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(54) **Title:** COMPOSITION FOR SKINCARE

(57) **Abstract:** It relates to a composition for skincare, comprising in an aqueous phase: (i) at least one polyglyceryl fatty acid ester; (ii) at least one hydrophobically associative water-soluble polymer; and (iii) at least one hydrophilic cosmetic active ingredient. It also relates to a non-therapeutic method for caring for the skin, comprising applying said composition to the skin.

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COMPOSITION FOR SKINCARE

TECHNICAL FIELD

The present invention relates to a composition. In particular, the present invention relates to a composition for skincare. The present invention also relates to a non-therapeutic method for caring for the skin.

BACKGROUND ART

The skin is the protective barrier for the human body. It protects the interior of the body from physical injury (such as trauma) and biological injury (such as bacteria, viruses or fungi). The skin of the human body comprises the dermis and the epidermis. The epidermis is the topmost layer of the skin, and its superficial layer is called the stratum corneum.

The development of formulations dedicated to caring for and/or making up the skin and/or lips, is permanent. To date, some prior art documents relating to compositions comprising cosmetic active ingredients have been published.

For compositions containing cosmetic active ingredients, penetration of the active ingredients to the stratum corneum is one of the most important properties. In order to take advantage of these active ingredients, it is preferable to obtain the compositions that will make it possible to result in better bioavailability of this type of active ingredient in the skin after application of said compositions.

However, it is difficult for the active ingredient contained to penetrate into the keratin materials for many cosmetic compositions.

For example, some hydrophilic active ingredients (eg. hydroxypropyl tetrahydropyrantriol) need to penetrate into dermis, at least epidermis to really perform their biological efficacy. However, the hydrophilic active ingredients are not easy to penetrate through highly-hydrophobic stratum corneum layer.

Among commercial products, tissue masks can provide relatively occlusive condition to afford high efficiency hydration. But normal leave-on (non-tissue mask) cannot provide the occlusive condition.

Thus, there is a need to provide a cosmetic product, which enables an effective penetration of a hydrophilic active ingredient therein into the stratum corneum.

SUMMARY OF THE INVENTION

The inventors have now discovered that it is possible to formulate such compositions, which enables an effective penetration of a hydrophilic active ingredient therein into the stratum corneum.

Accordingly, in a first aspect, the present invention provides a composition for skincare, comprising in an aqueous phase:

(i) at least one polyglyceryl fatty acid ester;

(ii) at least one hydrophobically associative water-soluble polymer; and

(iii) at least one hydrophilic cosmetic active ingredient.

The composition of the present invention can be in the form of an emulsion or a liquid, for example, a toner or a serum.

In a second aspect, the present invention provides a non-therapeutic method for caring for the skin, comprising applying the composition according to the first aspect of the present invention to the skin.

It was found that the hydrophilic cosmetic active ingredient contained in the composition according to the present invention can easily penetrate through the stratum corneum and into epidermis and demis, and the bioavailability of the hydrophilic cosmetic active ingredient is improved.

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

BRIEF DESCRIPTION OF THE DRAWINGS

Implementations of the present invention will now be described, by way of example only, with reference to the attached figures, wherein:

Fig. 1 shows the penetration profile of hydroxypropyl tetrahydropyrantriol at different time after application composition of invention example 1 on a pigskin, wherein A: 30 minutes; B: 4 hours; C: 8 hours; D: 16 hours.

Fig. 2 shows the penetration profile of hydroxypropyl tetrahydropyrantriol at different time after application composition of comparative example 2 on a pigskin, wherein A: 30 minutes; B: 4 hours; C: 8 hours; D: 16 hours.

Fig. 3 shows the penetration profile of hydroxypropyl tetrahydropyrantriol at 4 hours after application compositions of invention examples 1-4 on a pigskin, wherein A: invention example 1; B: invention example 2; C: invention example 3; D: invention example 4.

Fig. 4 shows the penetration profile of hydroxypropyl tetrahydropyrantriol at 4 hours after application compositions of comparative examples 1-3 on a pigskin, wherein A: comparative example 1; B: comparative example 2; C: comparative example 3.

DETAILED DESCRIPTION OF THE INVENTION

Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by those skilled in the art the present invention belongs to. When the definition of a term in the present description conflicts with the meaning as commonly understood by those skilled in the art the present invention belongs to, the definition described herein shall apply.

In that which follows and unless otherwise indicated, the limits of a range of values are included within this range, in particular in the expressions "between...and..." and "ranging from ... to ...".

Moreover, the expression "at least one" used in the present description is equivalent to the expression "one or more".

Throughout the instant application, the term “comprising” is to be interpreted as encompassing all specifically mentioned features as well as optional, additional, unspecified ones. As used herein, the use of the term “comprising” also discloses the embodiment wherein no features other than the specifically mentioned features are present (*i.e.* “consisting of”).

Unless otherwise specified, all numerical values expressing amount of ingredients and the like which are used in the description and claims are to be understood as being modified by the term “about”. Accordingly, unless indicated to the contrary, the numerical values and parameters described herein are approximate values which are capable of being changed according to the desired purpose as required.

For the purposes of the present application, the term "bioavailability" is intended to mean the molecular penetration of the active agent concerned into the skin and in particular into the stratum corneum.

All percentages in the present invention refer to weight percentage, unless otherwise specified.

According to the first aspect, the present invention provides a composition for skincare, comprising in an aqueous phase:

(i) at least one polyglyceryl fatty acid ester;

(ii) at least one hydrophobically associative water-soluble polymers; and

(iii) at least one hydrophilic cosmetic active ingredient.

Polyglyceryl fatty acid ester

According to the first aspect, the composition of the present invention comprises at least one polyglyceryl fatty acid ester.

It is preferable that the polyglyceryl fatty acid ester has a polyglycerol moiety derived from 2 to 10 glycerols, more preferably from 4 to 8 glycerols, and even more preferably 5 or 6 glycerols. In other words, it is preferable that the polyglyceryl fatty acid ester comprise from 2 to 10 polyglyceryl units, more preferably 4 to 8 polyglyceryl units, and even more preferably 5 or 6 polyglyceryl units.

The polyglyceryl fatty acid ester may be chosen from monoesters, diesters and triesters of a linear or branched, saturated or unsaturated fatty acid, preferably saturated fatty acid, including from 2 to 30 carbon atoms, preferably from 4 to 30 carbon atoms, and more preferably from 6 to 30 carbon atoms, such as lauric acid, oleic acid, stearic acid, isostearic acid, capric acid, caprylic acid, and myristic acid.

