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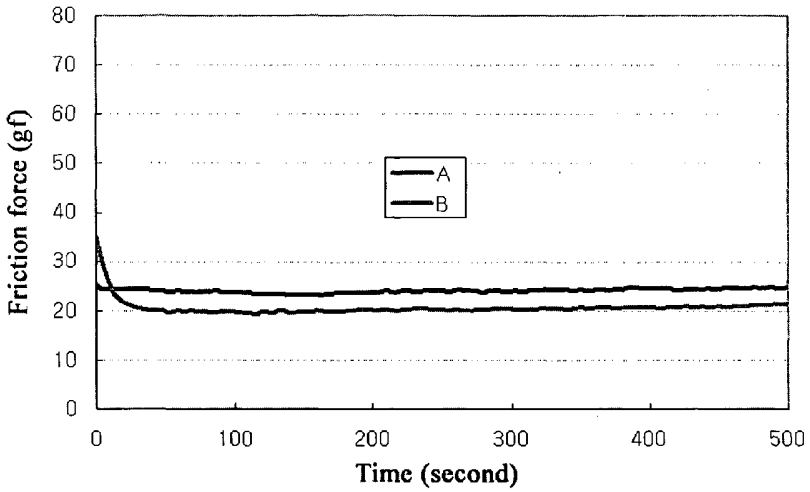
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(54) **Title:** SOLID COSMETIC COMPOSITION IN THE FORM OF WATER-IN-OIL EMULSION USING GELLING AGENT



(57) **Abstract:** Disclosed is solid cosmetic composition in the form of water-in-oil emulsion. The solid cosmetic composition in the form of water-in-oil emulsion of the present invention includes 0.1 to 2 % by weight of an inorganic gelling agent, 0.1 to 6 % by weight of an organic gelling agent, 10 to 60 % by weight of oil components including volatile oil, 1.5 to 10 % by weight of wax, 1 to 5 % by weight of an emulsifier, 10 to 50 % by weight of pigment components and component 5 to 40 % by weight of aqueous components, based on the total weight of the composition. The solid cosmetic composition in the form of water-in-oil emulsion shows an excellent stability to a sweating phenomenon, as well as an excellent overall satisfaction index for the feeling such as a moist feeling and a very light pasting property due to the easy phase change from a solid phase to a liquid phase during its application, and a finishing effect of the powdery makeup due to the rapid phase change from the liquid phase to powder after its application.

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SOLID COSMETIC COMPOSITION IN THE FORM OF WATER-IN-OIL EMULSION USING GELLING AGENT

TECHNICAL FIELD

The present invention relates to solid cosmetic composition in the form of water-in-oil emulsion.

BACKGROUND ART

Generally, solid cosmetic materials may be mainly divided into three groups: a powdery cosmetic material in which pigment is solidified as a major component by an oil binder; a solid-oily cosmetic material in which pigment is dispersed using the major component such as wax and oily petroleum; and a solid cosmetic material in the form of emulsion in which pigment is emulsified using oily components such as wax, and aqueous components. The cosmetic material in the form of emulsion gives the clear and moist feeling that cannot be given by the aqueous phase-free powdery cosmetic material and the cosmetic material composed only of the oily components, and also has a natural makeup effect due to the light makeup. There are many attempts to develop the cosmetic material in the form of emulsion due to the aforementioned advantage.

For example, there has been conducted many studies that silicon wax was used to prevent hardness change due to the aging, or shape change due to the temperature change (Japan Patent Application No. 2002-220321); hydrogenated Jojoba oil was used to improve soft feeling (Japan Patent Application No. 2002-53425); or hydrogenated sieves are used together with spherical powder having a compensation effect on

unevenness of the skin and an giving the excellent feeling (Japan Patent Application No. 2000-327575).

However, it was revealed from the studies that a feeling property by the phase change from a solid phase to a liquid phase and from a liquid phase to powder, which is intrinsic to the solid cosmetic material in the form of emulsion, was not observed upon application of the products. That is to say, since only the property of each material is used and modified to improve the stability or the overall feeling of the product, a large amount of wax should be used to secure the stability, such as to prevent the liquid phase and the oily phase being separated and to maintain a solid form temporarily, but using a large amount of wax eventually makes the feeling bad. Especially, the product including a large amount of wax has problems that the overall feeling is so bad upon its application to the skin, and the finishing effect of the makeup is poor after its application since the phase change into the solid phase, the liquid phase and the powder are not progressed clearly, respectively.

