.

[0151] Hyperbranched polymers are polycondensates, generally of polyester, polylamide or polyeyleneamine type, obtained from multifunctional monomers, which have an arborescent structure similar to that of dendrimers, but much less regular than the latter (see, for example, International Patent Application Publication Nos. WO-A-93/17060 and WO 96/12754).

[0152] The company Perstorp sells hyperbranched polyesters under the name Boltorn®. Hyperbranched polyethyl-eneamines are available from the company Dendritech under the name Combust®. Hyperbranched poly(esteramide)s comprising hydroxyl ends are sold by the company DSM under the name Hybrane®. These hyperbranched dendrimers and polymers esterified or amidated with acrylic and/or methacrylic acid differ from the polymers described above by virtue of the very large number of ethylenic double bonds present. This high functionality, most commonly greater than 5, can make them useful, for example, by allowing them to play the role of a "crosslinking node", i.e., a multiple crosslinking site.

[0153] In one embodiment of the present disclosure, for instance, these hyperbranched dendritic polymers can be used in combination with at least one of the polymers and/or oligomers described above.

[0154] Compounds Bearing at Least Two Functional Groups Comprising at Least One Labile Hydrogen

[0155] Compounds bearing at least two functional groups comprising at least one labile hydrogen that can be used in the present disclosure are also known. They may be low molecular mass organic compounds or else synthetic oligomers or polymers obtained by polyaddition, polycondensation and/or grafting, or chemically modified natural polymers.

[0156] According to the present disclosure, the functional groups comprising labile hydrogen can be chosen from, by way of non-limiting example, primary amine (—NH2), secondary amine (—NH), hydroxyl (—OH), carboxylic acid (—COOH) and/or thiol (—SH) functional groups.

[0157] When the functional group comprising the at least one labile hydrogen is a hydroxyl functional group, non-limiting mention may be made, as families of compounds, of aliphatic diols and polyols.

[0158] When the functional group comprising labile hydrogen is an amine functional group (NH2), it may be chosen from a diamine, a polyamine, an amino alcohol, an oligomer or a polymer comprising amine groups. Non-limiting examples of compounds bearing functional groups comprising labile hydrogens are: C1-14 alkylene glycols, glycerol, trimethylolpropane, pentamethyldiethanol, poly(C1-14 alkylene glycols) such as polyethylene glycol or polypropylene glycol, or copolymers thereof, the product of condensation of propylene glycol and trimethylolpropane, castor oil, phytantriol, sugars and carbohydrates such as sucrose or cellulose, ethylenediamine, 1,3-diaminoproppane, lysine, 2-amino-2-methyl-1-propanol, poly(alkyleneoxylamines) such as the Jeffermine® products sold by the company Texaco, nitrocellulose, cellulose esters, for instance those having a degree of substitution of less than 3, such as cellulose acetobutyrate and cellulose acetopropionate, cellulose ethers such as hydroxyethylcellulose, carboxymethylcellulose, hydroxypropylcellulose or ethylcellulose, polystyrene resins, silicones, perfluoropolymers, alkyds and polyketones comprising hydroxylated ends, poly(vinyl alcohol) and copolymers based on vinyl alcohol, allyl alcohol copolymers, copolymers based on hydroxy(C2-50)alkyl (meth)acrylate, such as 2-hydroxyethyl or 2-hydroxypropyl (meth)acrylate, sold for example under the name Joncryl® SCX 910 by the company Johnson Polymer or under the name Crodpalast® AC 5725 by the company Croda, copolymers based on vinylamine or on allylamine, silicones and
perfluoroethers comprising primary or secondary amine ends, hyperbranched dendrimers or polymers comprising hydroxyl or primary amine ends, such as the hyperbranched polyesters comprising hydroxyl ends sold by the company Perstorp under the names Boltron® H40 TMP Core and HBP Polyl® 3G (described in International Application Publication Nos. WO 93/17060 and WO 96/12754), or else dendrimers of polyamidoamine type comprising primary amine ends, described in the article by Tomalia, Angewandte Chemie, Int. Ed. Engl., vol. 29, No. 2, pages 138-175.

According to another embodiment of the present disclosure, the crosslinking is carried out photochemically and uses at least two types of compounds, for instance (A) and (B), having respectively at least one unsaturated double bond, in the presence of a photo-initiator.

According to this embodiment, (A) and (B) are chosen so as to form a reactive system for which the average valency is greater than 2. As used herein, the valency of a compound is understood to mean the number of covalent bonds that it can establish with the compounds that are associated with it. The average valency is defined as being equal to the ratio of the sum of the valencies of all the compounds (A) and (B), divided by the total number of compounds (A) and (B)

\[ v_a = \frac{\sum n_i v_i}{\sum n_i} \]

According to this embodiment of the present disclosure, the compounds (A) or (B) can be a compound comprising a function of unsaturated double bond type, for instance as defined above, and/or an ethylenically unsaturated monomer.

A group of photo-initiators that may be used according to the present disclosure, for example, includes that of copolymerizable photo-initiators. These are molecules comprising both a photo-initiating group capable of photo-induced free-radical splitting and at least one ethylenic double bond.

To obtain satisfactory lasting properties, a total amount of at least one photo-initiator can be present in an amount ranging from 0.1% to 10% by weight, such as ranging from 0.2% to 5% by weight, relative to the total weight of compounds comprising ethylenic double bonds.

In this embodiment, the crosslinking can be carried out in the presence of a co-film-forming agent, for instance nitrocellulose or cellulose esters.

Polymeric Film Derived from Evaporation of the Organic or Aqueous Solvent Phase of a Solution or Dispersion of at least One Film-Forming Polymer

According to another embodiment of the present disclosure, the at least one polymeric film can be obtained by evaporation of the organic or aqueous solvent phase of a solution or dispersion of at least one film-forming polymer.

To prepare a polymeric film according to the present disclosure, a single film-forming polymer or a blend of film-forming polymers can be used. The at least one film-forming polymer can be chosen from free-radical polymers, polycondensates and polymers of natural origin.

The film can be obtained by application of the second composition to a Teflon®-covered support and then drying at a temperature ranging from 20°C to 150°C. The film is then detached from the support.

Film-Forming Polymers Soluble or Dispersible in an Organic Solvent

According to one embodiment of the present disclosure, the at least one polymeric film derives from the evaporation of the organic solvent phase of a solution or dispersion of at least one film-forming polymer. In this embodiment, the at least one organic film-forming polymer is chosen from film-forming polymers soluble or dispersible in at least one class of organic solvent, for instance ketones, alcohol, glycols and propylene glycol ethers, short-chain esters, alkanes, and aqueous or non-aqueous mixtures thereof.

The corresponding polymers may be of any chemical nature. For instance, they may result either from the homo- or copolymerization of unsaturated monomers, or from polycondensation, or from the modification of natural polymers, such as polysaccharides. The weight-average molecular masses (Mw) of these polymers can range from 3,000 to 1,000,000, such as from 5,000 to 800,000, and for example from 10,000 to 500,000.

Among the polymers soluble or dispersible in organic solvents, the following polymers, non-limiting mention may be made of:

- (Meth)acrylic acid ester and/or amide homo- and copolymers, such as polymers resulting from the polymerization or copolymerization of methyl, ethyl, propyl, butyl, isobutyl, tert-butyl, pentyl, hexyl, cyclohexyl, 2-ethylhexyl, heptyl, octyl, isobornyl, norbornyl or adamantyl acrylates and/or methacrylates, or the corresponding (meth)acrylamides. These polymers can comprise from 0 to 20% of a polar comonomer such as (meth)acrylic acid, (meth)acrylamide, hydroxyethyl (meth)acrylate, 2-hydroxypropyl (meth)acrylate, and (meth)acrylonitrile. They may also result from co-polymerization with styrene or a substituted styrene.

