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(54) Title: POWDERY BASE COMPOSITION

(57) Abstract: Disclosed is a cosmetic powdery base composition comprising a fatty acid, an organic base, particle having an average diameter of from 1 to 50 microns, wherein the organic base is capable of providing a degree of neutralization of from 5 to 90% to the fatty acid, up to 100% of organic base is neutralized by the fatty acid and the cosmetic powdery base composition is anhydrous.

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POWDERY BASE COMPOSITION

Field of the invention

The present invention relates to a cosmetic powdery base composition. In particular, the present invention is related to a cosmetic powdery base composition which has no caking problem. Such powdery base composition may be used for rapid in-situ preparation of skin care product directly by a consumer and the generated skin care product is easy to be spread on the skin.

Background of the invention

Skin care compositions such as skin creams or lotions, and vanishing creams are well known. A typical skin care composition may easily comprise 60 to 90% of water. As such, water makes up a large proportion of the weight of a skin care product. It therefore represents a large proportion of the cost of transporting such a commercial product between manufacture and retailing. Furthermore, the cost for heating and cooling the water in the preparation is also high and the processing time is usually long. Yet a further problem associated with cosmetic products is the instability of some of the more desirable ingredients of such products.

International application with publication number WO 03/097003 A1 (Unilever) discloses base composition which may be used in cosmetic composition such as skin and vanishing creams. Such a base composition can readily be customised by the addition of suitable active and emotive ingredients to provide topical skin care composition as required by the consumer. The cosmetic composition may be rapidly prepared, for example, directly by a user by using the base composition.

Such topical base composition is favoured by the consumer. However, we found that when topical base composition is powdery, it has a significant tendency to cake. Caking of the cosmetic powdery base compositions has a bad influence not only on the in-situ preparation of skin care product by user, but also on the appearance of the powdery base composition. In addition, the applying sensory of the final skin care product is also very critical to the consumer. We therefore have recognized that it is very important to solve the caking problem of the cosmetic powdery base composition without compromise of spreading sensory of the final skin care product.

Summary of the invention

In a first aspect, the present invention is directed to a cosmetic powdery base composition comprising a fatty acid, an organic base and particle having a diameter of from 1 to 50 microns, wherein the organic base is capable of providing a degree of neutralization of from 5 to 90% to the fatty acid, up to 100% of organic base is neutralized by the fatty acid, and the cosmetic powdery base composition is anhydrous.

In a second aspect, the present invention is directed to a process for preparation of a cosmetic powdery base composition of the present invention comprising the steps of (i) providing a mixture comprising fatty acid and organic base wherein the organic base is capable of providing a degree of neutralization of from 5 to 90% to the fatty acid and up to 100% of organic base is neutralized by the fatty acid and (ii) mixing the particle having a diameter of 1 to 50 microns with the mixture resulted from step (i).

In a third aspect, the present invention is directed to kit of parts for preparing a skin care product, the kit comprises a cosmetics container, a cosmetic powdery base composition the preceding claims and instruction for use of the kit.

In a forth aspect, the present invention is directed to a skin care product obtainable from mixing the cosmetic powdery base composition of the present invention with an aqueous composition.

All other aspects of the present invention will more readily become apparent upon considering the detailed description and examples which follow.

Detailed description of the invention

Except in the examples, or where otherwise explicitly indicated, all numbers in this description indicating amounts of material or conditions of reaction, physical properties of materials and/or use may optionally be understood as modified by the word “about”.

All amounts are by weight of the composition, unless otherwise specified.

It should be noted that in specifying any range of values, any particular upper value can be associated with any particular lower value.

For the avoidance of doubt, the word "comprising" is intended to mean "including" but not necessarily "consisting of" or "composed of". In other words, the listed steps or options need not be exhaustive.

The disclosure of the invention as found herein is to be considered to cover all embodiments as found in the claims as being multiply dependent upon each other irrespective of the fact that claims may be found without multiple dependency or redundancy.

"Diameter" as used herein refers to diameter in non-aggregated state unless otherwise stated. For polydisperse samples having particulate with diameter less than 1 μm, diameter means the z-average diameter measured, for example, using dynamic light scattering (see international standard ISO 13321) with an instrument such as a Zetadiameterr Nano™ (Malvern Instruments Ltd, UK). For polydisperse samples having particulate with diameter at least 1 μm, diameter means the apparent volume median diameter (D50, also known as x50 or sometimes d(0.5)) of the microcapsules measurable for example, by laser diffraction using a system (such as a Masterdiameterr™ 2000 available from Malvern Instruments Ltd) meeting the requirements set out in ISO 13320.