Meanwhile, the cosmetic composition in the form of emulsion is mainly classified into two types of an oil-in-water (O/W) emulsion and a water-in-oil (W/O) emulsion. The oil-in-water (O/W) emulsion is hydrophilic, and has an advantage of giving moist and soft feeling, but also a disadvantage that its chemical endurance and water resistance are deteriorated, and its long-term stability is poor since its components are contracted due to volatilization of the aqueous components when they are exposed to the air. In order to solve the disadvantage, an oleophilic type of the water-in-oil (W/O) emulsion has been developed. The water-in-oil (W/O) emulsion shows an excellent cosmetic endurance and water resistance, but has a disadvantage of imposing a stress on

the skin due to its sticky, oily and waxy feeling. Also, it has a disadvantage of giving the bad feeling such as a pasting property, a spread property and others.

In order to improve the feeling of such cosmetic composition in the form of water-in-oil emulsion, the cosmetic composition in the form of water-in-oil emulsion including a large amount of volatile silicon oil is developed. Alike the cosmetic materials in the form of oil-in-water emulsion, the cosmetic composition in the form of water-in-oil emulsion including the volatile silicon oil, however, has an advantage that its long-term stability is poor since its components are contracted due to volatilization of the volatile silicon oil when they are exposed to the air. Also, the cosmetic composition in the form of water-in-oil emulsion is easily spread on the skin in its early application, but volatilization of the silicon oil makes the feeling so tight before the makeup is finished. And, the cosmetic composition also has a disadvantage that it is difficult to paste all the face evenly because it is phase-changed into powder in the region applied formerly during its application.

In order to increase the long-term stability of the solid water-in-oil cosmetic materials including such volatile silicon oil, there is developed a container whose airtightness itself is improved to prevent the volatile silicon oil from being evaporated, as described in Japan Patent Publication No. 2002-342. In addition, the method for inhibiting evaporation of the volatile silicon oil itself included in the cosmetic materials was developed, but its effect was shown to be insufficient.

Meanwhile, the cosmetic material in the form of emulsion has a disadvantage of giving a poor appearance and much discomfort upon its use because the sweating phenomenon, in which oil of its contents is extruded out to the surface or extruded

together with colorants, is generated due to the outer temperature change.

DISCLOSURE OF INVENTION

The present invention is designed to solve the problems of the prior art, and therefore it is an object of the present invention to provide solid cosmetic composition in the form of water-in-oil emulsion which shows an excellent stability to a sweating phenomenon, as well as an excellent overall satisfaction index for the feeling such as a moist feeling and a very light pasting property due to the easy phase change from a solid phase to a liquid phase during its application, and a finishing effect of the powdery makeup due to the rapid phase change from the liquid phase to powder after its application.

In order to accomplish the above object, the present invention provides solid cosmetic composition in the form of water-in-oil emulsion including 0.1 to 2 % by weight of an inorganic gelling agent, 0.1 to 6 % by weight of an organic gelling agent, 10 to 60 % by weight of oil components including volatile oil, 1.5 to 10 % by weight of wax, 1 to 5 % by weight of an emulsifier, 10 to 50 % by weight of pigment components and component 5 to 40 % by weight of aqueous components, based on the total weight of the composition.

The solid cosmetic composition in the form of water-in-oil emulsion of the present invention may be clearly phase-changed from the solid phase to the liquid phase, and from the liquid phase to the powder because the inorganic gelling agent and the organic gelling agent are used together to form a gel-emulsion structure for the cosmetic materials in the form of water-in-oil emulsion using oil, pigment component, aqueous

component, emulsifier and others. That is to say, the solid cosmetic composition in the form of water-in-oil emulsion of the present invention has advantages that it is convenient to carry and use it since it has a solid appearance before its use, and it shows excellent moisture and pasting properties since the gel-emulsion structure is scattered into a liquid phase during its use, and an excellent makeup effect since the makeup is finished to be powdery without oily feeling due to volatilization of aqueous components, oil and others after its use.

The feeling is significantly improved by minimizing a content of the wax since the solid cosmetic composition in the form of water-in-oil emulsion of the present invention has the gel-emulsion structure such as a solid matrix structure. In addition, the sweating phenomenon, which functions to deteriorate the stability of the cosmetic materials, may be reduced to a minimum level by minimizing the content of the wax used in the solid cosmetic composition in the form of water-in-oil emulsion of the present invention since the sweating phenomenon arises due to difference of volume expansivity between wax and oil by change temperature. That is to say, the reduced sweating phenomenon means that the stability is very excellent.