The polyglyceryl fatty acid ester may be selected from the group consisting of PG2 caprylate, PG2 sesquicaprylate, PG2 dicaprylate, PG2 tricaprylate, PG2 caprate, PG2 sesquicaprate, PG2 dicaprate, PG2 tricaprate, PG2 laurate, PG2 sesquilaurate, PG2 dilaurate, PG2 trilaurate, PG2 myristate, PG2 sesquimyristate, PG2 dimyristate, PG2 trimyristate, PG2 stearate, PG2 sesquistearate, PG2 distearate, PG2 tristearate, PG2 isostearate, PG2 sesquiisostearate, PG2 diisostearate, PG2 triisostearate, PG2 oleate, PG2 sesquioleate, PG2 dioleate, PG2 trioleate, PG3 caprylate, PG3 sesquicaprylate, PG3 dicaprylate, PG3 tricaprylate, PG3 caprate, PG3 sesquicaprate, PG3 dicaprate, PG3 tricaprate, PG3 laurate, PG3 sesquilaurate, PG3 dilaurate, PG3 trilaurate, PG3 myristate, PG3 sesquimyristate, PG3 dimyristate, PG3 trimyristate, PG3 stearate, PG3 sesquistearate, PG3 distearate, PG3 tristearate, PG3 isostearate, PG3 sesquiisostearate, PG3 diisostearate, PG3 triisostearate, PG3 oleate, PG3 sesquioleate, PG3 dioleate, PG3 trioleate, PG4 caprylate, PG4 sesquicaprylate, PG4 dicaprylate, PG4 tricaprylate, PG4 caprate, PG4 sesquicaprate, PG4 dicaprate, PG4 tricaprate, PG4 laurate, PG4 sesquilaurate, PG4 dilaurate, PG4 trilaurate, PG4 myristate, PG4 sesquimyristate, PG4 dimyristate, PG4 trimyristate, PG4 stearate, PG4 sesquistearate, PG4 distearate, PG4 tristearate, PG4 isostearate, PG4 sesquiisostearate, PG4 diisostearate, PG4 triisostearate, PG4 oleate, PG4 sesquioleate, PG4 dioleate, PG4 trioleate, PG5 caprylate, PG5 sesquicaprylate, PG5 dicaprylate, PG5 tricaprylate, PG5 tetracaprylate, PG5 caprate, PG5 sesquicaprate, PG5 dicaprate, PG5 tricaprate, PG5 tetracaprate, PG5 laurate, PG5 sesquilaurate, PG5 dilaurate, PG5 trilaurate, PG5 tetralaurate, PG5 myristate, PG5 sesquimyristate, PG5 dimyristate, PG5 trimyristate, PG5 tetramyristate, PG5 stearate, PG5 sesquistearate, PG5 distearate, PG5 tristearate, PG5 tetrastearate, PG5 isostearate, PG5 sesquiisostearate, PG5 diisostearate, PG5 triisostearate, PG5 tetraisostearate, PG5 oleate, PG5 sesquioleate, PG5 dioleate, PG5 trioleate, PG5 tetraoleate, PG6 caprylate, PG6 sesquicaprylate, PG6 dicaprylate, PG6 tricaprylate, PG6 tetracaprylate, PG6 pentacaprylate, PG6 caprate, PG6

sesquicaprate, PG6 dicaprate, PG6 tricaprate, PG6 tetracaprate, PG6 pentacaprate, PG6 laurate, PG6 sesquilaurate, PG6 dilaurate, PG6 trilaurate, PG6 tetralaurate, PG6 pentalaurate, PG6 myristate, PG6 sesquimyristate, PG6 dimyristate, PG6 trimyristate, PG6 tetramyristate, PG6 pentamyristate, PG6 stearate, PG6 sesquistearate, PG6 distearate, PG6 tristearate, PG6 tetrastearate, PG6 pentastearate, PG6 isostearate, PG6 sesquiisostearate, PG6 diisostearate, PG6 triisostearate, PG6 tetraisostearate, PG6 pentaisostearate, PG6 oleate, PG6 sesquioleate, PG6 dioleate, PG6 trioleate, PG6 tetraoleate, PG6 pentaoleate, PG6 dicaprate, PG6 dioleate, PG6 caprylate, PG7 dicaprate, PG7 dioleate, PG7 caprylate, PG8 dicaprate, PG8 dioleate, PG8 caprylate, PG9 dicaprate, PG9 dioleate, PG9 caprylate, PG10 dicaprate, PG10 dioleate, PG10 caprylate, and mixtures thereof.

It is preferable that the polyglyceryl fatty acid ester be chosen from: polyglyceryl mono- or di-caprate comprising from 2 to 10 glycerol units; polyglyceryl mono- or di-oleate comprising from 2 to 10 glycerol units; polyglyceryl mono- or di-caprylate comprising from 2 to 10 glycerol units, and a combination thereof.

It is more preferable that the polyglyceryl fatty acid ester be selected from polyglyceryl-6 dicaprate (PG6 dicaprate), polyglyceryl-6 dioleate (PG6 dioleate), polyglyceryl-6 caprylate (PG6 caprylate), polyglyceryl-2 oleate (PG2 oleate), and a combination thereof.

As PG6 dicaprate, for example, SunSoft Q-102H-C marketed by Taiyo Kagaku Co., Ltd. may be used. As PG6 dioleate, SunSoft Q-172H-C marketed by Taiyo Kagaku Co. Ltd. may be used. As PG6 caprylate, SunSoft Q-8H-C marketed by Taiyo Kagaku Co. Ltd. may be used.

Advantageously, the polyglyceryl fatty acid ester is present in an amount ranging from 0.5 wt.% to 10 wt.%, preferably from 1 wt.% to 5 wt.%, more preferably from 1.5 wt.% to 4 wt.%, relative to the total weight of the composition.

Hydrophobically associative water-soluble polymers

According to the first aspect, the composition of the present invention comprises at least one hydrophobically associative water-soluble polymer.

As used herein, hydrophobically associative water-soluble polymer means any amphiphilic polymer having in its structure at least one fatty chain as hydrophobic end and a least one hydrophilic portion as blockbone.

Preferably, the hydrophobically associative water-soluble polymer is selected from nonionic associative polyether-polyurethanes, polyacrylate crosspolymers, and a combination thereof.

- Nonionic associative polyether-polyurethanes:

said polymers may contain in their chain both hydrophilic sequences most often of a polyoxyethylenated nature and hydrophobic sequences which may be aliphatic linkages alone and/or cycloaliphatic and/or aromatic linkages.

Preferably, these polyether-polyurethanes comprise at least two lipophilic hydrocarbon chains having from 6 to 30 carbon atoms, preferably from 8 to 30, separated by a hydrophilic sequence. It is possible for the hydrocarbon chains to be pendent chains or chains at the end of a hydrophilic sequence. In particular, it is possible for one or more pendent chains to be envisaged. In addition, the polymer may comprise a hydrocarbon chain at one end or at both ends of a hydrophilic sequence.

The polyether-polyurethanes may be polyblocks, in particular in triblock form. The hydrophobic sequences may be at each end of the chain (for example: triblock copolymer with hydrophilic central sequence) or distributed both at the ends and in the chain (polyblock copolymers for example). These same polymers may also be in the form of graft units or may be star-shaped.