- Vinyl ester or amide homo- and copolymers, such as homo- and copolymers resulting from the polymerization of vinyl acetate, vinyl propionate or vinyl versatate, with or without the presence of a polar comonomer such as crotonic acid, allyloxyacetic acid, maleic anhydride (or acid), itaconic anhydride (or acid), vinylacetamide and vinylformamide. Similarly, they may result from the copolymerization of at least one of the monomers mentioned with styrene or a substituted styrene.

- Celluloses and cellulose derivatives, for instance nitrocelluloses and/or cellulose esters such as cellulose acetates, cellulose propionates, cellulose butyrates, cellulose acetopropionates and cellulose acetobutyrates.

- Polycondensates that are soluble or dispersible in these solvents. They are generally used as a main film-forming agent or else as a co-film-forming agent for one of the classes of polymers mentioned above (a to c), for example, if they are of low molecular weight (Mw<20),
Among these polycondensates, for instance if they are used as a film-forming agent or co-film-forming agent for at least one nitrocellulose and/or for a cellulose ester (class c), non-limiting mention may be made of: polyesters, for example fatty chain polyesters, such as copolymers having the CTFA name: “phthalic anhydride/glycerol/glycidyl decanoate copolymer” and “adipic acid, neopentyl glycol/trimellitic anhydride copolymer,” alkyls, tosylamide/formaldehyde condensates.

Polyurethanes and polylurea-urethanes, acrylic resins, and silicone resins (non-volatile or partially volatile).

According to one embodiment of the present disclosure, the at least one film-forming polymer is a film-forming linear block ethylenic polymer, which may comprise, for example, at least one first block and at least one second block having different glass transition temperatures (Tg), said at least one first block and at least one second block being connected to one another via an intermediate block comprising at least one monomer that constitutes the at least one first block and at least one monomer that constitutes the at least one second block.

For example, the at least one first and at least one second blocks of the block polymer can be incompatible with one another. Such polymers are described, for example, European Patent No. EP 14 11 069 or International Patent Application No. WO 04/028488.

Aqueous Dispersions of Particles or Film-Forming Polymers or Alternatively Latex

According to another embodiment of the present disclosure, the at least one polymeric film derives from the evaporation of the aqueous phase of an aqueous dispersion of particles of at least one film-forming polymer. In this case, the at least one film-forming polymer can be chosen from aqueous dispersions of particles of film-forming polymers or alternatively latex and, in this case, the composition according to the present disclosure comprises at least one aqueous phase.

The aqueous dispersion comprising at least one film-forming polymer can be prepared by those skilled in the art on the basis of their general knowledge, for instance by emulsion polymerization or by dispersion of the preformed polymer. Among the film-forming polymers of this type that can be used in the composition according to the present disclosure, non-limiting mention may be made of synthetic polymers, of the polycondensate type or of the free-radical type, polymers of natural origin, and blends thereof.

Use may be made, for example, in the form of latex, of the polymers (homo- and copolymers) that are mentioned above as polymers that are soluble or dispersible in an organic solvent medium, such as the polymers of classes a, b and c.

Among the polycondensates, non-limiting mention may be made of anionic, cationic, non-ionic or amphoteric polyurethanes, polylurethane-acrylics, polylurethane-polyvinylpyrrolidones, polylurethane-polyycondensates, polyurea-polylurethanes, polyureas, polylurea-polylurethanes, and blends thereof.

Non-limiting mention may also be made of polyesters, polyester amides, fatty chain polyesters, polyamides and epoxy ester resins.

The polyesters can be obtained, in a known manner, by polycondensation of aliphatic or aromatic diacids with aliphatic or aromatic diols or polyols. Among aliphatic diacids, non-limiting mention may be made of succinic acid, glutaric acid, adipic acid, pimelic acid, sebacic acid or sebacic acid. Among aromatic diacids, non-limiting mention may be made of terephthalic acid or isophthalic acid, alternatively a derivative such as phthalic anhydride. Among aliphatic diols, non-limiting mention may be made of ethylene glycol, propylene glycol, diethylene glycol, neopentyl glycol cyclohexanediol, or 4,4-(1-methylpropyridine)biphenol. Among polyols, non-limiting mention may be made of glycerol, pentaerythritol, sorbitol or trimethylolpropane.

The polymers of free-radical type may be, for example, acrylic and/or vinyl polymers or copolymers. Anionic free-radical polymers are used in one embodiment of the present disclosure. Among monomers bearing an anionic group that can be used during the free-radical polymerization, non-limiting mention may be made of acrylic acid, methacrylic acid, crotonic acid, maleic anhydride, or 2-acrylamido-2-methylpropansulfonic acid.

The acrylic polymers can result from the copolymerization of monomers chosen from esters and/or amides of acrylic acid or of methacrylic acid. As an example of monomers of the ester type, non-limiting mention may be made of methyl methacrylate, ethyl methacrylate, butyl methacrylate, isobutyl methacrylate, 2-ethylhexyl methacrylate and lauryl methacrylate. As an example of monomers of the amide type, non-limiting mention may be made of N,N-dimethylacrylamide and of N-t-octylacrylamide.

The vinyl polymers can result from the homopolymerization or from the copolymerization of monomers chosen from vinyl esters, styrene or butadiene. As an example of vinyl esters, non-limiting mention may be made of vinyl acetate, vinyl neodecanoate, vinyl pivalate, vinyl benzoate and vinyl 1-butyl benzolate.

Acrylic/silicone copolymers can also be used.

Non-limiting mention may also be made of polymers resulting from the free-radical polymerization of at least one free-radical monomer within and/or partially at the surface of pre-existing particles of at least one polymer chosen from polyurethanes, polyureas, polyesters, polyester amides and/or alkyds. These polymers are generally called hybrid polymers.

The dispersion can also comprise at least one associative polymer of polyurethane type or a natural gum, such as xanthan gum.

Among the polymers in an aqueous dispersion, non-limiting mention may be made of the dispersions of acrylic polymers sold under the name Neocryl XK-90®,
According to one embodiment, the makeup kit according to the present disclosure comprises:

i) at least one first liquid composition comprising an organic solvent phase and at least one film-forming polymer,

ii) at least one flexible polymeric film that is derived from the evaporation of the organic or aqueous solvent phase of a solution or dispersion of at least one film-forming polymer, wherein said at least one film and said first liquid composition being such that, when the at least one film is applied to the nail coated beforehand with said at least one first composition, the film adheres to the nail.

The at least one film-forming polymer of the at least one first composition and of the at least one polymeric film may be identical or different.

According to another embodiment, the at least one flexible polymeric film is a multilayer film prepared in several steps from various compositions that derive from the crosslinking of a crosslinkable composition and/or from the evaporation of the organic or aqueous solvent phase of a solution or dispersion of at least one film-forming polymer. For example, it can be a multilayer film prepared by superimposing at least two, or even more, layers obtained, respectively, by evaporation of the organic or aqueous solvent phase of solutions or dispersions of film-forming polymer(s) of different natures.

Other Additives

i) Pigments and Dyes

The at least one first composition and/or the at least one flexible polymeric film can also comprise, for example, at least one organic or inorganic dyestuff, such as the pigments or pearlescent agents of the type conventionally used in cosmetic compositions.

As used herein, the term “pigments” is understood to mean white or colored, mineral or organic particles that are insoluble in the medium or aqueous, and are intended to color and/or opacify the resulting film.

The at least one pigment, when present, may be present in an amount ranging from 0.01% to 20% by weight, for instance, from 0.01% to 15% by weight, such as from 0.02% to 10% by weight, relative to the total weight of the at least one first composition and/or of the at least one polymeric film.