The solid cosmetic composition in the form of water-in-oil emulsion of the present invention may be applied to various products such as lipstick, eyeshadow, powder foundation, stick foundation and others.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects, and advantages of preferred embodiments of the present invention will be more fully described in the following detailed description,

taken accompanying drawings. In the drawings:

Fig. 1a is a photograph showing a test result of evaluating a makeup transfer test on a commercially available liquid foundation;

Fig. 1b is a photograph showing a test result of evaluating a makeup transfer test on a commercially available powder foundation;

Fig. 1c is a photograph showing a test result of evaluating a makeup transfer test on solid cosmetic composition in the form of water-in-oil emulsion of the present invention; and

Fig. 2 is a diagram showing a test result of measuring dynamic friction coefficients of the solid cosmetic composition in the form of water-in-oil emulsion of the present invention and the conventional cosmetic composition.

BEST MODES FOR CARRYING OUT THE INVENTION

Hereinafter, the solid cosmetic composition in the form of water-in-oil emulsion of the present invention will be described in detail.

The solid cosmetic composition in the form of water-in-oil emulsion of the present invention includes 0.1 to 2 % by weight of an inorganic gelling agent, 0.1 to 6 % by weight of an organic gelling agent, 10 to 60 % by weight of oil components included in volatile oil, 1.5 to 10 % by weight of wax, 1 to 5 % by weight of an emulsifier, 10 to 50 % by weight of pigment components, and 5 to 40 % by weight of aqueous components, based on the total weight of the composition.

Since the solid cosmetic composition in the form of water-in-oil emulsion of the present invention maintains the solid phase more easily by means of interaction of the

inorganic gelling agent and the organic gelling agent included in the solid cosmetic composition, the content of the wax included in the cosmetic composition may be reduced for the purpose of maintaining the solid phase. As a result, a sheer thinning effect, which very advantageously affects the feeling, is more significantly improved, which is advantageous to improve the feeling. Also, the sweating phenomenon that oil is extruded out due to change of the temperature (mainly, at high temperature) may be lowered since the solid cosmetic composition in the form of water-in-oil emulsion of the present invention including both of the inorganic gelling agent and the organic gelling agent has the organic/inorganic gel-emulsion structure which functions as a buffer. Therefore, its entire stability is improved. Also, its excellent touch feel and good visual effect may be appealed to the consumers since the phase change from the solid phase to the liquid phase is remarkably progressed by the organic/inorganic gel-emulsion structure, as described above.

Preferably, the inorganic gelling agent included in the solid cosmetic composition in the form of water-in-oil emulsion of the present invention has an excellent sheer thinning effect. As the inorganic gelling agent, for example the gelable hydrophilic and/or oleophilic clay-based inorganic gelling agent such as quaternium-18 hectorite, montmorillonite, saponite, bentonite, hectorite, quaternium-18 bentonite, magnesium aluminum silicate, stearalkonium bentonite and others may be used alone or in combination thereof. Considering the overall physical properties and feeling of the cosmetic composition according to the present invention, it is more preferred to use quaternium-18 hectorite, montmorillonite, saponite, bentonite, hectorite and quaternium-18 bentonite; and quaternium-18 hectorite and bentonite are most preferred.

Preferably, the inorganic gelling agent of the present invention has a content of 0.1 to 2 % by weight, based on the total weight of the composition. The sheer thinning effect is relatively low if its content is less than 0.1 % by weight. That is to say, the phase change from the solid phase to the liquid phase is not relatively clearly progressed upon its use, resulting in deterioration of the pasting property. If its content exceeds 2 % by weight, then fluidity is relatively reduced in manufacturing the cosmetic composition.

Also, the solid cosmetic composition in the form of water-in-oil emulsion of the present invention includes 0.1 to 6 % by weight of the organic gelling agent, based on the total weight of the composition.

As the organic gelling agent, for example sorbitan olivate, 12-hydroxy stearic acid, hydrogenated castor oil, stearic acid octadecyl, ethylene glycol ester, propylene glycol ester, sorbitol fatty acid ester, solbide fatty acid ester, sorbitan fatty acid ester, dextrin fatty acid ester, cyclopentasiloxane (&)dimethicone/vinyldimethicone crosspolymer, dimethicone (&)dimethicone/vinyldimethicone crosspolymer, phenyl trimethicone (&)dimethicone/phenylvinylmethicone crosspolymer, isodecan (&)vinyldimethicone/lauryldimethicone crosspolymer and others may be used alone or in combination thereof. Considering the overall physical properties and feeling of the cosmetic composition according to the present invention, it is more preferred to use sorbitan olivate, 12-hydroxy stearic acid, hydrogenated castor oil, stearic acid octadecyl, ethylene glycol ester, propylene glycol ester, sorbitol fatty acid ester, solbide fatty acid ester and sorbitan fatty acid ester; and sorbitan olivate and stearic acid octadecyl are most preferred. The organic gelling agent including metals such as stearic acid

aluminum, stearic acid magnesium may be also included in the organic gelling agent.

