

[Description]

[Title of Invention]

COSMETIC COMPOSITION FOR FILTERING BLUE LIGHT AND
BLOCKING ULTRAVIOLET RAY

[Technical Field]

The present specification relates to a stable cosmetic composition for blue light filtering and ultraviolet light blocking in which a hydrophobic visible light blocking agent is homogeneously dispersed in an aqueous phase.

[Background Art]

Solar energy enters earth mainly as electromagnetic waves, and these electromagnetic waves include radio waves, microwaves, infrared rays, visible light, ultraviolet light, X-rays, and γ -rays in order from the longest wavelength. A large number of sunscreen products developed to protect the skin from sunlight (solar energy) are focused on preventing skin damage caused by ultraviolet light in the UVB region (290 to 320 nm) and the UVA region (320 to 400 nm). The influence of light (for example, visible light) having wavelengths other than ultraviolet light on the human skin has been rarely known, but recently, investigations on the harmful influences of violet light and blue light on the skin have been conducted.

In particular, blue light has been reported to regulate the proliferation and differentiation of keratinocytes and skin-derived endothelial cells, and violet light has been reported to diminish the differentiation of keratinocytes and to delay the recovery of damaged skin barrier.

In addition to the influences on the skin reported

above, blue light not only suppresses the secretion of melatonin which induces sleep, increases the secretion of serotonin which induces arousal so as to induce sleep disturbances but also directly reaches the retina and induces melanin production so as to cause dark and dull skin and stains.

These violet light and blue light intensively emit from LED display of smart phones, notebooks, monitors, and the like and LED lighting, the contact with these violet light and blue light is inevitable in the living environment of modern society, and it has been thus attempted to block these violet light and blue light in number of ways. However, researches on the blocking of such harmful light have not been sufficiently conducted in the field of cosmetics. In particular, it is also important to maintain the formulation stability while blocking harmful light because of the nature of cosmetics and sunscreen products, and it is thus required to research and make an effort to solve these problems.

[Citation List]

[Non-Patent Literature]

[Non-Patent Literature 1]

THE JOURNAL OF BIOLOGICAL CHEMISTRY Vol. 280, No. 22, Issue of June 3, pp.21061-21066, 2005 "Blue Light Induces Mitochondrial DNA Damage and Free Radical Production in Epithelial Cell"

[Summary of Invention]

[Technical Problem]

An object of the present specification is to provide a stable cosmetic composition for blocking harmful light which is a stable oil-in-water cosmetic composition for blocking visible light in which a hydrophobic visible

light blocking agent is homogeneously dispersed in an aqueous phase, and a method of maintaining the stability of such a composition.

[Solution to Problem]

In order to accomplish the above object, in an aspect, the present invention provides a cosmetic composition for blocking visible light which contains an oil phase portion containing an ultraviolet light blocking agent and a silicone oil; an aqueous phase portion containing one or more selected from the group consisting of a phosphate surfactant, a glutamate surfactant, and a carbamate surfactant and a thickener; and a hydrophobic visible light blocking agent homogeneously dispersed in the aqueous phase portion.

In another aspect, the present invention provides a method of enhancing the formulation stability of a cosmetic composition for blocking visible light containing an oil phase portion containing an ultraviolet light blocking agent and a silicone oil; an aqueous phase portion containing one or more selected from the group consisting of a phosphate surfactant, a glutamate surfactant, and a carbamate surfactant and a thickener; and a hydrophobic visible light blocking agent homogeneously dispersed in the aqueous phase portion, which includes adjusting a content of the surfactant to be from 0.5% to 2% by weight with respect to a total weight of the composition in the cosmetic composition.

[Advantageous Effects of Invention]

The present specification can provide a stable oil-in-water cosmetic composition for blocking visible light in which a hydrophobic visible light blocking agent is homogeneously dispersed in an aqueous phase and a method

of maintaining the stability of such a composition, and this makes it possible to meet the needs of consumers who are interested in this field and to promote the development of related industries.

[Description of Embodiments]

In the present specification, the term "visible light" means light that can be perceived by the human eye and generally includes light in the wavelength region (380 to 800 nm) visible to the human eye among various electromagnetic waves. Normally, blue light is light having a wavelength of from 380 to 500 nm and means light having a shorter wavelength and stronger energy in visible light that a person can see, namely, light reaching the retina, and more specifically, the region of 380 to 430 nm may be classified into a violet light region and the region of 430 to 500 nm into a blue light region.

In the present specification, the term "oil-dispersibility" refers to a property or degree that a substance is favorably dispersed in fat and oil or an oil component and is a concept included in hydrophobicity. In the same manner, "water-dispersibility" refers to a property or degree that a substance is favorably dispersed in water or a water-soluble substance and is a concept included in hydrophilicity.

In the present specification, the term "coloring component" refers to a coloring matter, a pigment, or other substances having the ability to exhibit a color. The coloring component includes a pigment, and preferably it may be a pigment component which can be used as a raw material for cosmetics. The coloring component may be one or more selected from the group consisting of titanium dioxide, micro titanium oxide (micro TiO_2), zinc oxide

(ZnO), micro zinc oxide (micro ZnO), iron oxides (FeO (II), Fe₂O₃ (III), Fe₃O₄ (IV)), aluminum oxide (alumina, Al₂O₃), barium sulfate (BaSO₃), PMMA (polymethyl methacrylate), silica, nylon, polyurethane, ultramarine, pearl, synthetic mica, mica, talc, kaolin, sericite, and boron nitride, but it is not limited thereto.