Among the mineral pigments that can be used in the present disclosure, non-limiting mention may be made of titanium oxide, zirconium oxide or cerium oxide, and also zinc oxide, iron oxide or chromium oxide, ferric blue, manganese violet, ultramarine blue and chromium hydrate.

Non-limiting mention may also be made of a pigment having a structure that may, for example, be of sericite/brown iron oxide/titanium dioxide/silica type. Such a pigment is sold, for example, under the reference Coverleaf NS or JS by the company Chemicals and Catalysts and has a contrast ratio in the region of 30.

The at least one dyestuff may also comprise at least one pigment having a structure that may, for example, be of iron oxide-comprising silica microsphere type. An example
of a pigment having this structure is that sold by the company Miyoshi under the reference PC Ball PC-L1-100 P, this pigment comprising microspheres of silica containing yellow iron oxide.

[0215] Among the organic pigments that can be used in the present disclosure, non-limiting mention may be made of carbon black, pigments of D & C type, and lakes based on cochineal carmine or on barium, strontium, calcium or aluminium, or alternatively the diketone pyrrolopyrroles (DPPs) described in European Patent Nos. EP 0 542 669, EP 0 787 730, and EP 0 787 731 and International Patent Application Publication No. WO-A-96/08537.

[0216] As used herein, the term “pearlescent agents” is understood to mean colored particles of any form, that may or may not be iridescent, for instance produced by certain molluscs in their shell, or alternatively synthesized, and which provide a color effect through optical interference.

[0217] The at least one pearlescent agent may be chosen from pearlescent pigments such as titanium mica coated with an iron oxide, mica coated with bismuth oxychloride, titanium mica coated with chromium oxide, titanium mica coated with an organic dye, and bismuth oxychloride-based pearlescent pigments. They may also be chosen from mica particles at the surface of which at least two successive layers of metal oxides and/or of organic dyestuffs are superimposed.

[0218] As an example of pearlescent agents, non-limiting mention may also be made of natural mica coated with titanium oxide, with iron oxide, with a natural pigment or with bismuth oxychloride.

[0219] Among the pearlescent agents available on the market, non-limiting mention may be made of the pearlescent agents Timica, Flamenco and Duochrome (mica-based) sold by the company Engelhard, the pearlescent agents Timiron sold by the company Merck, the mica-based pearlescent agents Prestige sold by the company Eckart and the synthetic mica-based pearlescent agents Sunshine sold by the company Sun Chemical.

[0220] The pearlescent agents may have, for example, a yellow, pink, red, bronze, orangey, brown and/or coppery color or glint.

[0221] By way of illustration of the pearlescent agents that may be used in the context of the present disclosure, non-limiting mention may be made of the gold-colored pearlescent agents sold, for instance, by the company Engelhard under the name Brilliant gold 212G (Timica), Gold 222C (Cloisonne), Sparkle gold (Timica), Gold 4504 (Chromalite) and Monarch gold 233X (Cloisonne); the bronze pearlescent agents sold in particular by the company Merck under the name Bronze fine (17384) (Colorona) and Bronze (17353) (Colorona) and by the company Engelhard under the name Super bronze (Cloisonne); the orange pearlescent agents sold, for instance, by the company Engelhard under the name Orange 363C (Cloisonne) and Orange MCR 101 (Cosmica) and by the company Merck under the name Passion orange (Colorona) and Matte orange (17449) (Microna); the brown-tinted pearlescent agents sold in particular by the company Engelhard under the name Nu-antique copper 340XB (Cloisonne) and Brown CL 4500 (Chromalite); the pearlescent agents with a copper glint sold, for example, by the company Engelhard under the name Copper 340A (Timica); the pearlescent agents with a red glint sold, for instance, by the company Merck under the name Sienna fine (17386) (Colorona); the pearlescent agents with a yellow glint sold for instance by the company Engelhard under the name Yellow (4502) (Chromalite); the red-tinted pearlescent agents with a gold glint sold, for example, by the company Engelhard under the name Sunstone G012 (Gemtone); the pink pearlescent agents sold, for instance, by the company Engelhard under the name Tan opale G005 (Gemtone); the black pearlescent agents with a gold glint sold, for instance, by the company Engelhard under the name Nu-antique bronze 240 AB (Timica), the blue pearlescent agents sold, for example, by the company Merck under the name Matte blue (17433) (Microna), the white pearlescent agents with a silvery glint sold, for instance, by the company Merck under the name Xirona Silver and the golden green orangey pinkish pearlescent agents sold, for example, by the company Merck under the name Indian summer (Xirona), and mixtures thereof.

[0222] The at least one first composition and/or the at least one polymeric film according to the present disclosure may also comprise at least one water-soluble or at least one liposoluble dye, which may be present in an amount ranging from 0.01% to 10% by weight, for instance ranging from 0.01% to 5% by weight, relative to the total weight of at least one first composition or of the at least one polymeric film. The liposoluble dyes can be chosen from, for example, Sudan red, DC Red 17, DC Green 6, β-carotene, soybean oil, Sudan brown, DC Yellow 11, DC Violet 2, DC Orange 5 or quinoline yellow. The water-soluble dyes can be chosen from, for example, beetroot juice or methylene blue.

[0223] Material Having an Optical Effect

[0224] The at least one first composition and/or the at least one polymeric film according to the present disclosure can comprise at least one material having a specific optical effect, for instance, present in the at least one flexible polymeric film. This effect is different from a simple conventional tint effect, i.e. unified and stabilized as produced by the conventional dyestuffs described above, for instance monochromatic pigments. As used herein, the term “stabilized” means devoid of any effect of color variability with the angle of observation or alternatively in response to a change in temperature.

[0225] The at least one material having a specific optical effect is present in a sufficient amount to produce an optical effect that is perceptible with the naked eye. For example, it can be an effect chosen from goniochromatic, metallic, such as mirror, soft-focus, rainbow and/or thermochromic effects.

[0226] For example, this material can be chosen from particles with a metallic glint, goniochromatic coloring agents, diffractive pigments, thermochromic agents, optical brighteners, and also fibers, such as interference fibers. Of course, these various materials can be combined so as to provide the simultaneous manifestation of two effects, or even of a novel effect in accordance with the present disclosure.

[0227] Particles with a Metallic Glint

[0228] As used herein, the expression “particles with a metallic glint” is understood to mean particles whose nature, size, structure and surface finish allow them to reflect incident light, for instance, in a non-iridescent manner.
Particles exhibiting a substantially planar outer surface are also suitable, since they are more readily able, if their size, structure and surface finish allow it, to give rise to intense specular reflection that can then be referred to as a mirror effect.

The particles with a metallic glint that can be used in the present disclosure can, for example, reflect light in all the components of the visible range without significantly absorbing one or more wavelengths. The spectral reflectance of these particles may, for example, be greater than or equal to 70%, in the 400 nm–700 nm range, for instance, greater than or equal to 80%, such as greater than or equal to 90%, for example 95%.

These particles can have a thickness of less than or equal to 1 µm, for instance less than or equal to 0.7 µm, such as less than or equal to 0.5 µm.

The particles with a metallic glint can be, for example, present in a total amount of less than or equal to 20% by weight, such as less than or equal to 10% by weight, relative to the total weight of the at least one first composition or of the at least one polymeric film.

Among the particles with a metallic glint that can be used in the present disclosure, non-limiting mention may be made of those chosen from:

- particles of at least one metal and/or of at least one metal derivative;
- particles comprising an organic or mineral, single-substance or multi-substance substrate, at least partially covered with at least one layer with a metallic glint comprising at least one metal and/or at least one metal derivative; and
- mixtures of said particles.