The solid cosmetic composition in the form of water-in-oil emulsion of the present invention includes 0.1 to 6 % by weight of the organic gelling agent. It its content is less than 0.1 % by weight, the stability of the composition is relatively deteriorated. That is to say, the sweating phenomenon may arise due to change of the outer temperature (especially, at high temperature). If its content exceeds 6 % by weight, a level of solidification is relatively strong. As s result, it is difficult to undergo the phase change from the solid phase to the liquid phase, and therefore the pasting property is deteriorated when the cosmetic composition is applied to the skin.

For the solid cosmetic composition in the form of water-in-oil emulsion of the present invention, the lower amount of the organic gelling agent is used compared to the inorganic gelling agent, the more deteriorated the stability of the composition is. In the other hand, the more amount of the organic gelling agent is used, the more deteriorated the feeling is. Accordingly, content ratio (a:b) of the organic gelling agent (a) and the inorganic gelling agent (b) included in the cosmetic composition of the present invention preferably ranges from 0.5:1 to 60:1 and more preferably from 3:1 to 15:1, considering the stability and the feeling of the composition.

Meanwhile, the solid cosmetic composition in the form of water-in-oil emulsion of the present invention includes 10 to 60 % by weight of the oil components with the volatile oils, based on the total weight of the composition. Cetylethylhexanoate, neopentylglycol dicaprate, isocetylethylhexanoate, disstearylmalate, triethylhexanoin, squalene, caprylliccapric triglyceride, pentaerythrityl tetraethylhexanoate, butyleneglycol dicaprylatecaprate, hexyl laurate, dimethylpolysiloxane, methylphenylpolysiloxane,

decamethylcyclopentasiloxane, methyl trimethicone, phenyl trimethicone, liquid-phase lanoline, olive oil, avocado oil, Jojoba oil, macadamia oil and others may be used as the oil.

The volatile oil in the oil components included in the solid cosmetic composition in the form of water-in-oil emulsion of the present invention allows the cosmetic materials to facilitate the phase change from the liquid phase to the powder after its application. That is to say, the solid-phase cosmetic composition of the present invention is phase-changed into the liquid phase during its application, and then the phase change from the liquid phase to the powder is facilitated as the aqueous components and the volatile oils are volatilized rapidly. The facilitated phase change is advantageous since the additional finishing makeup such as powder, pact and others are required. Accordingly, it is preferred to use the volatile oil alone, or in combination with the non-volatile oil. And silicon-based oil may also be used as the volatile oil, and cyclomethicone, which is a volatile and raw material odor-free cyclic silicon 4-mer to 6mer, is most preferably used.

The content of the non-volatile oil is more preferably lower than that of the volatile oil in the oil components including the volatile oil. The phase change from the aforementioned liquid phase to the powder is relatively slow if the content of the non-volatile oil is higher than that of the volatile oil. Therefore, the feeling such as a powdery feeling is deteriorated.

Also, the solid cosmetic composition in the form of water-in-oil emulsion of the present invention includes wax. The wax is generally used to solidify the cosmetic materials or give a luster. Vegetable wax such as candelilla wax, carnauba wax, rice

wax and others; animal wax such as Bees wax, lanoline and others; mineral wax such as ozokerite, cerecine wax and others; and petroleum wax such as paraffin wax, microcrystalline wax, polyethylene wax and others may be used for this purpose.

The wax used in the cosmetic composition of the present invention is preferably at least one ester-based wax which is solid at 25℃, for example cerecine wax or Candelilla wax may be also used.

In the solid cosmetic materials composition in the form of water-in-oil emulsion of the present invention, the wax preferably has a content of 1.5 to 10 % by weight. If the content of the wax is less than 1.5 % by weight, then a level of solidification is relatively lower, and if it exceeds 10 % by weight, the pasting property may be deteriorated and the sweating phenomenon may arise since it is difficult to undergo the phase change from the solid phase to the liquid phase.