In the present specification, the term "thickener" refers to a substance which increases the viscosity of a solution, a composition, and the like, is also referred to as a viscosity increasing agent or viscosity improver, and may be referred to as a thickening agent since it is seemingly sticky and feels thickened.

In the present specification, the term "emulsion" is one of the most commonly used formulation systems in the cosmetics industry and means a system in which an oil phase and an aqueous phase are uniformly dispersed by emulsification technique. Such emulsion can be prepared in various forms depending on the composition of the continuous phase, and emulsion in a water-in-oil (W/O), oil-in-water (O/W), water-in-oil-in-water (W/O/W), or oil-in-water-in-oil (O/W/O) form can be prepared. In the present specification, the form thereof is not particularly limited but an oil-in-water (O/W) form may be preferred.

In the present specification, the term "homo mixing" is also referred to as homogenizing and includes making the raw materials in a state of being homogeneously mixed in an emulsion or solution by using a homogenous mixer or homogenizer.

In the present specification, the term "silicone oil" refers to a liquid silicone resin having a relatively low degree of polymerization and a mixture thereof. There are volatile silicone oil and nonvolatile silicone oil, and the volatile silicone oil includes one

or more of a linear polysiloxane oil or a cyclic polysiloxane oil and the nonvolatile silicone oil includes one or more selected from the group consisting of polydimethylsiloxane, phenylsiloxane, alkylmethylsiloxane, dimethicone, cyclomethicone, dimethiconol, dimethicone polyol, a silicone elastomer, and a silicone resin.

In the present specification, the term "anionic surfactant" refers to a surfactant of which the portion to be ionized and exhibit surface activity when being dissolved in water becomes an anion among surfactants. Surfactants are classified into a nonionic surfactant (a surfactant which does not dissociate even when being an aqueous solution since it does not have an ionizing atom group in the molecule), a cationic surfactant (a surfactant of which the atom to exhibit surface activity after being dissolved in water and dissociated becomes a cation), an anionic surfactant, and an amphoteric surfactant (a surfactant having both a cationic group and an anionic group in the same molecule).

In the present specification, the term "phosphate surfactant" means a surfactant containing a phosphate in the chemical structure, the term "glutamate surfactant" means a surfactant containing a glutamate in the chemical structure, and the term "carbamate surfactant" means a surfactant containing a carbamate in the chemical structure.

In the present specification, the term "oil phase portion" refers to an aggregate part of a substance containing oils, a mixture thereof, or the like and may include an aggregate part in which a raw material which can be mixed with or dispersed in oils or a mixture thereof is mixed or added. Meanwhile, the term "aqueous phase portion" refers to an aggregate part of a substance

containing water, a substance which can be dissolved in water, a mixture thereof, or the like and may include an aggregate part in which a raw material which can be mixed with or dispersed in water, a substance which can be dissolved in water, a mixture thereof, or the like is mixed or added.

In the present specification, % means % by weight unless defined otherwise.

So far, O/W emulsion products in which a hydrophobic visible light blocking agent is homogeneously dispersed and stabilized in an aqueous phase have not been confirmed, in particular, there has been no case in which a product which has realized the stability of O/W formulation and, at the same time, has a skin tone correcting effect has been manufactured. This is because it is significantly difficult to maintain the formulation stability as an emulsion cosmetic while homogeneously dispersing a hydrophobic visible light blocking agent in the aqueous phase. It is urgently required to provide a composition which can effectively block harmful light and, at the same time, improve the stability of O/W formulation, and thus can be applied as a practical cosmetic product when frequent exposure to harmful light and consumer concerns thereby are taken into consideration, but these problems have not been solved up to date.

In the case of an O/W emulsion formulation containing a hydrophilic visible light blocking agent and particularly titanium dioxide having a surface treated with a water dispersible substance, when the O/W emulsion formulation is used together with most of thickeners (such as carbomer-based or acrylate-based thickeners) to be used in the oil phase, an excessive increase in viscosity, gelling, and powder agglomeration are caused,

and the formulation becomes significantly unstable, and the O/W emulsion formulation cannot be thus manufactured into a cosmetic product and used. Meanwhile, in the case of an O/W emulsion formulation containing a hydrophobic visible light blocking agent and particularly titanium dioxide having a surface treated with an oil dispersible (or hydrophobic) substance, there is a disadvantage that it is difficult to disperse the hydrophobic visible light blocking agent in the aqueous phase and it is impossible to secure the stability of the formulation.

The composition may be manufactured into a more preferable cosmetic composition particularly when the makeup effect of skin tone correction can also be realized while the stability of the O/W emulsion formulation containing a hydrophobic visible light blocking agent is effectively maintained. This is because skin tone correction is also required as a complex function of a cosmetic product for blocking harmful light. It has been one of the long-standing challenges of the art to manufacture a cosmetic product which maintains formulation stability for a long period of time while achieving harmful light blocking and skin tone correction at the same time.