The polyether-polyurethane can increase viscosity or consistency of the composition according to the present invention. Thus, after application of the composition according to the present invention, it can recover the original elasticity of the composition quickly.

The polyether-polyurethanes containing a fatty chain may be triblock copolymers whose hydrophilic sequence is a polyoxyethylenated chain comprising from 50 to 1000 oxyethylenated groups.

The polyether-polyurethanes comprise a urethane bond between the hydrophilic sequences, hence the origin of the name.

By extension, those whose hydrophilic sequences are linked by other chemical bonds to the hydrophobic sequences are also included among the nonionic polyether-polyurethanes containing a hydrophobic chain.

By way of examples of nonionic polyether-polyurethanes containing a hydrophobic chain which can be used in the present invention, it is also possible to use Rheolate® 205 containing a urea functional group sold by the company RHEOX or the Rheolates® 208, 204 or 212, as well as Acrysol® 1840.

There may also be mentioned the product ELFACOS T210® containing a C_{12}-C_{14} alkyl chain and the product ELFACOS T212® containing a C_{18} alkyl chain from AKZO.

The product DW 1206B® from ROHM & HAAS containing a C_{20} alkyl chain and with a urethane bond, sold at 20% dry matter content in water, may also be used.

It is also possible to use solutions or dispersions of these polymers in particular in water or in an aqueous-alcoholic medium. By way of examples of such polymers, there may be mentioned Rheolate® 255, Rheolate® 278 and Rheolate® 244 sold by the company RHEOX. It is also possible to use the product DW 1206F and DW 1206J provided by the company ROHM & HAAS.

The above-described polyether-polyurethanes which can be used can also be chosen from those described in the article by G Fonnum, J. Bakke and Fk. Hansen-Colloid Polym. Sci 271, 380-389 (1993).

As the above-described polyether-polyurethanes, mention may be made of polyether-polyurethanes comprising in their chain at least one polyoxyethylenated hydrophilic block and at least one of hydrophobic blocks containing at least one sequence chosen from aliphatic sequences, cycloaliphatic sequences, and aromatic sequences.

It may be preferable that the polyether-polyurethanes comprise at least two hydrocarbon-based lipophilic chains having from 8 to 30 carbon atoms, separated by a hydrophilic block, and wherein the hydrocarbon-based chains are chosen from pendent chains and chains at the end of the hydrophilic block.

According to a specific form of the present invention, use will be made of a polyether-polyurethane that may be obtained by polycondensation of at least three compounds comprising (i) at least one polyethylene glycol comprising from 150 to 180 mol of ethylene oxide, (ii) a polyoxyethylenated stearyl alcohol comprising 100 mol of ethylene oxide, and (iii) a diisocyanate.

Such polyurethane/polyethers are sold especially by the company Elementis under the name Rheolate FX 1100® and Rheoluxe 8118, which is a polycondensate of polyethylene glycol containing 136 mol of ethylene oxide, of stearyl alcohol polyoxyethylenated with 100 mol of ethylene oxide and of hexamethylene diisocyanate (HDI) with a weight-average molecular weight of 40000 (INCI name: PEG-136/Steareth-100/HDI Copolymer).

According to another specific form of the present invention, use will be made of a polyether-polyurethane that may be obtained by polycondensation of at least three compounds comprising (i) at least one polyethylene glycol comprising from 150 to 180 mol of ethylene oxide, (ii) stearyl alcohol or decyl alcohol, and (iii) at least one diisocyanate.

Such polyurethane/polyethers are sold in particular by the company Rohm & Haas under the names Aculyn 46® and Aculyn 44®.

Aculyn 46® having the INCI name: PEG-150/Stearyl Alcohol/SMDI Copolymer, is a polycondensate of polyethylene glycol comprising 150 or 180 mol of ethylene oxide, of

stearyl alcohol and of methylenebis(4-cyclohexyl isocyanate) (SMDI) at 15% by weight in a matrix of maltodextrin (4%) and water (81%) (INCI name: PEG-150/Stearyl Alcohol/SMDI Copolymer).

Aculyn 44® (PEG-150/Decyl Alcohol/SMDI Copolymer) is a polycondensate of polyethylene glycol comprising 150 or 180 mol of ethylene oxide, of decyl alcohol and of methylenebis(4-cyclohexyl isocyanate) (SMDI) at 35% by weight in a mixture of propylene glycol (39%) and water (26%) (INCI name: PEG-150/Decyl Alcohol/SMDI Copolymer).

As the associative polyurethanes, it may be preferable to use a compound represented by the following formula (1):

$$R^1—\{(O—R^2)_k—OCONH—R^3[—NHCOO—(R^4—O)_n—R^5]_h\}_m \qquad (1)$$

wherein R^1 represents a hydrocarbon group, R^2 and R^4 independently represent alkylene groups having 2 to 4 carbon atoms, which alkylene groups may be identical or different from each other, or a phenylethylene group, R^3 represents a hydrocarbon group, which may optionally have a urethane bond, R^5 represents a branched chain or secondary hydrocarbon group, m represents a number of at least 2, h represents a number of at least l, k represents a number within the range of 1 to 500, and n represents a number within the range of 1 to 200.

The hydrophobically modified polyurethane that is represented by the general formula (1) shown above is obtained by, for example, reacting at least one polyether polyol that is represented by the formula $R^1—[(O—R^2)_k—OH]_m$, at least one polyisocyanate that is represented by the formula $R^3—(NCO)_{h+1}$, and at least one polymonoalcohol that is represented by the formula $HO—(R^4—O)_n—R^5$.

In such cases, R^1 to R^5 in the general formula (1) are determined by the compounds $R^1—[(O—R^2)_k—OH]_m$, $R^3—(NCO)_{h+1}$ and $HO—(R^4—O)_n—R^5$. The loading ratios among the three compounds are not limited particularly and should preferably be such that the ratio of the isocyanate group derived from the polyisocyanate to the hydroxyl group derived from the polyether polyol and the polyether monoalcohol is selected within the range of NCO/OH of between 0.8:1 and 1.4:1.

The polyether polyol compound that is represented by the formula $R^1—[(O—R^2)_k—OH]_m$ and that may be used preferably for obtaining the associative thickener represented by the general formula (1) may be obtained from addition polymerization of an m-hydric polyol with an alkylene oxide, such as ethylene oxide, propylene oxide, butylene oxide, or epichlorohydrin, or with styrene oxide, and the like.