Also, the solid cosmetic composition in the form of water-in-oil emulsion of the present invention includes 1 to 5 % by weight of the emulsifier, based on the total weight of the composition. The ionic or non-ionic surfactant generally used in the cosmetic materials may be used for the emulsifier. For example, an anionic surfactant such as higher alkyl sulfate, alkyl ether sulfate, higher fatty acid amid sulfonate, alkyl benzene sulfonate, N-acyl glutaminate, higher fatty acid ester sulfonate and others; a cationic surfactant such as alkyl trimethyl ammonium salt, dialkyldimethyl ammonium salt, alkyl pyridinium salt, alkyldimethyl benzyl ammonium salt, alkylamine salt, polyamine fatty acid derivatives, amyl alcohol fatty acid derivatives and others; a positive surfactant such as imidazole-based positive surfactant, betain-based positive surfactant and others; and a non-ionic surfactant such as sorbitan fatty acid ester,

glycerine poly glycerine fatty acids, propylene glycol fatty acid ester, glycerine alkyl ether, polyoxy alkylene-modified silicone, alkylpolyoxy alkylene-positively modified silicone, polyoxyethylene glycerine fatty acid esters, polyoxyethylene alkyl ether, tetra polyoxyethylene tetra polyoxypropylene ethylene diamine condensate and others may be used, but not limited thereto.

Polyoxy alkylene-modified silicone or alkylpolyoxy alkylene-positively modified silicone is most preferred, considering the feeling, the emulsion stability and so on of the cosmetic composition.

Also, the solid cosmetic composition in the form of water-in-oil emulsion of the present invention includes 10 to 50 % by weight, and preferably 15 to 30 % by weight of the pigment components, based on the total weight of the composition. Clay mineral powder such as titanium dioxide, particulate titanium dioxide, zinc oxide, iron oxide, titanium dioxide/zinc oxide complex, alumina, talc, mica, kaolin, barium silicate, zeolite, Muscovite, synthetic mica, magnesium carbonate and others; inorganic pigment such as barium sulfate, iron titanate, titanium oxide-coated mica and others; and organic powder such as polystyrenepowder, polymethylmethacrylate powder, polyethylene powder, nylon powder, silicone powder and others may be used as the pigment components, but not limited thereto.

The pigment powder is more preferably hydrogenated. Various methods, in which the surface of the pigment powder is treated with high-viscosity silicone, treated by reacting alkyl hydrogen polysiloxane, treated with a cationic, anionic or non-ionic surfactant, or surface-coated with wax, may be used as the hydrogenation, but not limited thereto.

Also, the solid cosmetic composition in the form of water-in-oil emulsion of the present invention includes 5 to 40 % by weight, and preferably 10 to 25 % by weight of the aqueous component, based on the total weight of the composition. The aqueous component is a major component that gives the clear and moist feeling to the cosmetic composition of the present invention. Polyol-based moisturizing agents such as betain, butyleneglycol, polydric alcohol, sugar-protein complex, organic acid, organic salts, glycerine and propyleneglycol, dipropyleneglycol and others may be used alone or in combination thereof together with water.

Hereinafter, the present invention will be described in detail referring to Examples and Comparative examples. However, it should be understood that other equivalents and modifications of the Examples according to the present invention could be made thereto without departing from the spirit and scope of the invention, but not intended to limit the scope of the invention.

Examples 1 to 3 and Comparative examples 1 to 3

Compositions of Examples 1 to 3 and Comparative examples 1 to 3 were prepared on the basis of components and their contents as listed in the following Table 1. That is to say, materials 1-9 were heated to 80-85℃ and dissolved, and then materials 14-19, which are pigment components, were added thereto and emulsified, based on the contents listed in the following Table 1. Materials 10-13 were then added thereto and dispersed homogeneously. And then, the resultant mixture was defoamed, and then mixed with a material 20 and dissolved homogeneously. The resultant mixture was then filled into a molder, and cooled at room temperature to obtain solid cosmetic

composition in the form of water-in-oil emulsion.

Table 1

Name of Materials		Content (%)					
		Example			Comparative example		
		1	2	3	1	2	3
1	Cerecine	3.0	3.0	3.0	6.0	4.0	10.0
2	Candelilla	0.5	0.5	0.5	0.5	0.5	0.5
3	Polyoxy alkylene modified silicon	3.0	3.0	3.0	3.0	3.0	3.0
4	Acrylate /Dimethicone copolymer	3.0	3.0	3.0	3.0	3.0	3.0
5	Cyclomethicone	30.0	30.0	30.0	30	10	30
6	Hexyl laurate	-	10.0	10.0	10	30	10
7	Dimethicone/Vinyl dimethicone Crosspolymer	3.0	3.0	3.0	3.0	3.0	3.0
8	Sorbitan olivate	2.0	2.0	4.0	-	8.0	-
9	Quaternium-18 hectorite	0.5	0.5	0.5	-	-	0.5
10	Purified water	25.0	15.0	15.0	15.0	15.0	15.0
11	Butylene glycol	3.0	3.0	3.0	3.0	3.0	3.0
12	Betain	2.0	2.0	2.0	2.0	2.0	2.0
13	Methyl paraben	0.1	0.1	0.1	0.1	0.1	0.1
14	Titanium dioxide	10.0	10.0	10.0	10.0	10.0	10.0
15	Mica	2.0	2.0	2.0	2.0	2.0	2.0
16	Talc	To 100					
17	Nylon powder	3.0	3.0	3.0	3.0	3.0	3.0
18	Vinyldimethicone/Methiconesilsesquioxane crosspolymer	2.0	2.0	2.0	2.0	2.0	2.0
19	Iron oxide	1.5	1.5	1.5	1.5	1.5	1.5
20	Perfume	PA	PA	PA	PA	PA	PA