In the present invention, it has been confirmed that a hydrophobic visible light blocking agent, in particular an inorganic powder (for example, titanium dioxide) having a surface treated with a hydrophobic substance, can effectively block harmful light (especially blue light and violet light), and a measure to stabilize the O/W emulsion formulation for a long period of time by effectively and homogeneously dispersing this in the aqueous phase is arranged, and a cosmetic composition of such an O/W emulsion formulation and a method of enhancing the formulation stability of the composition

are provided. The present invention is intended to exert a harmful light (including ultraviolet light and visible light) blocking effect and a skin tone correcting effect at the same time and to maintain formulation stability for a long period of time, and thus it is also an invention which has solved the problem which has not been solved in the art for a long period of time.

In an aspect, the present invention may be a cosmetic composition for blocking visible light which contains an oil phase portion containing an ultraviolet light blocking agent and a silicone oil; an aqueous phase portion containing one or more selected from the group consisting of a phosphate surfactant, a glutamate surfactant, and a carbamate surfactant and a thickener; and a hydrophobic visible light blocking agent homogeneously dispersed (for example, dispersed in the form of emulsion particles) in the aqueous phase portion. In an embodiment, the particle size of the dispersed emulsion may be from 0.1 to 20 μm as an average diameter when measured using an optical microscope. In another embodiment, the average diameter may be 0.1 μm or more, 0.5 μm or more, 0.8 μm or more, 1 μm or more, 1.2 μm or more, 1.5 μm or more, 2 μm or more, 3 μm or more, 4 μm or more, 5 μm or more, 7 μm or more, 9 μm or more, 12 μm or more, 15 μm or more, or 18 μm or more. In addition, the average diameter may be 20 μm or less, 18 μm or less, 15 μm or less, 13 μm or less, 10 μm or less, 8 μm or less, 6 μm or less, 4 μm or less, 2 μm or less, 1 μm or less, 0.8 μm or less, 0.5 μm or less, or 0.2 μm or less. In still another embodiment, the average diameter may be from 1 to 5 μm .

In another aspect, the present invention provides a method of enhancing the formulation stability of a

cosmetic composition for blocking visible light containing an oil phase portion containing an ultraviolet light blocking agent and a silicone oil; an aqueous phase portion containing one or more selected from the group consisting of a phosphate surfactant, a glutamate surfactant, and a carbamate surfactant and a thickener; and a hydrophobic visible light blocking agent homogeneously dispersed in the aqueous phase portion, which includes adjusting the content of the surfactant to be from 0.5% to 2% by weight with respect to the total weight of the composition in the cosmetic composition.

According to an embodiment, the ultraviolet light blocking agent may be one or more of an organic ultraviolet light blocking agent or an inorganic ultraviolet light blocking agent.

According to an embodiment, the ultraviolet light blocking agent may be one or more selected from the group consisting of ethylhexyl methoxycinnamate, isoamyl p-methoxycinnamate, ethylhexyl salicylate, bis-ethylhexyloxyphenol methoxyphenyl triazine, diethylaminohydroxybenzoyl hexyl benzoate, octyl methoxycinnamate, octocrylene, homosalate, avobenzene, butyl methoxydibenzoylmethane, oxybenzone, octyl triazone, ethylhexyl triazone, menthyl anthranilate, phenylbenzimidazolesulfonic acid, and 3,4-methylbenzylidene camphor. In addition, according to another embodiment, the inorganic ultraviolet light blocking agent may be one or more selected from the group consisting of titanium dioxide, zinc oxide, and iron oxide.

According to another embodiment, the silicone oil may be one or more selected from the group consisting of silicone oils including cyclomethicone, dimethicone, cyclopentasiloxane, and cyclohexasiloxane. Preferably,

the silicone oil may be one or more of cyclopentasiloxane or cyclohexasiloxane.

According to another embodiment, a hydrocarbon-based oil including squalane or mineral oil; an ester-based oil including isopropyl palmitate, 2-octyldodecyl myristate, isopropyl myristate, or butyloctyl salicylate; and a vegetable oil including castor oil, olive oil, or jojoba oil may be used instead of the silicone oil.

As the surfactant which can be used in the composition according to an aspect of the present invention, there are anionic surfactants such as sulfates, sulfosuccinates, saccharinates, phosphates, isethionates, glutamates, and taurates, amphoteric surfactants such as betaine, sultaine, and amphotoacetates, nonionic surfactants such as polyoxyethylene sorbitan fatty acid esters, polyoxyethylene (hardened) castor oil, glycerin fatty acid esters, sorbitan fatty acid esters, sucrose fatty acid esters, alkylolamides, alkyl glucosides, and carbamate surfactants (surfactants containing carbamates in the chemical structure, preferably inulin lauryl carbamate), and cationic surfactants such as N-alkyldiaminoethylglycine, and these may be used singly or in mixture of two or more kinds thereof. Preferably, a surfactant having a phosphate, sulfate, glutamate, or citrate as a hydrophilic group, sodium, potassium, or ammonium as a counter ion, and generally a C2 to C24 fatty alkyl group as the hydrophobic group may be used as the anionic surfactant.