The polyols should preferably be di- to octa-hydric polyols. Examples of the di- to octa-hydric polyols include dihydric alcohols, such as ethylene glycol, propylene glycol,

butylene glycol, hexamethylene glycol, and neopenthyl glycol; trihydric alcohols, such as glycerol, trioxyisobutane, 1,2,3-butanetriol, 1,2,3-pentanetriol, 2-methyl-1,2,3-propanetriol, 2-methyl-2,3,4-butanetriol, 2-ethyl-1,2,3-butanetriol, 2,3,4-pentanetriol, 2,3,4-hexanetriol, 4-propyl-3,4,5-heptanetriol, 2,4-dimethyl-2,3,4-pentanetriol, pentamethylglycerol, pentaglycerol, 1,2,4-butanetriol, 1,2,4-pentanetriol, trimethylolethane, and trimethylolpropane; tetrahydric alcohols, such as pentaerythritol, 1,2,3,4-pentanetetrol, 2,3,4,5-hexanetetrol, 1,2,4,5-pentanetetrol, and 1,3,4,5-hexanetetrol; pentahydric alcohols, such as adonitol, arabitol, and xylitol; hexahydric alcohols, such as dipentaerythritol, sorbitol, mannitol, and iditol; and octahydric alcohols, such as sucrose.

Also, R^2 is determined by the alkylene oxide, styrene oxide, or the like, which is subjected to the addition. Particularly, for availability and excellent effects, an alkylene oxide having 2 to 4 carbon atoms, or styrene oxide is preferable.

The alkylene oxide, styrene oxide, or the like, to be subjected to the addition may be subjected to single polymerization, or random polymerization or block polymerization of at least two members. The procedure for the addition may be a conventional procedure. Also, the polymerization degree k may be selected within the range of 0 to 1,000, preferably within the range of 1 to 500, and more preferably within the range of 10 to 200. Further, the ratio of the ethylene group occupying R^2 should preferably be within the range of 50 to 100 mass % with respect to the total quantity of R^2. In such cases, the associative thickener appropriate for the purposes of the present invention is obtained.

Furthermore, the molecular weight of the polyether polyol compound that is represented by the formula $R^1—[(O—R^2)_k—OH]_m$ should preferably be selected within the range of 500 to 100,000, and should more preferably be selected within the range of 1,000 to 50,000.

The polyisocyanate that is represented by the formula $R^3—(NCO)_{h+1}$ and that may be used preferably for obtaining the hydrophobically modified polyether urethane represented by the general formula (1) employed in accordance with the present invention is not limited particularly in so far as the polyisocyanate has at least two isocyanate groups in the molecule. Examples of the polyisocyanates include aliphatic diisocyanates, aromatic diisocyanates, alicyclic diisocyanates, biphenyl diisocyanate, phenylmethane diisocyanate, phenylmethane triisocyanate, and phenylmethane tetraisocyanate.

Also, it is possible to employ dimers and trimers (isocyanurate bonds) of the above-enumerated polyisocyanates. Further, it is possible to employ biuret obtained by a reaction with an amine.

Furthermore, it is possible to employ a polyisocyanate having a urethane bond obtained by a reaction of the aforesaid polyisocyanate compound and a polyol. As the polyol, di- to octa-hydric polyols are preferable, and the above-enumerated polyols are preferable. In cases where a tri- or higher-hydric polyisocyanate is used as the polyisocyanate that is represented by the formula $R^3—(NCO)_{n+1}$, it is preferable to employ the aforesaid polyisocyanate having the urethane bond.

The polyether monoalcohol that is represented by the formula $HO—(R^4—O)_n—R^5$ and that may be used preferably for obtaining the hydrophobically modified polyether urethane represented by the general formula (1) employed in accordance with the present invention is not limited particularly in so far as the polyether monoalcohol is a polyether of a straight chain, branched chain, or secondary monohydric alcohol. The polyether monoalcohol may be obtained by addition polymerization of the straight chain, branched chain, or secondary monohydric alcohol with an alkylene oxide, such as ethylene oxide, propylene oxide, butylene oxide, or epichlorohydrin, or with styrene oxide, and the like.

As the compound represented by the general formula (1), polyethyleneglycol-240/decyltetradeceth-20/hexamethylene diisocyanate copolymer is preferable. The polyethyleneglycol-240/decyltetradeceth-20/hexamethylene diisocyanate copolymer is referred to also as PEG-240/HDI copolymer bis-decyltetradeceth-20 ether.

According to the present invention, it is preferable that the polyether-polyurethane be selected from Steareth-100/PEG-136/HDI Copolymer sold by the company Rheox under the name of Rheolate FX 1100, PEG-240/HDI Copolymer Bis-decyltetradeceth-20 ether sold by the company Asahi Denka under the name of Adekanol GT-700, and a combination thereof.

- Polyacrylate crosspolymers

The term “polycrylates crosspolymer” as used in the present application refers to a copolymer of acrylic acid, methacrylic acid or one of its esters, crosslinked with glycol dimethacrylate.

The following is a non-limiting list of polyacrylates crosspolymers, which can be used in the composition of the present invention.

Polyacrylate Crosspolymer-1 is a copolymer of one or more simple esters of acrylic or methacrylic acid, C_{1-4} dialkylamino C_{1-6} alkyl methacrylate, PEG/PPG-30/5 allyl ether, PEG 20-25 C_{10-30} alkyl ether methacrylate, hydroxy C_{2-6} alkyl methacrylate crosslinked with ethylene glycol dimethacrylate. This copolymer is commercially available under the tradename Carbopol Aqua CC Polymer from Lubrizol Advanced Materials, Inc. (Cleveland, Ohio).

Polyacrylate Crosspolymer-2 is a copolymer of PEG/PPG-23/6 Dimethicone citraconate, C_{10-30} alkyl PEG-25 methacrylate, and one or more monomers of acrylic acid, methacrylic acid or one of their simple esters, crosslinked with trimethylolpropane PEG-15 triacrylate. This copolymer is commercially available under the tradename Fixate Superhold Polymer from Lubrizol Advanced Materials, Inc. (Cleveland, Ohio).

Polyacrylate Crosspolymer-3 is a copolymer of butyl acrylate, PEG-10 acrylate, PPG-6 acrylate and dimethylacrylamide, crosslinked by PEG-23 Diacrylate. This copolymer is commercially available under the tradename Plascize L-64S from Goo Chemical Company, Ltd. (Kyoto, Japan).

Polyacrylate Crosspolymer-4 is a copolymer of sodium acryloyldimethyltaurate, dimethyl acrylamide, sodium acrylate, acrylic acid and hydroxyethylacrylate crosslinked with methylene bis-propenamide. This copolymer is commercially available under the tradename Sepinov P500 from Seppic (Paris, France).

Polyacrylate Crosspolymer-5 is commercially available under the tradename COSP23 from Miyoshi Kasei, Inc. (Urawa, Japan).

Polyacrylate Crosspolymer-6 is a copolymer of ammonium acryloyldimethyl-taurate, dimethylacrylamide, lauryl methacrylate and laureth-4 methacrylate, crosslinked with trimethylolpropane triacrylate. This copolymer is commercially available under the tradename Sepimax Zen from Seppic Affaires Reglementaires (Puteux, France).

Polyacrylate Crosspolymer-7 is a copolymer of methacrylate PPG-6 phosphate and one or more monomers of acrylic acid, methacrylic acid or one of their simple esters, crosslinked with dimethicone PEG/PPG-25/29 acrylate. This copolymer is commercially available under the tradename Y-17552 from Momentive Performance Materials (Friendly, W. Va.).