Among the metals that may be present in said particles, non-limiting mention may, for example, be made of Ag, Au, Cu, Al, Ni, Sn, Mg, Cr, Mo, Ti, Zr, Pt, V, Nb, W, Zn, Ge, Te and Se, and mixtures or alloys thereof. For example, in one embodiment, Ag, Au, Cu, Al, Zn, Ni, Mo and Cr, and mixtures or alloys thereof (for example bronzes and brasses), are used.

As used herein, the term “metal derivatives” is understood to mean compounds derived from metals, such as oxides, fluorides, chlorides and sulphides.

Among the metal derivatives that may be present in the particles, non-limiting mention may be made of metal oxides such as, for example, titanium oxide, for instance, TiO₂, iron oxide, for instance, Fe₂O₃, tin oxide or chromium oxide, barium sulphate, and the following compounds: MgF₂, CrF₃, ZnS, ZnSe, SiO₂, Al₂O₃, MgO, Y₂O₃, SeO₂, SiO, HFO₂, ZrO₂, CeO₂, Nb₂O₅, Ta₂O₅, and MoS₂, and mixtures or alloys thereof.

According to one embodiment of the present disclosure, the particles with a metallic glint can be made up of at least one metal as defined above, of at least one metal derivative as defined above, or alternatively of a mixture thereof.

These particles may be at least partially covered with a layer of another material, for example of transparent material such as, for instance, rosin, silica, stearates, polysiloxanes, polyester resins, epoxy resins, polyurethane resins and acrylic resins.

By way of illustration of these particles, non-limiting mention may be made of aluminium particles, such as those sold under the names Starbrite 1200 EAC® by the company Sibelwte and Metalure® by the company Eckart.

Non-limiting mention may also be made of metallic copper powders or alloy mixtures such as the references 2844 sold by the company Radium Bronze, metallic pigments, for instance aluminium or bronze, such as those sold under the names Rotosafe 700 from the company Eckart, the silica-coated aluminium particles sold under the name Visionaire Bright Silver from the company Eckart, and the particles of metal alloy, for example powders of bronze (copper and zinc alloy), coated with silica, sold under the name Visionaire Bright Natural Gold from the company Eckart.

According to another embodiment of the present disclosure, these particles may be particles that comprise a substrate and that therefore have a multilayer, for example bilayer, structure. This substrate may be organic or mineral, natural or synthetic, single-substance or multi-substance, solid or hollow. When the substrate is synthetic, it may be prepared with a shape that promotes the formation of a reflecting surface after coating, for instance after the deposition of a layer of materials with a metallic glint. The substrate may, for example, have a planar surface and the layer of materials with a metallic glint may have a substantially even thickness.

The substrate may be, by way of non-limiting example, chosen from the metals and the metal derivatives as mentioned above, and also from glasses, ceramics, aluminas, silicas, silicates, such as aluminosilicates and borosilicates, and synthetic micas such as fluorophlogopite, and mixtures thereof.

The layer with a metallic glint may completely or partly coat the substrate and this layer may be at least partially covered with a layer of another material, for example a transparent material, such as mentioned above. According to one embodiment, this layer with a metallic glint completely coats the substrate directly or indirectly, i.e. with interposition of at least one intermediate layer that may or may not be metallic.

The metals or metal derivatives that can be used in the reflective layer are as defined above. For example, it may be made up of at least one metal chosen from silver, aluminium, chromium, nickel, molybdenum, gold, copper, tin and magnesium, and mixtures (alloys) thereof. In one embodiment of the present disclosure, silver, chromium, nickel, molybdenum, and mixtures thereof, are used.

By way of illustration of this second type of particles, non-limiting mention may be made of:


By way of illustration of these particles comprising a glass substrate, non-limiting mention may be made of those coated, respectively, with silver, with gold or with...
titanium, in the form of flakes, sold by the company Nippon Sheet Glass under the names Microglass Metashine. Particles with a silver-coated glass substrate, in the form of flakes, are sold under the name Microglass Metashine REFSX 2025 PS by the company Toyal. Particles with a nickel/chrome/molybdenum alloy-coated glass substrate are sold under the name Crystal Star GF 550 and GF 2525 by this same company. There are those coated either with brown iron oxide or with titanium oxide or tin oxide or a mixture thereof, such as those sold under the name Reflectec® by the company Engelhard or those sold under the reference Metashine MC 2080GP by the company Nippon Sheet Glass.

[0251] These glass particles covered with metals can be coated with silica, such as those sold under the name Metashine series FSS1 or GPS1 by the company Nippon Sheet Glass.

[0252] Particles with a spherical glass substrate coated or not coated with a metal, such as those sold under the name Prizmalite Microsphere by the company Prizmalite Industries may also be used.

[0253] Also suitable for use according to the disclosure are the pigments of the Metashine 1080R range sold by the company Nippon Sheet Glass Co. Ltd. These pigments, described for example, in Japanese Patent Application No. JP 2001-11340, are flakes of C-Glass comprising from 65% to 72% of SiO₂, covered with a layer of titanium oxide of rutile type (TiO₂). These glass flakes have an average thickness of 1 micron and an average size of 80 microns, i.e. an average size/average thickness ratio of 80. They can provide blue, green or yellow glints or glints with a silver tint, depending on the thickness of the layer of TiO₂.

[0254] Particles comprising a substrate of silver-coated borosilicate, also called “white pearlescent agents” may also be used.

[0255] Particles comprising a metal substrate such as aluminum, copper or bronze, in the form of flakes, are sold under the trade name Starbrite by the company Silberline and under the name Visionaire by the company Eckart.

[0256] Particles comprising a substrate of synthetic mica coated with titanium dioxide, and, for example, of the particles ranging from 80 μm to 100 μm in size, comprising a substrate of synthetic mica (fluorophlogopite) coated with titanium dioxide representing 12% of the total weight of the particle, sold under the name Prominence by the company Nihon Koken.

[0257] The particles with a metallic glint can also be chosen from the particles formed from stacking at least two layers with different refractive indices. These layers may be polymeric or metallic in nature and may for example, include at least one polymeric layer.

[0258] Thus, the particles with a metallic glint may be particles that derive from a multilayer polymer film.

[0259] The choice of materials intended to constitute the various layers of the multilayer structure is, of course, made in such as way as to confer the desired metallic effect on the particles thus formed.


[0261] Diffractive Pigments

[0262] As used herein, the term “diffractive pigment” is understood to mean a pigment capable of producing a color variation according to the angle of observation when it is lit by white light, due to the presence of a structure that diffracts light.

[0263] A diffractive pigment may comprise a diffraction network capable, for example, of diffracting a ray of monochromatic incident light in defined directions. The diffraction network may comprise a periodic unit, for instance a line, the distance between two adjacent units being of the same order of magnitude as the wavelength of the incident light. When the incident light is polychromatic, the diffraction network will separate the various spectral components of the light and produce a rainbow effect.


[0265] The diffractive pigment can be prepared with units having various profiles, such as triangular, symmetrical or not, slotted, of constant width or not, and/or sinusoidal. The spatial frequency of the network and the depth of the units will be chosen according to the degree of separation of the various orders desired. The frequency can range, for example, from 500 lines per mm to 3000 lines per mm.

[0266] For example, the particles of the diffractive pigment each exhibit a flattened form, such as in the form of a flake.

[0267] The same particle of pigment may comprise two cross diffraction networks, which may or may not be perpendicular.

[0268] A possible structure for the diffractive pigment may comprise a layer of a reflective material, covered at least on one side with a layer of a dielectric material. The latter may confer better rigidity and durability on the diffractive pigment. The dielectric material can therefore be chosen, for example, from the following materials: MgF₂, SiO₂, Al₂O₃, AlF₃, CeF₃, LaF₃, NdF₃, SmF₃, BaF₂, CaF₂ and LiF, and combinations thereof. The reflective material can be chosen, for example, from metals and alloys thereof and also from non-metallic reflective materials. Among the metals that may be used, non-limiting mention may be made of Al, Ag, Cu, Au, Pt, Sn, Ti, Pd, Ni, Co, Rd, Nb and Cr, and compounds, combinations or alloys thereof. Such a reflective material may, on its own, constitute the diffractive pigment, which will then be monolayer.