According to another embodiment, the surfactant may be a phosphate surfactant or a glutamate surfactant, and a carbamate surfactant (a surfactant containing a carbamate in the chemical structure, preferably inulin lauryl carbamate) may be used instead of the anionic surfactant. Preferably, the surfactant may be any one of

potassium cetyl phosphate, aluminum isostearyl glyceryl phosphate, sodium lauryl sulfate, sodium stearyl glutamate, or inulin lauryl carbamate, and more preferably it may be potassium cetyl phosphate. By using such a substance, it is possible to effectively and homogeneously disperse the hydrophobic visible light blocking agent having a visible light blocking effect in the aqueous phase of the O/W emulsion formulation, and it is thus possible to secure the stability of the O/W emulsion formulation for a long period of time.

The cosmetic composition according to an aspect of the present invention may further contain one or more kinds of emulsifiers in addition to the components described above. For example, the cosmetic composition may further contain one or more emulsifiers selected from the group consisting of lecithin, hydrogenated lecithin, lysolecithin, hydrogenated lysolecithin, polysorbate 60, PEG-40 stearate, octyldodeceth-25, ceteareth-20, PEG-20 glyceryl isostearate, polyglyceryl-3-methylglucose distearate, cetearyl glucoside, and polyglyceryl-10 stearate, but it is not limited thereto. The emulsifier to be further contained may be contained at from 0.01% to 10% by weight with respect to the total weight of the cosmetic composition. It is difficult to achieve the purpose of emulsification when the content is less than 0.01% by weight, and skin irritation may be caused when the content exceeds 10% by weight.

According to another aspect of the present invention, the thickener may be one or more aqueous phase thickener selected from the group consisting of a carbomer, a polyacrylamide, an ammonium acryloyldimethyltaurate-VP copolymer, xanthan gum, a cellulose ether, a polyvinyl derivative, an alginate, a polyacrylate, and any mixture thereof.

According to an embodiment, one or more phases of the aqueous phase or the oil phase may further contain a thickener. For example, the thickener may be one kind selected from the group consisting of a sodium acrylate copolymer, a crosslinked or non-crosslinked acrylic acid polymer, particularly polyacrylic acid crosslinked with a polyfunctional agent, a cellulose derivative (for example, methylcellulose, hydroxymethylcellulose, hydroxyethylcellulose, hydroxypropylmethylcellulose, carboxymethylcellulose, or carboxymethylcellulose), a sodium salt of a cellulose derivative, cetylstearyl alcohol, oxyethylenated cetylstearyl alcohol containing ethylene oxide, guar gum, xanthan gum, and a combination thereof.

According to an aspect of the present invention, the thickener may be contained at from 0.001% to 20.0% by weight in the whole composition.

According to another embodiment, the hydrophobic visible light blocking agent may be an inorganic powder having a hydrophobically treated surface.

According to another embodiment, the inorganic powder may include one or more selected from the group consisting of titanium dioxide, micro titanium oxide (micro TiO_2), zinc oxide (ZnO), micro zinc oxide (micro ZnO), iron oxides (FeO (II), Fe_2O_3 (III), Fe_3O_4 (IV)), aluminum oxide (alumina, Al_2O_3), barium sulfate (BaSO_3), silicon dioxide (silica, SiO_2), talc, kaolin, sericite, and mica. Preferably, the inorganic powder may be titanium dioxide.

According to another embodiment, the surface treatment may be conducted using one or more selected from the group consisting of dimethicone, methicone, caprylylsilane having a substituent, lauroyl lysine, disodium stearyl glutamate, sodium myristyl glutamate,

silica, alumina, and aluminum hydroxide. It is possible to obtain a harmful light blocking effect and, at the same time, a skin tone correcting effect by such a surface treatment.

According to another embodiment, the hydrophobic visible light blocking agent or the inorganic powder having a hydrophobically treated surface may be titanium dioxide coated with aluminum hydroxide and triethoxycaprylsilane.

According to still another embodiment, the content of the hydrophobic visible light blocking agent may be from 0.5% to 5% by weight with respect to the total weight of the composition. When the content is less than 0.5% by weight, the coloring effect and the visible light blocking effect diminish, and when the content exceeds 5% by weight, the dispersion in the formulation is not smooth and the stability of the formulation thus remarkably deteriorates. The content of the hydrophobic visible light blocking agent may be 0.5% by weight or more, 0.8% by weight or more, 1% by weight or more, 1.2% by weight or more, 1.4% by weight or more, 1.6% by weight or more, 1.8% by weight or more, 2% by weight or more, 2.2% by weight or more, 2.4% by weight or more, 2.6% by weight or more, 2.8% by weight or more, 3.0% by weight or more, 3.5% by weight or more, 4.0% by weight or more, 4.5% by weight or more, or 4.8% by weight or more. In addition, the content may be 5% by weight or less, 4.8% by weight or less, 4.5% by weight or less, 4% by weight or less, 3.5% by weight or less, 3% by weight or less, 2.8% by weight or less, 2.6% by weight or less, 2.4% by weight or less, 2.2% by weight or less, 2% by weight or less, 1.8% by weight or less, 1.6% by weight or less, 1.4% by weight or less, 1.2% by weight or less, 1% by weight or less, 0.8% by weight or less, or 0.6% by weight

or less. Preferably, the content may be 1% by weight or more and less than 3% by weight.