Polyacrylate Crosspolymer-8 is a copolymer of t-butyl methacrylate, stearyl methacrylate, methoxy PEG-23 methacrylate, and dimethylacrylamide, crosslinked with ethylene glycol dimethacrylate.

Polyacrylate Crosspolymer-9 is a copolymer of t-butylaminoethyl methacrylate and carboxyethyl acrylate, crosslinked with a combination of pentaerythritol tetraacrylate and a hexafunctional acrylate formed by reacting pentaerythritol triacrylate with toluene diisocyanate.

Polyacrylate Crosspolymer-10 is the crosslinked polymer prepared by polymerizing a mixture of trimethoxysilylpropylmethacrylate with trimethyloylpropane trimethacrylate.

Polyacrylate Crosspolymer-11 is a polymer of methacrylic acid, acryloyl dimethyltaurate and dimethylacrylamide, crosslinked with PPG-3 glyceryl triacrylate, and

partially neutralized with ammonia. This copolymer is commercially available under the tradename Aristoflex Velvet from Clariant International Ltd. (Muttenz, Switzerland).

Polyacrylate Crosspolymer-12 is a copolymer of t-butyl methacrylate, stearyl methacrylate, methoxy PEG-23 methacrylate, and dimethylacrylamide, crosslinked with methylene bis-acrylamide.

Polyacrylate Crosspolymer-14 is a copolymer of acrylic acid, lauryl methacrylate, cetyl methacrylate, stearyl methacrylate, and phosphorylcholine glycol methacrylate, crosslinked by an allyl ether of pentaerythritol. This copolymer is commercially available under the tradename Phosphomer ST610KC from KCl Ltd. (Seoul, South Korea).

According to some embodiments, the composition according to the present invention comprises a polyacrylate crosspolymer selected from polyacrylate crosspolymer-1, polyacrylate crosspolymer-2, polyacrylate crosspolymer-3, polyacrylate crosspolymer-4, polyacrylate crosspolymer-5, polyacrylate crosspolymer-6, polyacrylate crosspolymer-7, polyacrylate crosspolymer-8, polyacrylate crosspolymer-9, polyacrylate crosspolymer-10, polyacrylate crosspolymer-11, polyacrylate crosspolymer-12, polyacrylate crosspolymer-14, and a combination thereof.

Preferably, the composition according to the present invention comprises one or more selected from polyacrylate crosspolymer-1, polyacrylate crosspolymer-6, polyacrylate crosspolymer-9, and polyacrylate crosspolymer-11.

Advantageously, the hydrophobically associative water-soluble polymer is present in an amount ranging from 0.1 wt.% to 2 wt.%, preferably from 0.1 wt.% to 1 wt.%, more preferably from 0.3 wt.% to 0.8 wt.%, relative to the total weight of the composition.

Hydrophilic cosmetic active ingredients

According to the first aspect, the composition of the present invention comprises at least one hydrophilic cosmetic active ingredient.

For the purpose of the present invention, the term “hydrophilic cosmetic active ingredient” means cosmetic active ingredient soluble or disperable in the hydrophilic phase defined above.

As examples of hydrophilic cosmetic active ingredient, mention can be made of:

-terephthalylidene dicamphor sulfonic acid (Ecamsule), phenylbenzimidazole sulfonic acid (Ensulizole), Benzophenone-4, aminobenzoic acid (PABA), camphor benzalkonium methosulfate, methylene bis-benzotriazolyl tetramethylbutylphenol (Bisoctrizole), disodium phenyl dibenzimidazole tetrasulfonate (Bisdisulizole disodium), tris-biphenyl triazine; their derivatives and corresponding salts; naphthaline bisimide

derivatives, and cinnamido amine cationic quaternary salts and derivatives, and a combination thereof;

-hydroxypropyl tetrahydropyrantriol, flavones, stilbenoids, tannins, phenolic acids, polyphenolics, vitamins, xanthines, ceramides, cholesterols, sphingosines, C-glycosides, zwitterionic N-substituted amino sulfonic acid buffers, sugars, nucleic acids, a- and β-hydroxy acids, aminopropyl triethoxysilane, dihydroxyacetone, botanical extracts, amino acids, and peptides, their derivatives, and a combination thereof; and

-ascorbic acid and its biologically compatible salts, enzymes, antibiotics, components having a tautening effect, α-hydroxy acids and their salts, hydroxylated polyacids, sucroses and their derivatives, urea, amino acids, oligopeptides, carnosine, acetyl tetrapeptide-9, palmitoyl tripeptide-1, water-soluble plant and yeast extracts, protein hydrolysates, hyaluronic acid, mucopolysaccharides, vitamins B_2, B_3 (niacinamide), B_6, H and PP, panthenol, folic acid, acetylsalicylic acid, allantoin, glycyrrhetic acid, kojic acid and hydroquinone.

Preferably, the hydrophilic cosmetic active ingredient is hydroxypropyl tetrahydropyrantriol.

Advantageously, the hydrophilic cosmetic active ingredient is present in an amount ranging from 0.1 wt.% to 30 wt.%, preferably from 0.5 wt.% to 15 wt.%, more preferably from 1 wt.% to 10 wt.%, relative to the total weight of the composition.

Aqueous phase

The composition of the present invention comprises an hydrous phase.

Said aqueous phase comprises water.

Preferably, the aqueous phase comprises an additional organic solvent miscible with water (at room temperature 25°C) such as glycol and polyols having from 2 to 20 carbon atoms, preferably from 2 to 10 carbon atoms, and preferentially having from 2 to 6 carbon atoms, such as glycerin, propylene glycol, butylene glycol, pentylene glycol, hexylene glycol, caprylyl glycol, dipropylene glycol, diethylene glycol; and mixtures thereof, so as to provide a hydration effect.

Advantageously, said aqueous phase is present in an amount ranging from 50 wt.% to 95 wt.%, preferably from 55 wt.% to 90 wt.%, and even more preferably from 60 wt.% to 90 wt.%, relative to the total weight of the composition.

The inventors have found that hydrophobically associative water-soluble polymer that contains hydrophobic chain end interact with polyglyceryl fatty acid ester to form florets region. And at same time, the hydrophilic polymer backbone forms the main

fibrous structure to trap florets and hydrophilic active ingredients inside. The formed reservoir-type matrix has good tolerance to salt and shape-memory property. Hence, after applying on skin surface, the relatively occlusive condition can be achieved to hydrate stratum corneum so that more hydrous routes are available for hydrophilic active ingredients (eg. hydroxypropyl tetrahydropyrantriol) penetration. And the formed matrix also provides concentration gradient to drive diffusion.

Additional cosmetic active ingredients

Depend on the final purpose, the composition according to the present invention can comprises one or more additional cosmetic active ingredients.