[0269] In one embodiment, the diffractive pigment may comprise a multilayer structure comprising a core of a dielectric material covered with at least one reflective layer, at least on one side, or even completely encapsulating the core. A layer of a dielectric material may also cover the at least one reflective layer. The dielectric material used can then, for example, inorganic, and can be chosen, for example, from metal fluorides, metal oxides, metal sulphides, metal nitrides, metal carbides, and combinations thereof. The dielectric material may be in the crystalline,
semi-crystalline or amorphous state. The dielectric material, in this configuration, can, for example, be chosen from the following materials: MgF₂, SiO₂, SiO₂₂, Al₂O₃, TiO₂, WO₃, Al₂O₃, BN, BC, WC, TiC, TiN, Si₃N₄, ZnS, glass particles, diamond-type carbons, and combinations thereof.


[0271] A diffractive pigment may comprise, for example, the following structure: MgF₂/Al/MgF₂, a diffractive pigment having this structure being sold under the name Spectraflair 1400 Pigment Silver by the company Flex Products, or Spectraflair 1400 Pigment Silver FG. MgF₂ can be present in an amount ranging from 80% to 95% by weight, relative to the total weight of the pigment.

[0272] Goniochromatic Coloring Agents

[0273] As used herein, the term “goniochromatic coloring agent” is understood to mean an agent that makes it possible to observe a color change, also called “color flop,” according to the angle of observation, greater than that which can be encountered with pearlescent agents. One or more goniochromatic coloring agents can be used simultaneously.

[0274] The at least one goniochromatic coloring agent can be chosen so as to exhibit a relatively substantial color change with the angle of observation.

[0275] The at least one goniochromatic coloring agent can be chosen such that it is possible to observe, for a variation in angle of observation ranging from 0° to 80° under lighting at 45°, a variation in color AE of the cosmetic composition, measured in colorimetric space CIE 1976, of at least 2.

[0276] The at least one goniochromatic coloring agent can be chosen such that it is possible to observe, for lighting at 45° and a variation in the angle of observation ranging from 0° to 80°, a variation Dh in the angle of tint of the cosmetic composition, in the CIE 1976 plane, of greater than or equal to 30°, or even greater than or equal to 40°, or greater than or equal to 60°, or even, for instance, greater than or equal to 100°.

[0277] The at least one goniochromatic coloring agent can be chosen, for example, from multilayer interference structures and liquid crystal coloring agents.

[0278] In the case of a multilayer structure, it may comprise, for example, at least two layers, each layer, which may be identical or different from the other layer(s), being prepared, for example, from at least one material chosen from: MgF₂, CaF₂, ZnS, ZnSe, Si, SiO₂, Ge, Te, Fe₂O₃, Pt, V₄, Al₂O₃, MgO, Y₂O₃, S₃O₃, SiO, H₂O₂, ZrO₂, CeO₂, Nb₂O₅, Ta₂O₅, TiO₂, Ag, Al, Au, Cu, Rb, Ti, Ta, W, Zn, MoS₂, cryolite, alloys and polymers, and combinations thereof.

[0279] The multilayer structure may or may not exhibit, with respect to a central layer, symmetry in terms of the chemical nature of the layers that are piled up.

[0280] Non-limiting examples of symmetrical multilayer interference structures that can be used in compositions prepared in accordance with the present disclosure are, for example, the following structures: Al/SiO₂/Al/SiO₂/Al, pigments having this structure being sold by the company Dupont De Nemours; Cr/MgF₂/Al/MgF₂/Cr, pigments having this structure being sold under the name Chromoflair by the company Flex; MoS₂/SiO₂/Al/SiO₂/MoS₂; Fe₂O₃/SiO₂/Al/SiO₂/Fe₂O₃ and Fe₂O₃/SiO₂/Fe₂O₃/SiO₂/Fe₂O₃, pigments having these structures being sold under the name Siocepearl from the company BASF; MoS₂/SiO₂/mica-oxide/SiO₂/MoS₂; Fe₂O₃/SiO₂/mica-oxide/SiO₂/Fe₂O₃; TiO₂/SiO₂/TiO₂ and TiO₂/Al₂O₃/TiO₂, SnO/TiO₂/SiO₂/TiO₂/SnO; Fe₂O₃/SiO₂/Fe₂O₃; SnO/mica/TiO₂/SiO₂/TiO₂/mica/SnO, pigments having these structures being sold under the name Xirona by the company Merck (Darmstadt). By way of non-limiting example, these pigments may be the pigments having the structure silica/titanium oxide/tin oxide sold under the name Xirona Magic by the company Merck, the pigments having the structure silica/brown iron oxide sold under the name Xirona Indian Summer by the company Merck, and the pigments having the structure silica/titanium oxide/mica/tin oxide sold under the name Xirona Carribean Blue by the company Merck. Non-limiting mention may also be made of the pigments Infinite Colors from the company Shiseido. Various effects are obtained depending on the thickness and the nature of the various layers. Thus, with the structure Fe₂O₃/SiO₂/Al/SiO₂/Fe₂O₃, the color changes from green-golden to red-grey for SiO₂ layers of 320 nm to 350 nm; from red to golden for SiO₂ layers of 380 nm to 400 nm; from violet to green for SiO₂ layers of 410 nm to 420 nm; from copper to red for SiO₂ layers of 430 nm to 440 nm.

[0281] Goniochromatic coloring agents with a multilayer structure comprising alternating polymeric layers can also be used.

[0282] By way of illustration of the materials that may constitute the various layers of the multilayer structure, mention may be made, without this list being limiting, of: polyethylene naphthalate (PEN) and its isomers, for example 2,6-, 1,4-, 1,5-, 2,7- and 2,3-PEN, polyalkylene terephthalates, polyimid, polyetherimides, atactic polypropylenes, polycarbonates, poly(alkyl methacrylate)s and poly(alkyl acrylate)s, syndiotactic polystyrene (sPS), syndiotactic poly-alpha-methylstyrenes, syndiotactic polydichlorostyrene, copolymers and blends of these polystyrenes, 'cellulose derivatives, polyalkylene polymers, fluoro-polymers, chloropolymers, polysulphones, polyacrylonitriles, polyamides, silicone resins, epoxy resins, polyvinyl acetate, polyetheramides, ionomeric resins, elastomers and polyurethanes. Copolymers are also suitable, for example PEN copolymers (for example, copolymers of 2,6-, 1,4-, 1,5-, 2,7- and/or 2,3-naphthalenedicarboxylic acid or its esters with (a) terephthalic acid or its esters; (b) isophthalic acid or its esters; (c) phthalic acid or its esters; (d) alkane glycals; (e) cycloalkane glycals (for example, cyclohexanodimethanol diol); (f) alkane dicarboxylic acids; and/or (g) cycloalkane dicarboxylic acids), polyalkylene terephthalate copolymers and styrene copolymers. In addition, each individual layer may include blends of two or more polymers or copolymers above. The choice of materials intended to constitute the various layers of the multilayer structure is, of course, made so as to confer the desired optical effect on the particles thus formed.

[0283] By way of example of pigments with a polymeric multilayer structure, non-limiting mention may be made of those sold by the company 3M under the name Color Glitter.
The liquid-crystal coloring agents comprise, for example, silicones or cellulose ethers onto which mesomorphic groups are grafted.

As liquid-crystal goniochromatic particles, use may be made of non-limiting example, be made of those sold by the company Chenix and also those sold under the name Helicone® HC by the company Wacker.