"Anhydrous" as used herein refers to means less than 5%, preferably still less than 1% and most preferably from 0.0 to 0.1% of water by weight, based on total weight of the cosmetic powdery base composition.

"Water-soluble" as used herein refers to ingredient that dissolves in water to give a solution with a concentration of at least 5 grams per liter at 25°C and atmospheric pressure. "Water-insoluble" as used herein refers to ingredient that dissolves in water to give a solution with a concentration of less than 5 grams per liter at 25°C and atmospheric pressure.

The fatty acid can be any suitable fatty acid, typically contains fatty acid moieties with chain lengths of from C_{12} to C_{24}. In certain preferred embodiments, the hydrocarbon chain length of the fatty acid used is from 14 to 22, more preferably 14 to 20, even more preferably 16 to 18 carbon atoms. More preferably, the fatty acid is stearic acid or palmitic acid or a mixture of the two. The fatty acid in the present invention is preferably prepared using hystric acid which is substantially (generally about 90 to 95%) a mixture of stearic acid and palmitic acid in a ratio of between 55:45 to 45:55.

The fatty acid may also contain relatively pure amounts of one chain length fatty acid moiety. Although normally saturated, suitable fatty acid may contain unsaturated fatty acid moieties, and may contain fatty acid moieties having a degree of substitution, such as e. g. hydroxy fatty acids. However, it is preferred that the fatty acid is selected from the group comprising saturated fatty acids or a combination of saturated fatty acids and unsaturated fatty acids. Saturated fatty acids refer to saturated fatty acids has no substitution.

One of the essential elements in the composition is the organic base which serves to form the organic base soap with the fatty acids. The organic base preferably comprises alkanolamine and more preferably is selected from the group consisting of triethanolamine, diethanolamine, monoethanolamine, triisopropanolamine, and a combination thereof. Most preferably the organic base is triethanolamine.

The amount of organic base is so as to typically provide partial saponification of the fatty acid thereby generated organic base soap. The organic base is capable of providing a degree of neutralization of from 5 to 90%, preferably 7 to 75%, more preferably 9 to 60%, even more preferably 11 to 50% and still even more preferably 12 to 40% to the fatty acid.

Preferably the total amount of fatty acid and organic base soap is present in amount of from 30 to 95%, more preferably from 40 to 90% even more preferably from 60 to 85% by weight of powdery base composition.

The cosmetic powdery base composition is anhydrous. In the powdery base composition, up to 100% of organic base is neutralized by the fatty acid. The situation that no organic base is neutralized by the fatty acid is included. However, to make the in-situ generation of skin care product easier by the consumer, it is preferred that at least 30% of the organic base is neutralized by the fatty acid. More preferably, at least 50%, even more preferably 75 to 100%, still even more preferably 100% of the organic base is neutralized by the fatty acid in the powdery base composition.

For sake of clarity, it should be noted that the particle is different from the fatty acid or soap included in the powdery base composition. It refers that the particle is different in chemistry from fatty acid or soap included in the powdery base composition. The particle may be inorganic particle, polymer particle or a combination thereof. Preferably, the particle comprises silica, titanium dioxide, boron nitride, zinc stearate, talc, mica, magnesium oxide, magnesium carbonate, silicone resin, silicone elastomer, polyethylene. polyacrylate, poly(methyl methacrylate), polystyrene, polyurethane, polyamide, polyactic acid, cellulose, nylon, or a combination thereof. More preferably, the particle comprises silica, silicone elastomer, titanium dioxide, boron nitride, zinc stearate, talc, mica, silicone resin, polyethylene. polyacrylate, polystyrene, polyurethane, nylon, or a combination thereof. Even more preferably, the particle comprises silica, silicone elastomer, titanium dioxide, nylon or a combination thereof. Particularly preferred silicone elastomers comprise dimethicone/vinyl dimethicone crosspolymer, dimethicone crosspolymer, Polysilicone-11 or a mixture thereof. Still even more preferably the particle comprises silica, dimethicone/vinyl dimethicone crosspolymer, titanium dioxide, nylon or a combination thereof. Most preferably, the particle comprises silica, nylon, or a combination thereof.