It is easy for the skilled in the art to adjust the amount of the additional cosmetic active ingredient based on the final use of the composition according to the present invention.

Additional adjuvants or additives

The composition of the present invention may comprise conventional cosmetic adjuvants or additives, for instance fragrances, chelating agents (for example, disodium EDTA), preserving agents (for example, chlorphenesin and phenoxyethanol) and bactericides (for example, hydroxyacetophenone), surfactants, other thickeners, fillers, pH regulators (for example citric acid, sodium hydroxide, potassium hydroxide), and mixtures thereof.

The skilled in the art can select the amount of the additional adjuvants or additive so as not to adversely impact the final use of the composition according to the present invention.

According to a particularly preferred embodiment, the present invention provides a composition for skincare, comprising in an aqueous phase, relative to the total weight of the composition:

(i) from 1.5 wt.% to 4 wt.% of at least one polyglyceryl fatty acid ester selected polyglyceryl-6 dicaprate, polyglyceryl-6 dioleate, polyglyceryl-6 caprylate, polyglyceryl-2 oleate, and mixtures thereof;

(ii) from 0.3 wt.% to 0.8 wt.% of at least one Hydrophobically associative water-soluble polymer selected from Steareth-100/PEG-136/HDI Copolymer, PEG-240/HDI Copolymer Bis-decyltetradeceth-20 ether, polyacrylate crosspolymer-1, polyacrylate crosspolymer-6, polyacrylate crosspolymer-9, polyacrylate crosspolymer-11, and combination thereof; and

(iii) from 1 wt.% to 10 wt.% of hydrophilic cosmetic active ingredient.

According to some embodiments, the composition according to the present invention is oil-free.

For the purposes of the present invention, the term “oil-free” mean that the composition comprises a single liquid phase which is an aqueous phase (a liquid phase including water).

According to some embodiments, the composition according to the present invention does not comprise a cationic surfactant.

Method and use

The composition of the present invention can be used for caring for the skin.

Thus, according to the second aspect, the present invention provides a non-therapeutic method for caring for the skin, comprising applying the composition according to the first aspect of the present invention to the skin.

The following examples serve to illustrate the present invention without, however, being limiting in nature.

EXAMPLES

Main raw materials used, trade names and supplier thereof are listed in Table 1.

Table 1

INCI Name	Trade Name	Supplier
POLYGLYCERYL-6 DIOLEATE	SUNSOFT Q-172H-C	TAIYO KAGAKU
TRIDECETH-6	AVALURE FLEX-6 CC POLYMER	LUBRIZOL
PEG-240/HDI COPOLYMER BIS-DECYLTETRADECETH-20 ETHER	ADEKANOL GT-730	ADEKA
POLYACRYLATE CROSSPOLYMER-6	SEPIMAX ZEN	SEPPIC
HYDROXYPROPYL TETRAHYDROPYRANTRIOL	MEXORYL SCN	CHIMEX (NOVEAL)
ACRYLATES/C10-30 ALKYL ACRYLATE CROSSPOLYMER	PEMULEN TR-2 POLYMER	LUBRIZOL
CARBOMER	CARBOPOL 980 POLYMER	LUBRIZOL
GLYCERYL CAPRYLATE	DERMOSOFT GMCY	DR STRAETMANS (EVONIK)

Invention Examples 1-4 and Comparative Examples 1-3

Compositions according to invention examples (IE.) 1-4 and comparative examples (CE.) 1-3 were prepared according to the contents given in Table 2 (the contents are expressed as weight percentages of active material relative to the total weight of each composition, unless otherwise indicated).

Table 2

Components	IE. 1	IE. 2	IE. 3	IE. 4	CE. 1	CE. 2	CE. 3
	Wt.%	Wt.%	Wt.%	Wt.%	Wt.%	Wt.%	Wt.%
POLYGLYCERYL-6 DIOLEATE	2	2	2	2	2	-	-
HYDROXYPROPYL TETRAHYDROPYRANTRIOL	9	9	9	9	9	9	9
TRIDECETH-6	0.07	-	-	0.07	-	-	0.07
PEG-240/HDI COPOLYMER BIS-DECYLTETRADECETH-20 ETHER	0.63	0.7	-	0.63	-	-	0.63
POLYACRYLATE CROSSPOLYMER-6	-	-	0.7	0.3	-	-	0.3
ACRYLATES/C10-30 ALKYL ACRYLATE CROSSPOLYMER	-	-	-	-	0.7	-	-
CARBOMER	-	-	-	-	-	0.7	-
GLYCERYL CAPRYLATE	-	-	-	-	-	-	2
WATER	QS100	QS100	QS100	QS100	QS100	QS100	QS100

Compositions according to invention examples (IE.) 1-4 belong to the present invention.

Composition of comparative example 1 does not comprise at least one hydrophobically associative water-soluble polymer.

Composition of comparative example 2 does not comprise at least one hydrophobically associative water-soluble polymer.

Composition of comparative example 3 does not comprise at least one polyglyceryl fatty acid ester.

Preparation process:

The compositions listed above were prepared as follows, taking the composition of invention example 1 as an example:

1). mixing water and hydroxypropyl tetrahydropyrantriol with a homogenizer to obtain an aqueous system.

2). Adding polyglyceryl-6 dioleate into the aqueous system and homogenizing for 10 minutes.

3). Adding trideceth-6 and homogenizing for 10 minutes to obtain the composition.

Example 2: Evaluation of compositions

The penetration of cosmetic active ingredients in each composition prepared in Example 1 was characterized as follows.

Bi-photon microscopy characterization

6ul of composition of each example was applied evenly on 0.8 cm X 0.8 cm porcine skin (pig ear skin from food industry), corresponding to 9 mg/cm^2. The porcine skin sample was then emerged on insert membrane with PBS underneath, followed by 37℃ incubation at 95% RH for 2 hours. Treated sample was embedded in an OCT Tissue Freezing Medium, then frozen and cryo-sectioned into 20 μm thickness. It was further characterized with a Bi-photon microscopy.

Fig. 1 shows the penetration profile of hydroxypropyl tetrahydropyrantriol at different time after application the composition of invention example 1 on a pigskin, wherein A: 30 minutes; B: 4 hours; C: 8 hours; D: 16 hours.

Fig. 2 shows the penetration profile of hydroxypropyl tetrahydropyrantriol at different time after application the composition of comparative example 2 on a pigskin, wherein A: 30 minutes; B: 4 hours; C: 8 hours; D: 16 hours.

The fluorescein shows hydroxypropyl tetrahydropyrantriol distribution in the pigskin top layer of which is the stratum corneum.

It can be observed that the composition of invention example can provide a time-dependent diffusion profile.

It can be seen from Fig.1 and Fig. 2 that as compared with composition of comparative example 2, composition of invention example 1 can improve the penetration of hydroxypropyl tetrahydropyrantriol into the skin after being applied on the skin.