** PA: Proper amount

Hereinafter, the overall feeling and the stability were evaluated for the solid

cosmetic composition in the form of water-in-oil emulsion obtained in Examples 1 to 3 and Comparative examples 1 to 3. For evaluation of the stability, the sweating phenomenon by the temperature change was measured.

Evaluation of Feeling

50 women aged 25~45 years old was divided into two groups. The cosmetic compositions prepared in Examples 1 to 3 and Comparative examples 1 to 3 were distributed to each group, and applied to women's faces on both sides. And then, the visual effect on the phase change from the solid phase to the liquid phase or from the liquid phase to the powder, the pasting property, the powdery feeling, and the overall satisfaction index were evaluated according to the following evaluation.

The results measured for the aforementioned properties are presented as follows: "Very good (◎)" if at least 24 women decide that the feeling is excellent; "Good (○)" if 18-23 women decide that the feeling is excellent; "Not good (△)" if 10-17 women decide that the feeling is excellent; and "Bad (x)" if at most 10 women decide that the feeling is excellent.

Table 2

Item	Example			Comparative example		
	1	2	3	1	2	3
Visual effect on phase change	◎	◎	◎	△	△	x
Pasting property	◎	◎	o	x	x	X
Powdery feeling	o	◎	◎	○	△	△
Satisfaction index	o	◎	◎	△	x	x

As seen in the result of the Table 2, it was revealed that the cosmetic composition according to the present invention has the excellent feeling such as the visual effect on the phase change, the pasting property, the powdery feeling and the overall satisfaction, compared to the Comparative examples.

Evaluation on generation of sweating phenomenon

In order to evaluate a level of a sweating phenomenon of the solid water-in-oil cosmetic compositions prepared according to Examples 1 to 3 and Comparative examples 1 to 3, the sweating phenomenon was observed for 24 hours under the temperature conditions as listed in the following Table 3, and then evaluated in accordance with the following standard of visual evaluations.

The sweating phenomenon was evaluated as follows: : "Very good (◎)" if there is no change in the skin surface; "Good (○)" if a light luster appears in the skin surface; "Bad (△)" if fine oil is observed in the skin surface; and "Very bad (x)" if the skin surface is covered with oil.

Table 3

Item	Example			Comparative example		
	1	2	3	1	2	3
50 ℃	○	○	○	X	○	X
45 ℃	◎	○	◎	X	◎	X
37 ℃	◎	◎	◎	△	◎	△
Room temperature	◎	◎	◎	○	◎	○

As seen from the result in the Table 3, it was confirmed that the solid cosmetic composition in the form of water-in-oil emulsion of the present invention is a stable

composition in which the sweating phenomenon is inhibited at high temperature due to the gelling effect of the inorganic and organic gelling agents.

Example 4

Lipstick was prepared on the basis of components and their contents as listed in the following Table 4. Materials 1-10 were homogeneously dissolved at 75-80℃. Then, materials 10-13 were added thereto and homogeneously dispersed to obtain lipstick.

Table 4

	Name of Materials	Content (%)
1	Cerecine	4.0
2	Candelilla wax	2.0
3	Paraffin wax	8.0
4	Cyclomethicone	30.0
5	Phenyl trimethicone	15.0
6	Dimethicone/Vinyl dimethicone crosspolymer	12.0
7	Diisostearyl malate	1.0
8	Trimethylsiloxysilicate	7.0
9	Quaternium-18 hectorite	0.8
10	Sorbitan olivate	5.0
11	Titanium oxide	4.0
12	Talc	9.0
13	Iron oxide	2.0
14	Perfume	Proper amount

The lipstick prepared in the Example 4 was evaluated for the feeling and stability in accordance with the above-mentioned method. As a result, it was confirmed that the lipstick prepared according to the present invention has the excellent

stability and the excellent feeling without causing the sweating phenomenon.