The particle of the present invention has a diameter of 1 to 50 microns. Preferably, the particle has a diameter of 2 to 30 microns, more preferably 2.5 to 20 microns. Preferably the particle is present in amount of 2 to 40%, more preferably 5 to 30% and even more preferably 10 to 25% by weight of the cosmetic powdery base composition.

To solve the caking problem and/or provide a better sensory, the weight ratio of the particle to the total amount of fatty acid and soap is preferably 3:1 to 1:30, more

preferably 1:1 to 1:10, and even more preferably 1:2 to 1:7 in the cosmetic powdery base composition.

The cosmetic powdery base composition of the invention preferably comprises a co-surfactant. Suitable co-surfactant can for example be selected from the group consisting of fatty alcohol, fatty acid ester and a combination thereof. Illustrative of fatty alcohols are lauryl alcohol, cetyl alcohol, stearyl alcohol, isostearyl alcohol or combinations thereof. Glycerolstearate and glycolstearate are examples of fatty acid esters. More preferably, the co-surfactant is fatty alcohol and even more preferably is cetyl alcohol.

The amount of the co-surfactant is preferably 0.5 to 15% by weight of the powdery base composition, more preferably 1 to 10% and even more preferably 2 to 8% by weight of the powdery base composition.

The cosmetic powdery base composition may comprise optional ingredients including whitening pigment, emollient material, moisturizing agent, organic sunscreen, skin lightening agent, fragrance, natural extract, or a combination thereof provided that the cosmetic powdery base composition is still in form of powder. Preferably, the optional ingredient is solid or water-insoluble liquid at ambient temperature (25°C) and at atmospheric pressure.

Whitening pigments are typically particles of high refractive index materials. For example, the whitening pigment may have a refractive index of greater than 1.3, more preferably greater than 1.8 and most preferably from 2.0 to 2.7. Examples of such whitening pigment are those comprising bismuth oxy-chloride, boron nitride, barium sulfate, mica, silica, titanium dioxide, zirconium oxide, aluminium oxide, zinc oxide or combinations thereof. More preferred whitening pigment are particles comprising titanium dioxide, zinc oxide, zirconium oxide, mica, iron oxide or a combination thereof. Even more preferred whitening pigment are particles comprising zinc oxide, zirconium oxide, titanium dioxide or a combination thereof as these materials have especially high refractive index. Still even more preferably the whitening pigment is selected from titanium dioxide, zinc oxide or a mixture thereof and most preferred whitening pigment is titanium dioxide. The average diameter of whitening pigment is typical from 15 nm to 1 microns, more

preferably from 35 nm to 800 nm, even more preferably from 50 nm to 500 nm and still even more preferably from 100 to 300 nm.

Suitable emollient materials include silicones, hydrocarbons, triglycerides or a mixture thereof. These silicones may be organic, silicone-containing or fluorine-containing, volatile or non-volatile, polar or non-polar. Particularly preferred silicones include nonvolatile silicones for example emulsifying and non-emulsifying silicone elastomers. Representative of this category is Dimethicone/Vinyl Dimethicone Crosspolymer available as Dow Corning 9040, General Electric SFE 839, and Shin-Etsu KSG-18. Hydrocarbons may include mineral oil, petrolatum and polyalpha-olefins. Examples of preferred volatile hydrocarbons include polydecanes such as isododecane and isodecane (e.g. Permethyl-99A which is available from Presperse Inc.) and the C7-C8 through C12-C15 isoparaffins (such as the Isopar Series available from Exxon Chemicals). Illustrative triglycerides but not limiting are sunflower seed oil, cotton oil, canola oil, soybean oil, castor oil, borage oil, olive oil, shea butter, jojoba oil and mixtures thereof. Mono- and di- glycerides may also be useful. Particularly preferable are glyceryl monostearate and glyceryl distearate.

Particularly preferred moisturizing agents includes, petrolatum, aquaporin manipulating actives, oat kernel flour, substituted urea like hydroxyethyl urea, hyaluronic acid and/or its precursor N-acetyl glucosamine, hyaluronic acid and/or its precursor N-acetyl glucosamine, or a mixture thereof.