These agents may also be in the form of dispersed goniochromatic fibers. Such fibers may, for example, range from 50 μm to 700 μm, for example 300 μm, in size.

For instance, interference fibers having a multilayer structure may be used. Fibers having a multilayer polymer structure are described, for example, in European Patent Nos. EP 0 921 217, EP 0 686 858 and U.S. Pat. No. 5,472,798. The multilayer structure can comprise at least two layers, each layer, which may be identical or different from the other layer(s), being made of at least one synthetic polymer. The polymers present in the fibers can have a refractive index ranging from 1.30 to 1.82, such as ranging from 1.35 to 1.75. Among the polymers that may be used for constituting the fibers, non-limiting mention may be made of polyesters such as polyethylene terephthalate, polyethylene naphthalate or polycarbonate; acrylic-polymer such as poly(methyl methacrylate); polyamides.

For example, goniochromatic fibers having a polyethylene terephthalate/nylon-6-bilayer structure are sold by the company Teijin under the name Morphotex.

In one embodiment of the present disclosure, the at least one goniochromatic coloring agent may be combined with at least one diffractive pigment.

The combination of these two materials can result in a composition or a film that exhibits increased color variability, and which is therefore able to allow an observer to perceive a color change, or even a color movement, under numerous observation and light conditions.

The weight ratio of the at least one diffractive pigment to the at least one goniochromatic coloring agent can range, for example, from 85/15 to 15/85, for instance from 80/20 to 20/80, such as from 60/40 to 40/60, for example of the order of 50/50. Such a ratio can provide a strong rainbow effect and a strong goniochromatic effect.

Optical Brighteners

At least one optical brightener may be used. Optical brighteners are compounds well known to those skilled in the art. Such compounds are described, for example, in “Fluorescent Whitening Agent, Encyclopedia of Chemical Technology, Kirk-Othmer,” vol. 11, p. 227-241, 4th edition, 1994, Wiley. They can also be defined, for instance, as compounds that can absorb in the UV range, ranging from 300 nm to 390 nm and that can re-emit in the range ranging from 400 nm to 525 nm.

Among optical brighteners, non-limiting mention may be made of stilbene derivatives, for instance poly(aryleneamine) and triazine-stilbenes, coumarin derivatives, such as hydroxycoumarins and aminocoumarins, oxazole derivatives, benzoxazole derivatives, imidazole derivatives, triazole derivatives, pyrazoline derivatives, pyrene derivatives and porphyrin derivatives, and mixtures thereof.

Such compounds are readily commercially available. Mention may be made, by way of non-limiting example of: the stilbene derivative of naphtho triazolyl sold under the trade name “Tinopal GS,” the disodium distyril-4,4'-biphenyl sulphonate (CTFA name: disodium distyrylphenyl disulfonate) sold under the trade name “Tinopal CBS-X,” the cationic derivative of aminocoumarin sold under the trade name “Tinopal SWN CONC.,,” the sodium 4,4'-bis[4,6-diaminilino-1,3,5-triazin-2-yl]amino]stilbene-2,2'-disulphonate sold under the tradename “Tinopal SOP,” the 4,4'-bis[4-anilinol-6-bis(2-4-dihydroxyethyamino]-1,3,5-triazin-2-yl]amino]stilbene-2,2'-disulphonic acid sold under the tradename “Tinopal UNPA-GX,” the 4,4'-bis[anilinol-6-morpholino-1,3,5-triazin-2-yl]amino]stilbene sold under the trade name “Tinopal AMS-GX,” and the 4,4'-bis[4-anilino-6-(2-hydroxyethyl)methylamino]-1,3,5-triazin-2-yl]amino]-2,2'-stilbenedisulphonic acid disodium salt sold under the tradename “Tinopal 5BM-GX,” all by the company Ciba Specialities Chimiques; the 2,5-bis(5-tert-butyl-1,3-benzoxazolyl)phenone sold under the trade name “Uvitex OB” by the company Ciba, the anionic derivative of diamino stilbene as a dispersion in water, sold under the tradename “Leucophor BSB liquide” by the company Clariant, and the optical brightener lakes sold under the trade name “Covapor” by the company Wacker.

The optical brighteners that can be used in the present disclosure may also be in the form of copolymers, for example copolymers of acrylics and/or of methacrylates, grafted with optical brightener groups as described in French Patent Application No. FR 99 10942.

The at least one optical brightener may be used as it is, or may be introduced into the film in the form of particles and/or of fibers covered with said at least one optical brightener, such as those described below.

For example, the fibers covered with at least one optical brightener such as those sold by the company LCW under the trade reference Fiberlon 54 Z03, that are approximately 0.4 mm long and have a titre of 0.5 denier, can be used.

Material with Relief Effect

At least one material with relief effect may also be used. The relief effect may or may not be associated with an optical effect. A material of this type is generally present in an amount sufficient to confer a relief effect perceptible to the touch, or even to the naked eye. It may be in particular be a rough and/or hammer stroke effect.

Material Conferring a Rough Appearance

The at least one polymeric film of the kit according to the present disclosure can be used, for example, for attaching solid particles or fibers to its film, thus conferring an original makeup with relief. In addition, the substantially spherical-shaped or void-shaped particles can give the makeup a soft feel.

In one embodiment of the present disclosure, the solid particles are substantially spherical in shape, so as to allow good distribution thereof when they are applied to the at least one first layer.

The solid particles used according to the present disclosure may have an average size ranging from 2.5 μm to 5 mm, such as from 50 μm to 2 mm. The smaller the
particles, the more satisfactory the manner in which they last. The use of particles is also compatible with the implementation of motifs.

[0305] The solid particles may be made of any material that satisfies the density properties defined above. For example, the solid particles may be made of a material chosen from glass, zirconium oxide, tungsten carbide, plastics such as polyurethanes, polyamides, polytetrafluoroethylene or propylene, metals such as steel, copper, brass or chromium, marble, onyx, jade, natural mother-of-pearl, precious stones (diamond, emerald, ruby, sapphire), amethyst, aquamarine. For instance, glass beads such as those sold under the name “Silibeads®” by the company Sigmund Lindner may be used; these beads additionally can confer a gloss effect and a sparkling effect on the makeup.

[0306] The solid particles, which may or may not be deformable, can be solid or hollow, colorless or colored, and coated or uncoated.

[0307] The fibers that can be used according to the present disclosure may be fibers of synthetic or natural, mineral or organic origin.

[0308] As used herein, the term “fiber” is understood to mean an object of length L and of diameter D such that L is much greater than D, D being the diameter of the circle into which the cross section of the fiber fits. The ratio of (L/D) (or shape factor) can range from 3.5 to 2,500, for instance from 5 to 500, as from 5 to 150.

[0309] The fibers may be, for example, fibers used in the manufacture of textiles, such as particular silk, cotton, wool or flax fibers, fibers of cellulose, for instance extracted from wood, vegetables or algae, fibers of rayon, polyamide (Nylon®), viscose, acetate, such as rayon acetate, poly(p-phenyleneetherephthalamide) (or aramide), for instance Kevlar®, acrylic polymer, such as poly(methyl methacrylate) or poly(2-hydroxyethyl methacrylate), polyolefin, and for example polyethylene or polypropylene, glass, silica, carbon, such as in the form of graphite, polytetrafluoroethylene (such as Teflon®), insoluble collagen, polyesters, polyvinyl chloride or vinylide, polyvinyl alcohol, polyacrylonitrile, chitosan, polyurethane, or polyethylene phthalate, or fibers formed from a blend of polymers such as those mentioned above, for instance polyamide/polyester fibers.