According to still another embodiment, the content of the surfactant may be from 0.5% to 2% by weight with respect to the total weight of the composition. When the content is less than 0.5% by weight, the formulation is unstable, and when the content exceeds 2% by weight, the effect is little different from that in the case of 2% by weight and there is a possibility to cause skin irritation. The content of the anionic surfactant may be 0.5% by weight or more, 0.7% by weight or more, 0.9% by weight or more, 1.0% by weight or more, 1.2% by weight or more, 1.4% by weight or more, 1.5% by weight or more, 1.6% by weight or more, or 1.8% by weight or more. In addition, the content of the anionic surfactant may be 2% by weight or less, 1.8% by weight or less, 1.6% by weight or less, 1.5% by weight or less, 1.4% by weight or less, 1.2% by weight or less, 1.0% by weight or less, 0.8% by weight or less, 0.6% by weight or less, or 0.55% by weight or less.

According to another aspect of the present invention, the visible light may have a wavelength of from 380 to 800 nm. Preferably, the visible light may be one or more of violet light having a wavelength of from 380 to 430 nm or blue light having a wavelength of from 430 to 500 nm.

According to an embodiment, the cosmetic composition may block violet light by 60% or more. The cosmetic composition may block violet light by 60% or more, 65% or more, 68% or more, 70% or more, 75% or more, 78% or more, 80% or more, 85% or more, 90% or more, 95% or more, or 97% or more. In addition, the cosmetic composition may block violet light by 98% or less, 95% or less, 90% or less, 85% or less, 80% or less, 78% or less, 75% or less, 70% or less, 68% or less, 65% or less, or 63% or less.

According to another embodiment, the cosmetic composition may block blue light by 35% or more. The cosmetic composition may block blue light by 35% or more, 36% or more, 38% or more, 40% or more, 42% or more, 45% or more, 50% or more, 55% or more, 60% or more, 65% or more, or 68% or more. In addition, the cosmetic composition may block blue light by 70% or less, 68% or less, 65% or less, 60% or less, 55% or less, 50% or less, 45% or less, 42% or less, 40% or less, 38% or less, or 36% or less.

According to another embodiment, the cosmetic composition may be an emulsion or cream formulation. According to still another embodiment, the cosmetic composition may be an oil-in-water (O/W) emulsion formulation. The present specification may be applied to other formulations, but it may particularly relate to an O/W emulsion composition and a method of stabilizing the formulation thereof. In the case of O/W emulsion, it has been significantly difficult to disperse the hydrophobic visible light blocking agent (for example, titanium dioxide having a surface treated with a hydrophobic substance, zinc oxide having a surface treated with a hydrophobic substance, or the like) in the aqueous phase and it has been significantly difficult to maintain the O/W formulation stability even if the hydrophobic visible light blocking agent is dispersed, but such a problem has been solved by an aspect of the present invention.

According to another embodiment, the cosmetic composition may be a liquid or cream formulation.

According to an aspect of the present invention, the cosmetic composition may maintain the stability of formulation for 4 weeks or longer at from -30°C to 60°C. In an embodiment, the temperature may be -30°C or higher, -20°C or higher, -10°C or higher, -5°C or higher, 0°C or

higher, 5°C or higher, 10°C or higher, 15°C or higher, 20°C or higher, 25°C or higher, 30°C or higher, 35°C or higher, 40°C or higher, 45°C or higher, 50°C or higher, 55°C or higher, 60°C or higher, or 65°C or higher. In addition, the temperature may be 60°C or lower, 55°C or lower, 50°C or lower, 45°C or lower, 40°C or lower, 35°C or lower, 30°C or lower, 25°C or lower, 20°C or lower, 15°C or lower, 10°C or lower, 5°C or lower, 0°C or lower, -5°C or lower, -10°C or lower -20°C or lower, or -25°C or lower. Preferably the temperature may be from -20°C to 45°C.

In addition, the stability may be maintained for 4 weeks or longer, 5 weeks or longer, 6 weeks or longer, 7 weeks or longer, 8 weeks or longer, or 9 weeks or longer at from -30°C to 60°C. In addition, the stability may be maintained for 10 weeks or shorter, 9 weeks or shorter, 8 weeks or shorter, 7 weeks or shorter, 6 weeks or shorter, or 5 weeks or shorter.

According to an aspect of the present invention, the hydrophobic visible light blocking agent may be homogenized and dispersed at from 5000 to 15000 rpm for from 1 to 20 minutes. Preferably, the hydrophobic visible light blocking agent may be homogenized and dispersed at from 8000 to 12000 rpm for from 3 to 8 minutes. In an embodiment, the hydrophobic visible light blocking agent may be homogenized in the aqueous phase or in the oil phase. According to another aspect of the present invention, the cosmetic composition may be obtained by homogeneously dispersing the hydrophobic visible light blocking agent and then emulsifying the hydrophobic visible light blocking agent together with other raw materials or components. In an embodiment, the emulsification may be conducted at from 5000 to 15000 rpm for from 1 to 20 minutes, preferably at from 8000 to

12000 rpm for from 3 to 6 minutes.