Cosmetic transfer test

A finishing effect of the makeup was compared and measured by evaluating a level of the cosmetic transfer of the commercially available liquid foundation and the commercially available powder foundation (LANCOME™, France), and the solid cosmetic materials in the form of water-in-oil emulsion. The cosmetic transfer test was conducted as follows. Samples were evenly applied on the skin, and then makeup region was covered with a tissue and the skin was pressured three times for 10 seconds with 30gf/cm^2 of a plumb. And then, the value difference (Δ L) was calculated by measuring a level of the cosmetic materials transferred to the tissue using a color meter. The results are photographed in Fig. 1a (the commercially available liquid foundation), Fig. 1b (the commercially available powder foundation) and Fig. 1c (the cosmetic composition prepared according to the present invention), respectively. The calculated value difference is listed in the following Table 5.

Table 5

	Commercially Available Liquid Foundation	Commercially Available Powder Foundation	Cosmetic Composition of Example 1
△L	4.44	0.08	0.09

As listed in Table 5, the makeup transfer was compared using the value difference (Δ L). As s result, it was shown that the solid cosmetic materials in the form of water-in-oil emulsion have the very low value difference. It is meant that the solid cosmetic composition in the form of water-in-oil emulsion of the present invention has the excellent finishing effect of the makeup nearly identical to the commercially

available powder foundation.

Measurement of Dynamic Friction Coefficient

The solid cosmetic composition in the form of water-in-oil emulsion (B) of the present invention prepared in the Example 1, and the cosmetic composition (A) devoid of the gelling agent prepared in the Comparative example 1 was measured for the dynamic friction coefficients.

The dynamic friction coefficient was measured by an *in vitro* method using Vitrodyne. A PE film was firstly adhered to a backlight plate, and then 2 mg/cm^2 of the cosmetic composition was applied to a path in which a cylindric probe moves. Then, another PE film was also adhered to the cylindric probe. The dynamic friction coefficients were measured with a load cell by reciprocating the cylindric probe at a rate of 3.5cm/s for 15 minutes. The force ($150g_f$) pressed by the plumb was constantly maintained during measurement of the dynamic friction coefficients. The result was shown in Fig. 2.

As shown in Fig. 2, it was revealed that, in the case A, the dynamic friction coefficient was constantly maintained with the passage of time from the beginning when the stress is increased, while, in the case B, the initial dynamic friction coefficient was measured high, but the dynamic friction coefficient was significantly lowered as the force is increased, and then constantly maintained. From the fact that the initial dynamic friction coefficients was significantly lowered due to the sheer thinning effect of the gelling agent, it was seen that the phase change from the solid phase to the liquid phase was apparently progressed.

INDUSTRIAL APPLICABILITY

As described above, the solid cosmetic composition in the form of water-in-oil emulsion according to the present invention may be useful to show an excellent stability to a sweating phenomenon, and as an excellent overall satisfaction index for the feeling such as a moist feeling and a very light pasting property due to the easy phase change from a solid phase to a liquid phase during its application, and a finishing effect of the powdery makeup due to the rapid phase change from the liquid phase to powder after its application, since it may form the inorganic/organic gel-emulsion structure.

What is claimed is:

1. Solid cosmetic composition in the form of water-in-oil emulsion, comprising 0.1 to 2 % by weight of an inorganic gelling agent, 0.1 to 6 % by weight of an organic gelling agent, 10 to 60 % by weight of oil components including volatile oil, 1.5 to 10 % by weight of wax, 1 to 5 % by weight of an emulsifier, 10 to 50 % by weight of pigment components, and 5 to 40 % by weight of aqueous components, based on the total weight of the composition.

2. The solid cosmetic composition in the form of water-in-oil emulsion according to the claim 1,

wherein content ratio (a:b) of the organic gelling agent (a) : the inorganic gelling agent (b) ranges from 0.5 : 1 to 60 : 1.

3. The solid cosmetic composition in the form of water-in-oil emulsion according to the claim 1,

wherein the inorganic gelling agent includes at least one selected from the group consisting of quaternium-18 hectorite, montmorillonite, saponite, bentonite, hectorite and quaternium-18 bentonite.

4. The solid cosmetic composition in the form of water-in-oil emulsion according to the claim 1,

wherein the organic gelling agent includes at least one selected from the group

consisting of sorbitan olivate, 12-hydroxy stearic acid, hydrogenated castor oil, stearic acid octadecyl, ethylene glycol ester, propylene glycol ester, sorbitol fatty acid ester, solbide fatty acid ester and sorbitan fatty acid ester.

5. The solid cosmetic composition in the form of water-in-oil emulsion according to any of the claims 1 to 4,

wherein the oil components have lower content of the non-volatile oil than that of the volatile oil.