[0310] Material Conferring a Hammer Stroke Appearance

[0311] It is possible to package in the at least one polymeric film of the kit according to the present disclosure a material comprising a mixture of fumed silica, metallic pigment and organopolysiloxane compound, so as to confer on it a hammer stroke appearance.

[0312] Such a mixture is described, for instance, in European Patent Application No. EP 1 040 813.

[0313] Material with Oilfactory Effect

[0314] For example, the at least one polymeric film according to the present disclosure can also have olfactory properties through the incorporation, into said the at least one film, for instance, of at least one scented material and/or fragrant substance.

[0315] The at least one fragrant substance can be chosen from any substance that gives off an odor, well known to those skilled in the art, for example, from essential oils and/or essences.

[0316] The at least one olfactory material can, if necessary, be introduced via at least one solvent-plasticizer.

[0317] As used herein, the term “solvent-plasticizer” is understood to mean a compound that at least partially solubilizes the olfactory material and that is capable of evaporating slowly.

[0318] The at least one solvent-plasticizer can be chosen from glycols, such as diethylene glycol, ethyl diglycol, n-propyl glycol, n-butyl glycol, methyl diglycol or n-butyl diglycol, alcohols, such as cyclohexanol, 2-ethylbutanol, 3-methoxybutanol, 2-ethylhexanol or phenoxyethanol, esters, such as glycol monoacetate, ethyl glycol acetate, n-butyl glycol acetate, ethyl diglycol acetate, n-butyl diglycol acetate, methyl abietate, isopropyl myristate, propylene glycol diacetate or propylene glycol methyl ether acetate, and glycol ethers such as dipropylene glycol methyl ether or dipropylene glycol butyl ether, alone or as a mixture.

[0319] The at least one first composition and/or the at least one flexible polymeric film can also comprise at least one adjuvant commonly used in cosmetics, and for instance in the nailcare and/or cosmetics field. For example, the at least one adjuvant can be chosen from vitamins, trace elements, softening agents, sequestering agents, basifying or acidifying agents, wetting agents, thickeners, dispersing agents, anti-foaming agents, spreading agents, co-resins, preserving agents, UV-screening agents, active agents, moisturizers, neutralizers, stabilizers, antioxidants, and mixtures thereof.

[0320] Thus, it can for instance incorporate, as active agents, hardening or strengthening agents for keratin materials, active agents that promote nail growth, such as methylysulphonylemethane, and/or active agents for treating various conditions located in the nail, for instance onychomycosis.

[0321] The at least one adjuvant can be present in an amount conventionally used in this field, for example, from 0.01% to 20% by weight, such as from 0.01% to 10% by weight, relative to the total weight of the at least one first composition or of the at least one polymeric film.

[0322] Other than in the operating examples, or where otherwise indicated, all numbers expressing quantities of ingredients, reaction conditions, and so forth used in the specification and claims are to be understood as being modified in all instances by the term “about.” Accordingly, unless indicated to the contrary, the numerical parameters set forth in the following specification and attached claims are approximations that may vary depending upon the desired properties sought to be obtained by the present disclosure. At the very least, and not as an attempt to limit the application of the doctrine of equivalents to the scope of the claims, each numerical parameter should be construed in light of the number of significant digits and ordinary rounding approaches.

[0323] Notwithstanding that the numerical ranges and parameters set forth the broad scope of the disclosure are approximations, the numerical values set forth in the specific examples are reported as precisely as possible. Any numerical value, however, inherently contain certain errors necessarily resulting from the standard deviation found in their respective testing measurements.

[0324] The following example illustrates the present disclosure in a non-limiting manner.
EXAMPLE

[0325]

Example 1: Makeup kit for nails

<table>
<thead>
<tr>
<th>Component</th>
<th>weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) First liquid composition</td>
<td></td>
</tr>
<tr>
<td>Nitrocellulose</td>
<td>10%</td>
</tr>
<tr>
<td>Plasticizer: n-ethyl-o-p-toluene sulfonamide</td>
<td>4%</td>
</tr>
<tr>
<td>(Resimpol 8 from Pass-Americana)</td>
<td></td>
</tr>
<tr>
<td>Alkyd resin</td>
<td>10%</td>
</tr>
<tr>
<td>(50/50 butyl acetate/ethyl acetate)</td>
<td>100</td>
</tr>
<tr>
<td>2) Flexible polymeric film</td>
<td></td>
</tr>
<tr>
<td>Nitrocellulose</td>
<td>10%</td>
</tr>
<tr>
<td>Plasticizer: n-ethyl-o-p-toluene sulfonamide</td>
<td>5%</td>
</tr>
<tr>
<td>(Resimpol 8 from Pass-Americana)</td>
<td></td>
</tr>
<tr>
<td>Alkyd resin</td>
<td>10%</td>
</tr>
<tr>
<td>Modified hectorite (Bentone 27V from Elements)</td>
<td>1.3%</td>
</tr>
<tr>
<td>Pigments</td>
<td>1%</td>
</tr>
<tr>
<td>(50/50 butyl acetate/ethyl acetate)</td>
<td>100</td>
</tr>
</tbody>
</table>

[0326] A layer, 600±20 microns thick, of the above flexible polymeric film composition was spread over a plate covered with Teflon® and left to dry for 7 days at ambient temperature (25±5°C). A flexible polymeric film approximately 130±50 microns thick, derived from the evaporation of the solvent phase of the composition, was obtained and was detached from the support.

[0327] A layer of the at least one first liquid composition was then applied to the nail, a few seconds were allowed to elapse, and then the flexible polymeric film, cut beforehand to the shape of the nail, was applied to the nail coated with the first composition. The excess film was cut to the size of the nail with a cutting instrument.

What is claimed is:

1. A makeup kit for nails, comprising:
   i) at least one first liquid composition;
   ii) at least one flexible polymeric film, wherein said at least one first liquid film and said at least one first liquid composition being such that, when the at least one first film is applied to the nail coated with the at least one first liquid composition, the film adheres to the nail.

2. The kit according to claim 1, wherein the at least one first liquid film is derived from the crosslinking of a crosslinkable composition and/or from the evaporation of the solvent phase of a solution or dispersion of at least one liquid polymer forming polymer.

3. The kit according to claim 1, wherein the at least one first liquid composition comprises at least one adhesive material and an organic solvent phase.

4. The kit according to claim 3, wherein the at least one adhesive material is chosen from copolymers derived from the copolymerization of vinyl monomers with polymeric entities, copolymers that have a polymeric backbone and a Tg ranging from 0°C to 45°C, and are grafted with chains that derive from acrylic and/or methacrylic monomers and have a Tg ranging from 50°C to 200°C; and polyisobutenes having a relative molar mass Mv ranging from 10,000 to 150,000.

5. The kit according to claim 1, wherein the at least one first liquid composition comprises a solvent phase and at least one film-forming polymer.

6. The kit according to claim 1, wherein the at least one polymeric film has a solids content of greater than or equal to 80% by weight.

7. The kit according to claim 6, wherein the at least one polymeric film has a solids content of greater than or equal to 85% by weight.

8. The kit according to claim 1, wherein the at least one polymeric film is derived from the thermal, photochemical and/or chemical crosslinking of a crosslinkable composition.

9. The kit according to claim 8, wherein the crosslinking composition comprises at least one reactive system comprising:
   at least one first compound (A) comprising at least two functional groups (X), and
   at least one second compound (B) comprising at least two functional groups (Y), that are reactive with respect to the functional groups (X), said at least one reactive system having an average functionality of greater than 2, wherein the functionality is defined as: (total number of functions (X) and (Y))/total number of molecules of compounds (A) and (B)).

10. The kit according to claim 8, wherein the crosslinking involves polyaddition and/or polycondensation of at least one compound comprising at least two isocyanate and/or epoxide functional groups with compounds having at least two functional groups comprising at least one labile hydrogen.