According to another aspect, the cosmetic composition may be for blocking visible light and at the same time for skin tone improvement. By an aspect of the present invention, it is possible to provide a cosmetic composition which contains a hydrophobic visible light blocking agent (for example, titanium dioxide having a surface treated with a hydrophobic material) capable of blocking harmful visible light (for example, one or more of blue light or violet light), stably maintains the O/W formulation, and at the same time, can improve the skin tone, and a method of stabilizing the formulation of the composition, and thus the present specification can be widely utilized in the fields related to cosmetic compositions or sunscreen products.

The cosmetic composition may further contain functional additives and components to be contained in general cosmetic compositions. The functional additives may include, for example, components selected from the group consisting of water-soluble vitamins, oil-soluble vitamins, polypeptides, polysaccharides, sphingolipids, and seaweed extracts. Other components to be blended in the composition may include fat and oil components, a moisturizer, an emollient, a surfactant, organic and inorganic pigments, an organic powder, an ultraviolet absorber, a preservative, a bactericide, an antioxidant, plant extracts, a pH adjuster, an alcohol, a coloring matter, a fragrance, a blood circulation accelerator, a cold sense agent, an antiperspirant, purified water, and the like.

The form of the cosmetic composition is not particularly limited and can be appropriately selected depending on the purpose. For example, the cosmetic composition can be manufactured into any one or more

forms selected from the group consisting of a cleansing product, a cleansing product, a skin exfoliating product, a skin lotion, a skin softener, a skin toner, an astringent, a lotion, a milky lotion, a moisturizing lotion, a nourishing lotion, a massage cream, a nourishing cream, a moisturizing cream, a hand cream, a foundation, an essence, a nourishing essence, a pack, a soap, a cleansing foam, a cleansing gel, a cleansing lotion, a cleansing cream, a body lotion, and a body cleanser, but it is not limited thereto. Preferably the cosmetic composition may be in the form of a lotion or cream.

In a case in which the formulation according to an aspect of the present invention is a paste, cream, or gel, an animal fiber, a plant fiber, wax, paraffin, starch, tragacanth, a cellulose derivative, polyethylene glycol, silicone, bentonite, silica, talc, zinc oxide, or the like may be used as a carrier component.

In a case in which the formulation according to an aspect of the present invention is a solution or emulsion, a solvent, a solvating agent, or an emulsifier is used as a carrier component, and for example, there are water, ethanol, isopropanol, ethyl carbonate, ethyl acetate, benzyl alcohol, benzyl benzoate, propylene glycol, 1,3-butyl glycol oil, a glycerol aliphatic ester, polyethylene glycol, or a sorbitan fatty acid ester.

In a case in which the formulation according to an aspect of the present invention is a surfactant-containing cleansing, an aliphatic alcohol sulfate, an aliphatic alcohol ether sulfate, a sulfosuccinic acid monoester, an isethionate, an imidazolinium derivative, methyl taurate, a sarcosinate, a fatty acid amide ether sulfate, an alkylamidobetaine, an aliphatic alcohol, a fatty acid glyceride, a fatty acid diethanolamide, a

vegetable oil, a linolenic derivative, an ethoxylated glycerol fatty acid ester, or the like may be used as a carrier component.

In another aspect, the present invention may relate to a visible light blocking method including a step of administering a cosmetic composition containing an oil phase portion containing an ultraviolet light blocking agent and a silicone oil; an aqueous phase portion containing one or more among the surfactants and a thickener; and a hydrophobic visible light blocking agent homogeneously dispersed in the aqueous phase portion to a subject in need thereof.

In still another aspect, the present invention may relate to a visible light blocking and skin tone improving method including a step of administering a cosmetic composition containing an oil phase portion containing an ultraviolet light blocking agent and a silicone oil; an aqueous phase portion containing one or more among the surfactants and a thickener; and a hydrophobic visible light blocking agent homogeneously dispersed in the aqueous phase portion to a subject in need thereof.

In still another aspect, the present invention may relate to the use of a composition containing an oil phase portion containing an ultraviolet light blocking agent and a silicone oil; an aqueous phase portion containing one or more among the surfactants and a thickener; and a hydrophobic visible light blocking agent homogeneously dispersed in the aqueous phase portion for the manufacture of a cosmetic composition for blocking visible light.

In still another aspect, the present invention relates to the use of a composition containing an oil phase portion containing an ultraviolet light blocking

agent and a silicone oil; an aqueous phase portion containing one or more among the surfactants and a thickener; and a hydrophobic visible light blocking agent homogeneously dispersed in the aqueous phase portion for the manufacture of a cosmetic composition for blocking visible light and skin tone improvement.

In still another aspect, the present invention may relate to the use of a composition containing an oil phase portion containing an ultraviolet light blocking agent and a silicone oil; an aqueous phase portion containing one or more among the surfactants and a thickener; and a hydrophobic visible light blocking agent homogeneously dispersed in the aqueous phase portion for blocking visible light or skin tone improvement.

In still another aspect, the present invention may relate to the use of a surfactant which is one or more selected from the group consisting of a phosphate surfactant, a glutamate surfactant, and a carbamate surfactant and is contained in a specific content for enhancement of formulation stability of the cosmetic composition.