A wide variety of organic sunscreen is suitable for use in combination with the essential ingredients of this invention. Suitable UV-A / UV-B sunscreen include, 2- hydroxy-4-methoxybenzophenone, octyldimethyl p-aminobenzoic acid, digalloyltrioleate, 2,2-dihydroxy-4-methoxybenzophenone, ethyl-4-(bis(hydroxypropyl)) aminobenzoate, 2-ethylhexyl-2-cyano-3,3-diphenylacrylate, 2-ethylhexylsalicylate, glyceryl p-aminobenzoate, 3,3,5-trimethylcyclohexylsalicylate, methylanthranilate, p-dimethyl-aminobenzoic acid or aminobenzoate, 2-ethylhexyl-p-dimethyl-amino-benzoate, 2-phenylbenzimidazole-5-sulfonic acid, 2-(p-dimethylaminophenyl)-5-sulfonicbenzoxazoic acid, 2-ethylhexyl-p-methoxycinnamate, butylmethoxydibenzoylmethane, 2-hydroxy-4-methoxybenzophenone, octyldimethyl-p-aminobenzoic acid and mixtures thereof. The

most suitable organic sunscreens are 2-ethylhexyl-p-methoxycinnamate, butylmethoxydibenzoylmethane or a mixture thereof.

Vitamin B3 compounds (including derivatives of vitamin B3) e.g. niacin, nicotinic acid or niacinamide are the preferred skin lightening agent as per the invention, most preferred being niacinamide.

The cosmetic powdery base composition may be prepared in any suitable process. However, it is preferable that the process for preparation of the cosmetic powdery base composition of the present invention comprises the steps of:
(i) providing a mixture comprising fatty acid and organic base wherein the organic base is capable of providing a degree of neutralization of from 5 to 90% to the fatty acid and up to 100% of organic base is neutralized by the fatty acid;
(ii) mixing the particle having a diameter of 1 to 50 microns with the mixture resulted from step (i).

The mixture of the step (i) is heated to a temperature above the melting temperature of the mixture, preferably in the range of 40 to 80 °C; and subsequently cooled to a temperature below the crystallization temperature of the mixture, preferably below 40 °C, more preferably below 25 °C. The resulting mixture is preferably made in powder format before step (ii).

The cosmetic powdery base composition can be provided to a consumer for individual preparation of a cream in any suitable way. Therefore, it is preferable that the cosmetic powdery base composition is provided inside a cosmetics container. The cosmetics container preferably has a volume of 2 to 250 mL, more preferably 5 to 100 mL, even more preferably 8 to 50 mL and still even more preferably 10 to 30 mL.

Preferably a kit of parts comprises a cosmetic container, a cosmetic powdery base composition according to the invention and instruction for use of the kit. The consumers may prepare a final skin care product by mixing the cosmetic powdery base composition with an aqueous composition according to the instruction. Preferably, the skin care product is produced in 0.1 to 30 minutes, more preferably in 0.5 to 15 minutes and even

more preferably 1 to 7 minutes. The instruction preferably includes guidance on the amount of the aqueous composition to be added, and more preferably, includes guidance on the amount and temperature of the aqueous composition to be added and even more preferably include guidance on the amount and temperature of the aqueous composition to be added and the desired mode of agitation of the mixture.

To facilitate the operation by consumers, it is preferable that the kit of parts additionally comprises an aqueous composition which is physically separate from the cosmetic powdery base composition. Preferably, the aqueous composition is provided inside a separate packaging unit. The separate packaging unit may be part of the cosmetic container, or another cosmetic container.

The aqueous composition refers to composition comprising at least 5%, preferably at least 15%, more preferably at least 25% of water by weight of the aqueous composition. Preferably, the aqueous composition comprises 30 to 100%, more preferably 50 to 100% of water by weight of the aqueous composition. Even more preferably, the aqueous composition is water.

In certain embodiments, the aqueous composition preferably comprises water-soluble ingredient. Preferably, the water-soluble ingredient is stable in water. Preferably, the aqueous comprises polyhydric alcohol. Polyhydric alcohols may be selected from group of propylyene glycol, dipropylene glycol, polypropylene glycol, polyethylene glycol, sorbitol, hydroxypropyl sorbitol, hexylene glycol, 1,3-butylene glycol, isoprene glycol, ethoxylated glycerol, propoxylated glycerol or a mixture thereof. Most preferred polyhydric alcohol is glycerol known also as glycerin. The amount of polyhydric alcohol may range anywhere from 0.1 to 15%, preferably between 0.4 and 8% by weight of the aqueous composition.