Fig. 3 shows the penetration profile of hydroxypropyl tetrahydropyrantriol at 4 hours after application the composition of invention examples 1-4 on a pigskin, wherein A: invention example 1; B: invention example 2; C: invention example 3; D: invention example 4.

Fig. 4 shows the penetration profile of hydroxypropyl tetrahydropyrantriol at 4 hours after application the composition of comparative examples 1-3 on a pigskin, wherein A: comparative example 1; B: comparative example 2; C: comparative example 3.

It can be seen from Fig.3 and Fig. 4 that as compared with compositions of comparative examples 1-3, compositions of invention example 1-4 can improve the penetration of hydroxypropyl tetrahydropyrantriol into the skin after being applied on the skin.

CLAIMS

1. A composition for skincare, comprising in an aqueous phase:
(i) at least one polyglyceryl fatty acid ester;
(ii) at least one hydrophobically associative water-soluble polymer; and
(iii) at least one hydrophilic cosmetic active ingredient.

2. Composition according to claim 1, wherein the polyglyceryl fatty acid ester has a polyglycerol moiety derived from 2 to 10 glycerols, more preferably from 4 to 8 glycerols, and even more preferably 5 or 6 glycerols.

3. Composition according to claim 1 or 2, wherein the polyglyceryl fatty acid ester may be chosen from monoesters, diesters and triesters of a linear or branched, saturated or unsaturated fatty acid, preferably saturated fatty acid, including from 2 to 30 carbon atoms, preferably from 4 to 30 carbon atoms, and more preferably from 6 to 30 carbon atoms, such as lauric acid, oleic acid, stearic acid, isostearic acid, capric acid, caprylic acid, and myristic acid.

4. Composition according to any of claims 1 to 3, wherein the polyglyceryl fatty acid ester is selected from polyglyceryl mono- or di-caprate comprising from 2 to 10 glycerol units; polyglyceryl mono- or di-oleate comprising from 2 to 10 glycerol units; polyglyceryl mono- or di-caprylate comprising from 2 to 10 glycerol units, and a combination thereof, preferably, the polyglyceryl fatty acid ester is selected from polyglyceryl-6 dicaprate, polyglyceryl-6 dioleate, polyglyceryl-6 caprylate polyglyceryl-2 oleate, and a combination thereof.

5. Composition according to any of claims 1 to 4, wherein the polyglyceryl fatty acid ester is present in an amount ranging from 0.5 wt.% to 10 wt.%, preferably from 1 wt.% to 5 wt.%, more preferably from 1.5 wt.% to 4 wt.%, relative to the total weight of the composition.

6. Composition according to any of claims 1 to 5, wherein the hydrophobically associative water-soluble polymer is selected from nonionic associative polyether-polyurethanes, polyacrylate crosspolymers, and a combination thereof.

7. Composition according to claim 6, wherein the polyether-polyurethane comprise at least two hydrocarbon-based lipophilic chains having from 8 to 30 carbon atoms, separated by a hydrophilic block, and wherein the hydrocarbon-based chains are chosen from pendent chains and chains at the end of the hydrophilic block.

8. Composition according to claim 6, wherein the polyether-polyurethane is obtained by polycondensation of at least three compounds comprising (i) at least one polyethylene glycol comprising from 150 to 180 mol of ethylene oxide, (ii) a polyoxyethylenated stearyl alcohol comprising 100 mol of ethylene oxide, and (iii) a diisocyanate, or polycondensation of at least three compounds comprising (i) at least one polyethylene glycol comprising from 150 to 180 mol of ethylene oxide, (ii) stearyl alcohol or decyl alcohol, and (iii) at least one diisocyanate, preferably the polyether-polyurethane is selected from Steareth-100/PEG-136/HDI Copolymer, PEG-240/HDI Copolymer Bis-decyltetradeceth-20 ether, and a combination thereof.

9. Composition according to claim 6, wherein the polyacrylate crosspolymer is selected from polyacrylate crosspolymer-1, polyacrylate crosspolymer-2, polyacrylate crosspolymer-3, polyacrylate crosspolymer-4, polyacrylate crosspolymer-5, polyacrylate crosspolymer-6, polyacrylate crosspolymer-7, polyacrylate crosspolymer-8, polyacrylate crosspolymer-9, polyacrylate crosspolymer-10, polyacrylate crosspolymer-11, polyacrylate crosspolymer-12, polyacrylate crosspolymer-14, and a combination thereof, preferably the polyacrylate crosspolymer is selected from polyacrylate crosspolymer-1, polyacrylate crosspolymer-6, polyacrylate crosspolymer-9, polyacrylate crosspolymer-11 and a combination thereof.

10. Composition according to any of claims 1-9, wherein the hydrophobically associative water-soluble polymer is present in an amount ranging from 0.1 wt.% to 2 wt.%, preferably from 0.1 wt.% to 1 wt.%, more preferably from 0.3 wt.% to 0.8 wt.%, relative to the total weight of the composition

11. Composition according to any of claims 1-10, wherein the hydrophilic cosmetic active ingredient is selected from hydroxypropyl tetrahydropyrantriol, flavones, stilbenoids, tannins, phenolic acids, polyphenolics, vitamins, xanthines, ceramides, cholesterols, sphingosines, C-glycosides, zwitterionic N-substituted amino sulfonic acid buffers, sugars, nucleic acids, a- and β-hydroxy acids, aminopropyl triethoxysilane, dihydroxyacetone, botanical extracts, amino acids, and peptides, their derivatives, and a

combination thereof, preferably, the hydrophilic cosmetic active ingredient is hydroxypropyl tetrahydropyrantriol.

12. Composition according to any of claims 1-11, wherein the hydrophilic cosmetic active ingredient is present in an amount ranging from 0.1 wt.% to 30 wt.%, preferably from 0.5 wt.% to 15 wt.%, more preferably from 1 wt.% to 10 wt.%, relative to the total weight of the composition.

13. Composition according to claim 1, comprising in an aqueous phase, relative to the total weight of the composition:

(i) from 1.5 wt.% to 4 wt.% of at least one polyglyceryl fatty acid ester selected polyglyceryl-6 dicaprate, polyglyceryl-6 dioleate, polyglyceryl-6 caprylate, polyglyceryl-2 oleate, and mixtures thereof;

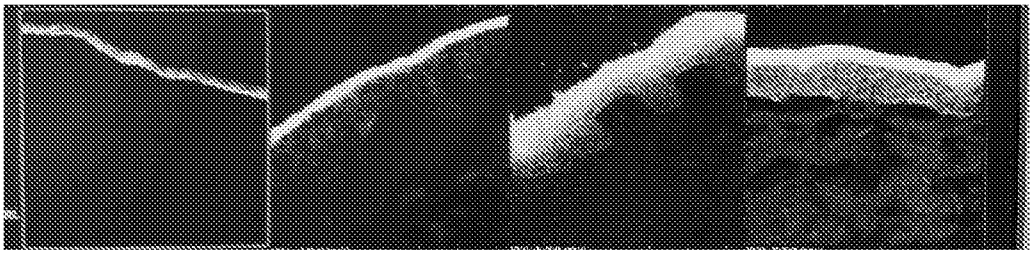
(ii) from 0.3 wt.% to 0.8 wt.% of at least one Hydrophobically associative water-soluble polymer selected from Steareth-100/PEG-136/HDI Copolymer, PEG-240/HDI Copolymer Bis-decyltetradeceth-20 ether, polyacrylate crosspolymer-1, polyacrylate crosspolymer-6, polyacrylate crosspolymer-9, polyacrylate crosspolymer-11, and combination thereof; and

(iii) from 1 wt.% to 10 wt.% of hydrophilic cosmetic active ingredient.