Hereinafter, configurations and effects according to an aspect of the present invention will be described in more detail with reference to Examples and the like. However, the following Examples are provided for illustrative purposes only in order to facilitate understanding of an aspect of the present invention, and the gist and scope of the present invention are not limited thereto.

[Examples and Comparative Examples] Preparation of cosmetic composition of O/W emulsion formulation

A cosmetic composition was prepared by dispersing TiO_2 for hydrophobic pigment (for coloring agent) in an aqueous phase of O/W emulsion formulation using potassium

cetyl phosphate. The O/W emulsion formulation can be prepared using the components in the following Table 1, and it can be prepared by a conventional method of manufacturing an O/W emulsion formulation.

Specifically, the components for the oil phase in the table were mixed according to the numerical values (% by weight) in the table and heated to 75°C (mixture 1) when a cosmetic composition for ultraviolet light blocking containing the components listed in the following Table 1 was prepared. Meanwhile, the components for the aqueous phase in the table were mixed according to the numerical values (% by weight) in the table and heated to 75°C (mixture 2). The mixture 2 and surface-treated titanium dioxide were mixed with the mixture 1 and stirred (or surface-treated titanium dioxide was mixed and homogenized (at 10,000 rpm for 5 minutes) with the mixture 2 and this was mixed and stirred with the mixture 1), and then the mixture thus obtained was uniformly emulsified (at 10,000 rpm for 4 minutes) by using a homomixer (T.K. HOMOMIXER MARK II f model, TOKUSHU KIKI KOGYO CO. LTD), thereby preparing a composition.

In addition, the contents (% by weight) of specific components were varied according to the following Table 1 when the compositions were prepared by the above method.

[Table 1]

Division	Components	Comparative Example	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6
Oil phase	Polysorbate 60	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Behenyl alcohol	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Ethylhexyl methoxycinnamate	6.50	6.50	6.50	6.50	6.50	6.50	6.50
	Ethylhexyl salicylate	4.50	4.50	4.50	4.50	4.50	4.50	4.50
	Bis-ethylhexyloxyphenol methoxyphenyl triazine	3.00	3.00	3.00	3.00	3.00	3.00	3.00

	Diethylaminohydroxybenzoyl hexyl benzoate	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	Cyclopentasiloxane * cyclohexasiloxane	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	Silica	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Aqueous phase	Purified water	to 100	to 100	to 100	to 100	to 100	to 100	to 100
	Disodium EDTA	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	Phenylbenzimidazolesulfonic acid	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Tromethamine	2	2	2	2	2	2	2
	Propanediol	7.00	7.00	7.00	7.00	7.00	7.00	7.00
	Potassium cetyl phosphate	0.00	1.00	0.00	0.00	1.00	1.00	1.00
	Hydroxyethyl acrylate/sodium acryloyldimethyltaurate copolymer	0.70	0.70	0.70	0.70	0.70	0.70	0.70
	Carbomer	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	Phenoxyethanol	0.40	0.40	0.40	0.40	0.40	0.40	0.40
	Ethylhexyl glycerin	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Surface-treated titanium dioxide	Titanium dioxide coated with silica and alumina (TiO ₂ coated with hydrophilic substance, namely, water-dispersible TiO ₂ for coloring)	0.00	0.00	1.00	0.00	0.00	0.00	0.00
	Titanium dioxide coated with aluminum hydroxide and triethoxycaprylsilane (TiO ₂ coated with hydrophobic substance, namely, oil-dispersible TiO ₂ for coloring)	0.00	0.00	0.00	1.00	1.00	2.00	3.00

(The numerical values in Table 1 are % by weight)

[Experimental Example 1] Confirmation on formulation stability, ultraviolet light blocking power, harmful visible light blocking property, and presence or absence of skin tone correction

The feasibility on the manufacture of actual cosmetic compositions and cosmetics using the

compositions according to Examples above and the formulation stability, ultraviolet light blocking power, and harmful visible light (blue light and violet light) blocking effect of the compositions were measured, and the presence or absence of skin tone correction by the compositions was examined.

The formulation stability was confirmed by the results obtained by preparing an actual cosmetic composition (for example, a sunscreen product) using Examples above and then observing the presence or absence of separation, powder agglomeration, appearance change, and the like of the actual cosmetic composition for 4 weeks at -20°C, 5°C, room temperature, 30°C, and 45°C.

The UVB protection factor (sun protection factor, SPF) was measured according to the method and criteria for measuring the ultraviolet light blocking effect by the ISO test method (ISO 24444). First, 12 subjects suitable for the test purpose were selected by examining the medical history and diagnosing the skin condition, the back portion to which the product was not applied was irradiated with ultraviolet light using Multiport Solar UV Simulator (601-300W), and the minimal erythema dose (MED) for the site not applied with the product was determined after 16 to 24 hours. Each of the samples of the cosmetic compositions in Table 1 was uniformly applied to the skin of the back portion of the subjects in an amount of 2 mg/cm². The skin was irradiated with ultraviolet light based on the MED of the site not applied with the product, and the MED and SPF of the standard sample and test composition samples were determined. The sun protection factor (SPFi) of each subject was calculated according to the general formula 1, and the sun protection factor of the composition samples was determined by the arithmetic mean values.