The present invention also provides a skin care product obtainable from mixing the cosmetic powdery base composition of the present invention with the aqueous composition.

It is preferable that the final skin care product comprises fatty acid in amount of 1 to 25% by weight of the skin care product. More preferably, the fatty acid is present in the skin care product in amount of 2 to 20%, and even more preferably 4 to 15% by weight of the skin care product. The organic base soap is preferably present in the final skin care product in amount of 0.1 to 15%, more preferably 0.5 to 10%, and even more preferably 1 to 8% by weight of the skin care product. The particle having a diameter of from 1 to 50 microns is preferably present in the skin care product in amount of 0.2 to 8%, more preferably 0.5 to 6%, and even more preferably 1 to 4% by weight of the composition.

The skin care product preferably comprises water in amount of 10 to 98% by weight of the product, more preferably from 30 to 95%, even more preferably from 50 to 92%, most preferably from 66% to 90% by weight of the product.

The final skin care product may comprise whitening pigment, emollient material, moisturizing agent, organic sunscreen, skin lightening agent, fragrance, natural extract, or a combination thereof.

The skin care product refers to a product suitable for topical application to human skin, including leave-on and wash-off products. Preferably the skin care product is a leave-on product. The term "leave-on" as used herein means a product that is applied to or rubbed on the skin, and left thereon. The term "skin" as used herein includes the skin on the face (except eye lids and lips), neck, chest, abdomen, back, arms, under arms, hands, and legs. Preferably “skin” includes the skin on the face (except eye lids and lips) and under arms. More preferably skin means skin on the face other than lips and eyelids.

The following examples are provided to facilitate an understanding of the invention. The examples are not intended to limit the scope of the claims.

Examples

Example 1

This example demonstrates the caking problem of the powdery base composition.

Powdery base composition A was prepared as follows: 89.79 g of stearic acid, 2.79 g of cetyl alcohol, 6.52 g of triethanolamine and 0.9 g of fragrance were mixed and melted at 80 °C and then made into a powder.

The prepared powdery base composition A was put into a closed vial. After stored for one week at room temperature. It was found that there were agglomerations in the powdery base composition A. If the powdery base composition A was stored for longer time, for example, two weeks, the caking problem became more serious.

Example 2

This example demonstrates the preparation of powdery composition containing different particles.

Table 1

Ingredient	Sample (wt %)				
	B	1	2	3	C
Stearic Acid	71.83	71.83	71.83	71.83	71.83
Cetyl Alcohol	2.23	2.23	2.23	2.23	2.23
Triethanolamine	5.22	5.22	5.22	5.22	5.22
Fragrance	0.72	0.72	0.72	0.72	0.72
Tapioca Starch [a]	20.00	---	---	---	---
Nylon-6 [b]	---	20.00	---	---	---
Silica [c]	---	---	20.00	---	---
Silica & Titanium dioxide [d]	---	---	---	20.00	---
Titanium Dioxide [e]	---	---	---	---	20.00

a. Tapioca Pure, supplied by AkzoNobel
b. Toray TR-1, supplied by KOBO
c. MSS-500/3H, supplied by KOBO
d. SUNSIL-TinNatural white, ex Sunjin Beauty Science
e. X. DE TITANE ORGANOPHILE W877, supplied by SENSIENT

A series of powdery base compositions were prepared by mixing the fresh-made powdery composition A as prepared in Example 1 with different particles in a weight ratio of 4:1 (powdery composition A: particles). The final formulations of the powdery base compositions are shown in Table 1.

Example 3

This example demonstrates the effects of particle size on caking properties of the composition.

Table 2

Sample	Particle	Diameter (D50, μm)	Caking problem of samples	Sensory of final creams
B	Tapioca Starch	150	No	Balling-up
1	Nylon-6	13	No	Easy to spread
2	Silica	3	No	Easy to spread
3	Silica & Titanium dioxide	5	No	Easy to spread
C	Titanium Dioxide	0.45	No	Balling-up

The samples were put into a closed vial and stored for one week at room temperature to assess the caking of the samples. The results were shown in Table 2. There was no caking problem for any of samples 1 to 3, B and C.

15 g of water at room temperature was added to 2 g of each sample in a vial. The vial was shaken by human hand for less than one minute. The resulting product was a homogeneous vanishing cream.