11. The kit according to claim 10, wherein the at least one compound bearing reactive functional groups of isocyanate type are chosen from isocyanates, trisocyanates and polysocyanates that are aliphatic, cycloaliphatic or aromatic, having a molecular mass of less than 10,000.

12. The kit according to claim 8, wherein the crosslinking is carried out photochemically and uses at least two types of compounds bearing, respectively, at least one unsaturated double bond, in the presence of a photo-initiator.

13. The kit according to claim 1, wherein the at least one polymeric film is derived from the evaporation of the solvent phase of a solution or dispersion of at least one film-forming polymer.

14. The kit according to claim 5, wherein the at least one film-forming polymer is chosen from (meth)acrylic acid ester and/or amide homo- and copolymers, vinyl ester or amide homo- and copolymers, celluloses, cellulose derivatives, polyurethanes, acrylic polyurethanes, polyureas, polyurea polyurethanes, polyester polyurethanes, polyether polyurethanes, polyesters, polyester-amides, fatty chain polyesters, epoxies and arylsulphonamide condensates.

15. The kit according to claim 3, wherein the solvent phase comprises at least one organic solvent chosen from:
   - short-chain esters (having from 3 to 8 carbon atoms in total);
   - ketones that are liquid at ambient temperature;
   - alcohols that are liquid at ambient temperature;
   - glycols that are liquid at ambient temperature;
propylene glycol ethers that are liquid at ambient temperature;
alddehydes that are liquid at ambient temperature;
carbonates; and
acetics.

16. The kit according to claim 5, wherein the solvent phase comprises at least one organic solvent chosen from:
short-chain esters (having from 3 to 8 carbon atoms in total);
ketones that are liquid at ambient temperature;
alkohols that are liquid at ambient temperature;
glycols that are liquid at ambient temperature;
propylene glycol ethers that are liquid at ambient temperature;
alddehydes that are liquid at ambient temperature;
carbonates; and
acetics.

17. The kit according to claim 15, wherein the at least one organic solvent is present in an amount ranging from 5% to 95% by weight, relative to the total weight of the composition.

18. The kit according to claim 17, wherein the at least one organic solvent is present in an amount ranging from 10% to 85% by weight, relative to the total weight of the composition.

19. The kit according to claim 16, wherein the at least one organic solvent is present in an amount ranging from 5% to 95% by weight, relative to the total weight of the composition.

20. The kit according to claim 19, wherein the at least one organic solvent is present in an amount ranging from 10% to 85% by weight, relative to the total weight of the composition.

21. The kit according to claim 2, wherein the at least one polymeric film is derived from the evaporation of the aqueous phase of an aqueous dispersion of particles of at least one film-forming polymer.

22. The kit according to claim 21, wherein the aqueous dispersion of particles of the at least one film-forming polymer is chosen from a latex, a pseudolatex, or a mixture thereof.

23. The kit according to claim 21, wherein the at least one film-forming polymer is chosen from polycondensates; anionic, cationic, non-ionic and amphoteric polyurethanes; polyurethane-acrylics, polyurethane-polyvinylpyrrolidones; polyester-polyurethanes; polyether-polyurethanes; polycrystalline polyurethanes; polyesters; polyurea-polyurethanes; polyesters; polyester amides; fatty chain polyesters; polyamides; epoxy ester resins; acrylic and/or vinyl polymers or copolymers; acrylic/silicone and/or nitrocellulose/ acrylic copolymers; and polymers formed from the free-radical polymerization of at least one free-radical monomer within and/or partially at the surface of pre-existing particles of at least one polymer chosen from polyurethanes, polyureas, polyesters, polyester amides and/or alcohols.

24. The kit according to claim 1, wherein at least one major organic solvent of the at least one first liquid composition can bring about a increase in mass of at least one flexible polymeric film brought into contact with it, of greater than or equal to 10%, after immersion of the film for 60 minutes in the solvent at ambient temperature (25°C).

25. The kit according to claim 24, wherein the at least one major organic solvent of the at least one first liquid composition can bring about an increase in mass of the at least one flexible polymeric film brought into contact with it, of greater than or equal to 20%, after immersion of the film for 60 minutes in the solvent at ambient temperature (25°C).

26. The kit according to claim 1, wherein the at least one first liquid composition and/or the at least one polymeric film further comprises at least one adjuvant chosen from co-resins, plasticizers, coalescence agents and spreading agents.

27. The kit according to claim 1, wherein the at least one first liquid composition and/or the at least one flexible polymeric film further comprises an effective amount of at least one dyestuff.

28. The kit according to claim 1, wherein the at least one first liquid composition and/or the at least one flexible polymeric film comprises at least one material with an optical, relief and or olfactory effect.

29. The kit according to claim 1, wherein the at least one first liquid composition is transparent.

30. The kit according to claim 1, wherein the at least one first liquid composition is free of any dyestuff and of any material with an optical and/or relief effect.

31. The kit according to claim 1, wherein the at least one flexible polymeric film is precut to the shape and to the size of the nail.

32. A makeup or care kit for nails, comprising:

i) at least one first liquid composition comprising an organic solvent phase and at least one film-forming polymer;

ii) at least one flexible polymeric film that is derived from the evaporation of the organic or aqueous solvent phase of a solution or dispersion of at least one film-forming polymer, wherein the at least one flexible polymeric film and the at least one first liquid composition being such that, when the film is applied to the nail coated with said first composition, the film adheres to the nail.

33. The kit according to claim 1, wherein the at least one polymeric film can be removed with at least one organic solvent.

34. The kit according to claim 32, wherein the at least one polymeric film can be removed with at least one organic solvent.

35. A method for making up or caring for nails, comprising:

applying to the nail at least one layer of at least one first liquid composition, and

applying to the at least one layer, at least one flexible polymeric film that can adhere to the nail via said at least one layer of first liquid composition.

36. The method according to claim 35, wherein the at least one polymeric film is applied to the at least one layer of the at least one first liquid composition after partial drying of said layer.

37. A method for making up nails, comprising applying to the nail at least one flexible polymeric film, the face of the film to contact the nail having been coated with at least one layer of at least one first liquid composition, said at least one
film and said at least one first liquid composition being such that, when the film is applied to the nail, the film adheres to the nail.

38. The method according to claim 35, wherein the at least one first liquid composition comprises at least one adhesive material and an organic solvent phase.

39. The method according to claim 37, wherein the at least one first liquid composition comprises at least one adhesive material and an organic solvent phase.

40. The method according to claim 35, wherein the at least one polymeric film is derived from the crosslinking of a crosslinkable composition and/or from the evaporation of the solvent phase of a solution or dispersion of at least one film-forming polymer.

41. The method according to claim 37, wherein the at least one polymeric film is derived from the crosslinking of a crosslinkable composition and/or from the evaporation of the solvent phase of a solution or dispersion of at least one film-forming polymer.

42. The method according to one of claim 35, wherein the at least one polymeric film is precut to the shape of the nail.

43. The method according to one of claim 37, wherein the at least one polymeric film is precut to the shape of the nail.

44. The method according to claim 35, further comprising cutting the polymeric film to the shape and the size of the nail.

45. The method according to claim 37, further comprising cutting the polymeric film to the shape and the size of the nail.

46. The method according to claim 35, wherein at least one additional layer of at least one second liquid composition comprising a film-forming polymer and an organic solvent medium is applied to the at least one polymeric film.

47. The method according to claim 37, wherein at least one additional layer of at least one second liquid composition comprising a film-forming polymer and an organic solvent medium is applied to the at least one polymeric film.

48. The kit according to claim 1, wherein the at least one first liquid composition and the at least one flexible polymeric film are packaged separately.

49. The kit according to claim 32, wherein the at least one first liquid composition and the at least one flexible polymeric film are packaged separately.