14. Composition according to any of claims 1-13, which is oil-free.

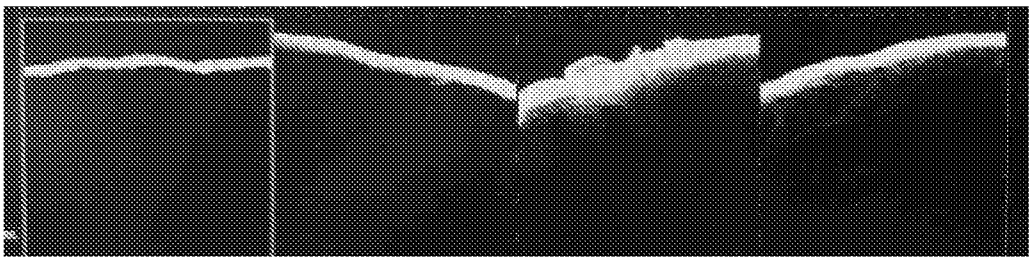
15. A non-therapeutic method for caring for the skin, comprising applying the composition according to any of claims 1-14 to the skin.

Figures



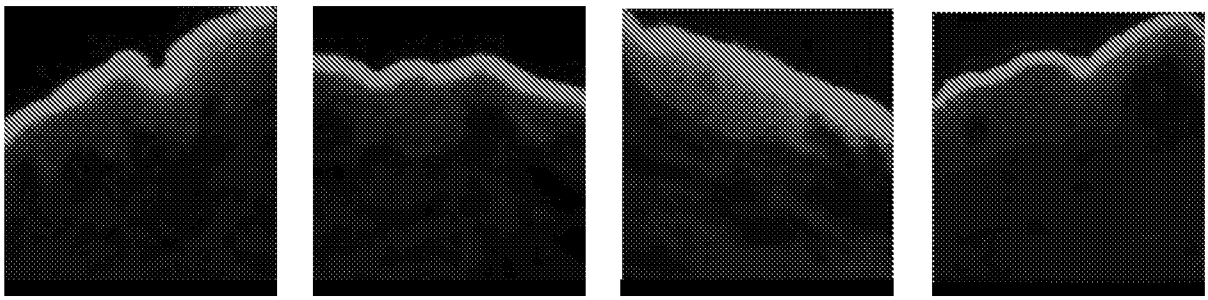
A B C D

Fig.1



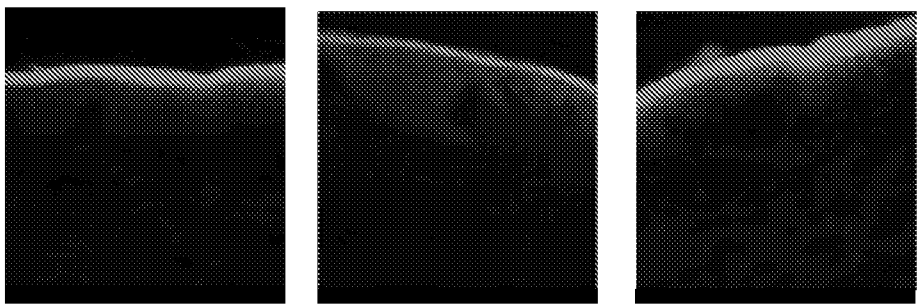
A B C D

Fig.2



A B C D

Fig.3



A B C

Fig.4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/074771

A. CLASSIFICATION OF SUBJECT MATTER

A61K 8/37(2006.01)i; A61K 8/87(2006.01)i; A61K 8/86(2006.01)i; A61K 8/81(2006.01)i; A61Q 19/00(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61K; A61Q

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS, CNTXT, VEN, DWPI, USTXT, EPTXT, PUBMED, STN, L'OREAL, OREA, WU Di, SUN Lingling, WANG Hongjuan, LIU Juan, skincare, cosmetic, polyglyceryl fatty acid ester, polyglyceryl fatty ester, polyglyceryl, dicaprate, dioleate, caprylate, oleate, associative, polyether-polyurethanes, polyurethane-polyethers, polyurethane, polyacrylate crosspolymer, steareth-100/PEG-136/HDI Copolymer, PEG-240/HDI Copolymer Bisdecyltetradeceth-20 ether, 103777-69-1, hydroxypropyl tetrahydropyrantriol

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2017018541 A1 (L'OREAL) 02 February 2017 (2017-02-02) the description page 1 line 30-page 3 line 27, page 5 lines 5-8, page 14 lines 30-45, page 22 lines 25-43, page 27 lines 1-7, Table 1 Ex.6	1-15
X	WO 2021125118 A1 (L'OREAL) 24 June 2021 (2021-06-24) the description page 1 line 25-page 3 line 7, page 11 line 22-page 12 line 29, page 17 line 42-page 18 line 32, page 22 lines 5-28, Table 1 Ex.2	1-6, 9-13, 15
X	WO 2014098267 A1 (L'OREAL) 26 June 2014 (2014-06-26) the description page 1 line 40-page 3 line 30, page 10 lines 17-40, page 17 line 45-page 18 line 1, page 35 lines 5-10, page 39 lines 25-30	1-8, 10-13, 15
X	WO 2014098268 A1 (L'OREAL) 26 June 2014 (2014-06-26) the description page 1 line 38-page 3 line 36, page 13 line 8- page 14 line 7, page 20 line 15-page 22 line 6, page 33 lines 5-21, page 35 lines 7-17, Table 1 Examples 1-2	1-8, 10-13, 15
A	WO 2020122087 A1 (L'OREAL) 18 June 2020 (2020-06-18) the whole document	1-15

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 October 2022	**25 October 2022**
Name and mailing address of the ISA/CN **National Intellectual Property Administration, PRC** **6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer **YU,Li** Telephone No. **(86-10)-53961883**

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/074771

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2021093539 A1 (CONCEPT MATRIX SOLUTIONS) 01 April 2021 (2021-04-01) the whole document	1-15

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/074771

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WO	2014098268	A1	26 June 2014	JP	2014122198	A	03 July 2014
WO	2020122087	A1	18 June 2020	JP	2020109056	A	16 July 2020
US	2021093539	A1	01 April 2021	None			