The sensory of the final vanishing cream when it is applied was assessed. When applied to the skin by human hand, the vanishing creams generated by samples B and C formed crumbs or pills on the skin, indicating that they had balling-up problem. In contrast, the skin care products generated by samples 1 to 3 were easily spread onto the skin. The results are shown in the last column of Table 2.

Therefore, the particles having diameter of from 1 to 50 microns is capable of not only solving the caking problem of the powdery composition but also making the final skin care product being easy to be spread when it is applied to the skin.

Claims

1. A cosmetic powdery base composition comprising:
   (a) a fatty acid;
   (b) an organic base; and
   (c) particle having a diameter of from 1 to 50 microns,
   wherein (i) the organic base is capable of providing a degree of neutralization of from 5 to 90% to the fatty acid, (ii) up to 100% of organic base is neutralized by the fatty acid in the composition, and (iii) the cosmetic powdery base composition is anhydrous.

2. The composition according to claim 1 wherein the particle has a diameter of 2 to 30 microns, preferably 2.5 to 20 microns.

3. The composition according to claim 1 or 2 wherein the particle comprises silica, titanium dioxide, boron nitride, zinc stearate, talc, mica, magnesium oxide, magnesium carbonate, silicone resin, silicone elastomer, polyethylene. polyacrylate, poly(methyl methacrylate), polystyrene, polyurethane, polyamide, polyactic acid, cellulose, nylon, or a combination thereof, preferably the particle comprises silica, silicone elastomer, titanium dioxide, nylon or a combination thereof.

4. The composition according to any one of the preceding claims wherein the particle is present in amount of 5 to 40%, preferably 15 to 25% by weight of the composition.

5. The composition according to any one of the preceding claims wherein the fatty acid is stearic acid, palmitic acid or a mixture thereof.

6. The composition according to any one of the preceding claims wherein the weight ratio of the particle to the total amount of fatty acid and soap is 1:1 to 1:10.

7. The composition according to any one of the preceding claims wherein the organic base is selected from triethanolamine, diethanolamine, monoethanolamine, triisopropanalamine, or a combination thereof, preferably the organic base is triethanolamine.

8. The composition according to any one of the preceding claims wherein the total amount of the fatty acid and organic base soap is 30 to 95%, preferably from 60 to 85% by weight of powdery base composition.

9. The composition according to any one of the preceding claims wherein the composition comprises a co-surfactant, preferably a fatty alcohol, more preferably a cetyl alcohol.

10. A process for preparation of the composition of any one of claims 1 to 9 comprising the steps of:
(i) providing a mixture comprising fatty acid and organic base wherein the organic base is capable of providing a degree of neutralization of from 5 to 90% to the fatty acid and up to 100% of organic base is neutralized by the fatty acid; and
(ii) mixing the particle having a diameter of 1 to 50 microns with the mixture resulted from step (i).

11. Kit of parts for preparing a skin care product, the kit comprises a cosmetics container, a composition according to any one of the preceding claims and instruction for use of the kit.

12. Kit of parts according to claim 11 wherein the skin care container is provided with measuring signs.

13. Kit of parts according to claim 11 or 12 wherein the kit additionally comprises an aqueous composition which is physically separate from the cosmetic powdery base composition, preferably, the aqueous composition is water.

14. A skin care product obtainable from mixing the cosmetic powdery base composition of any one of claims 1 to 9 with an aqueous composition.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/051970

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61Q1/00 A61K8/02 A61K8/29 A61K8/25 A61K8/36
A61K8/41 A61K8/87
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007/029152 A2 (PROCTER & GAMBLE [US]; TANIGUCHI TOSHIYA [JP]) 15 March 2007 (2007-03-15)	1-5,10, 14
Y	page 8 - page 9 page 40 - page 41	1-14

X	WO 02/03950 A2 (PROCTER & GAMBLE [US]) 17 January 2002 (2002-01-17) page 32 - page 33	1-5,7,9, 10,14

X	WO 2009/023765 A1 (INVISTA TECH SARL [CH]; IAVARONE CHARLES FRANK [US]; LAMBERT JAMES MIC) 19 February 2009 (2009-02-19)	1-3,5-7, 9,10,14
Y	page 88 - page 89 page 93; example 72 PhaseC	1-14

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

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
18 February 2019	01/03/2019

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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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