6. The solid cosmetic composition in the form of water-in-oil emulsion according to any of the claims 1 to 4, wherein the wax is at least one ester-based wax in the solid form at 25℃.

7. The solid cosmetic composition in the form of water-in-oil emulsion according to any of the claims 1 to 4, wherein the pigment components are hydrotreated.

FIG. 1a

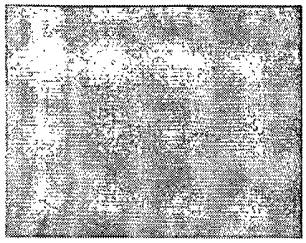


FIG. 1b

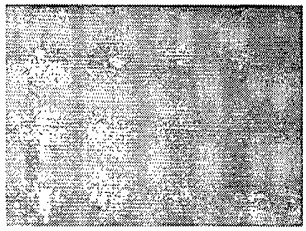


FIG. 1c

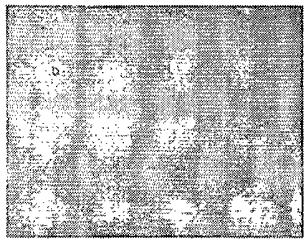
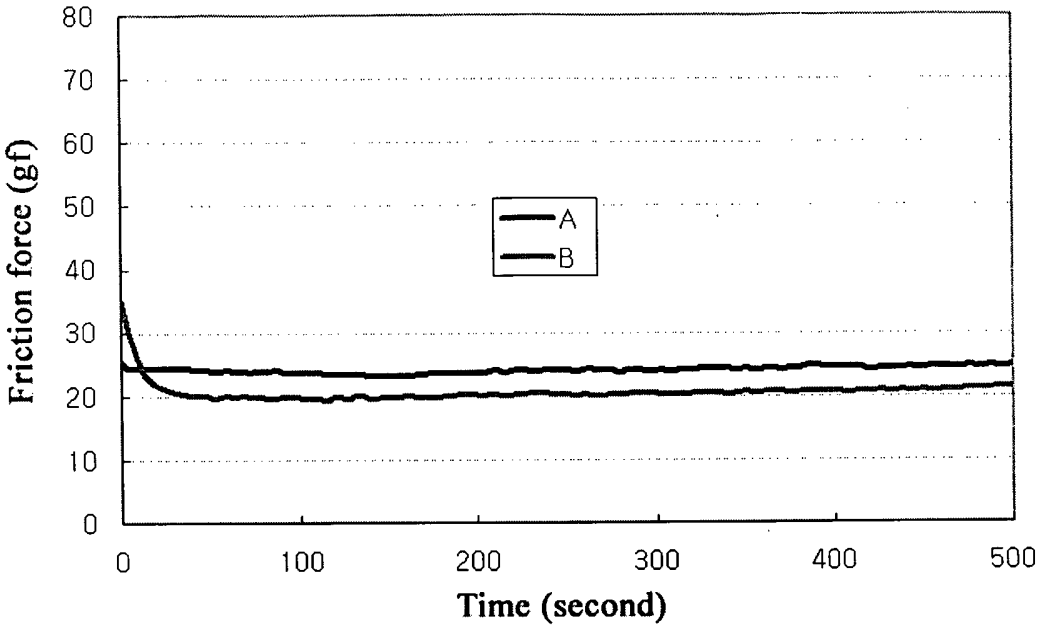


FIG. 2


80
70
60
50
40
30
20
10
0
Friction force (gf)
A
B
0
100
200
300
400
500
Time (second)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2004/002311

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 A61K 7/02, A61P 17/16

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)

IPC7 as above

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

Korean patents and applications for inventions since 1975

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

eKIPASS, Pubmed [(quaterinium OR montmorillonite OR bentinite OR hectorite) AND (sorbitan OR glycol OR fatty acid ester OR castor oil) AND water-in-oil emulsion AND cosmetic]

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6210692 B1 (L'OREAL S.A.) 03 Apr. 2001 See the whole document.	1 - 7
A	KR 2002-0007062 A (ENPRANI CO., LTD) 26 Jan. 2002 See the whole document.	1 - 7
A	US 5948393 A (SHIDEIDO CO., LTD) 07 Sep. 1999 See the whole document.	1 - 7
A	US 5552136 A (THE PROCTER & GAMBLE CO.) 03 Sep. 1996 See the whole document.	1 - 7

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

☒ See patent family annex.

* Special categories of cited documents:

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

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
01 JUNE 2005 (01.06.2005)	**02 JUNE 2005 (02.06.2005)**

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR2004/002311

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