[General Formula 1]

Sun protection factor (SPFi) of each subject =
minimal erythema dose for site applied with product /
minimal erythema dose for site not applied with product

The protection factor of UVA (PFA) was determined according to the test method described in the UVA blocking effect measurement method by the Japan Cosmetic Industry Association (JCIA, 2012). The standard sample and the cosmetic composition samples in Table 1 were uniformly applied to the back portion of the subjects in an amount of 2 mg/cm², stabilized for 15 minutes, and then irradiated with ultraviolet ray A based on the minimal persistent pigment darkening dose of the site not applied with the product, and the minimal persistent pigment darkening dose and PFA of the standard sample and test products were determined. The minimal persistent pigment darkening dose was determined, and PFA was calculated by the following general formula 2 using the determined values, and the average value thereof was determined.

[General Formula 2]

PFA = MPPD for site applied with sample / MPPD for site not applied with sample

Here, MPPD means the minimal persistent pigment darkening dose (minimum ultraviolet radiation dose at which faint darkening is recognized) (hereinafter referred to as MPPD)).

In order to confirm the blue light blocking ratio and violet light blocking ratio of the cosmetic compositions prepared according to Table 1 above, the formulations of Examples and Comparative Examples were applied onto quartz or band pass filters in an amount of 2 mg/cm² and then irradiated using a light source including blue/violet light region, and the transmitted blue/violet light wavelength region (380 to 500 nm) was

measured by using SPR-4001 Spectroradiometer (Luzchem, Canada).

Furthermore, in order to test the skin tone correcting effect of the cosmetic compositions prepared according to Table 1 above, 10 subjects were selected, one half of the face was applied with ordinary sunscreen, and the other half of the face was applied with the sunscreen products prepared using the compositions of Comparative Example and Examples, the presence or absence of skin tone correction was examined and confirmed immediately after application.

Specific results are presented in the following Table 2.

[Table 2]

Division	Comparative Example	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6
Feasibility on manufacture	0	0	0	X	0	0	0
Formulation stability	Stable for 4 weeks	Stable for 4 weeks	Powder agglomeration	-	Stable for 4 weeks	Stable for 4 weeks	Stable for 4 weeks
SPF	53	55	-	-	60	63	67
PFA	8	9	-	-	14	16	19
Violet light blocking ratio	28	30	-	-	60	68	78
Blue light blocking ratio	23	25	-	-	35	38	45
Presence or absence of skin tone correction	X	X	0	-	0	0	0
Others	-	-	-	-	-	-	Severe cloudiness

(The numerical values for the violet blocking ratio and blue blocking ratio in Table 2 are %)

With regard to the feasibility on the manufacture of cosmetic products (for example, sunscreen products) of

cream formulations using the compositions, it has been found that all the compositions except the composition of Example 3 can be prepared into cosmetic products. From the standpoint of the stability of O/W emulsion formulation, it has been confirmed that the formulation is stable for 4 weeks or longer in all Examples except Example 2 and Example 3 (that is, the emulsion formulation is stably maintained in a state in which the hydrophobic visible light blocking agent is effectively and homogeneously dispersed in the aqueous phase). In the case of Example 2 in which potassium cetyl phosphate was not contained but water-dispersible TiO_2 for coloring was contained, it was impossible to maintain the formulation since TiO_2 coated with a hydrophilic (water-dispersible) substance was agglomerated. In the case of Example 3 in which hydrophobic TiO_2 for coloring was contained but potassium cetyl phosphate was not contained, the emulsion stability was not maintained since the hydrophobic visible light blocking agent (TiO_2 coated with a hydrophobic substance) was not homogeneously dispersed in the aqueous phase.

In Examples 4 to 6, the experiment was conducted to compare the results when the content of the hydrophobic visible light blocking agent (TiO_2 coated with a hydrophobic substance) (1 to 3%) was varied. As a result, in the case of stabilizing the formulations containing a hydrophobic visible light blocking agent (TiO_2 coated with a hydrophobic substance) at 1% by weight, 2% by weight, or 3% by weight using potassium cetyl phosphate, it has been confirmed that the hydrophobic visible light blocking agent was homogeneously dispersed in the aqueous phase and a remarkably excellent effect was exhibited in terms of formulation stability and the compositions were superior to those of Examples 1 and 2 and Comparative

Example particularly in terms of harmful visible light blocking, but it has been found that the feel of use and the consumer satisfaction may decrease because of severe cloudiness when the hydrophobic visible light blocking agent (TiO₂ coated with a hydrophobic substance) was used at 3% by weight (consequently, it is appropriate to use the hydrophobic visible light blocking agent at less than 3% by weight). Moreover, a skin tone correcting effect (becoming brighter skin tone) has also been confirmed in Examples 4 to 6.

[Experimental Example 2] Change of effect depending on content of specific component

The formulation stability, ultraviolet light blocking effect, and harmful visible light blocking effect depending on the content of potassium cetyl phosphate (the content of TiO₂ coated with a hydrophobic substance was fixed to 1% by weight) were measured.

[Table 3]

Components	Comparative Example	Example 7	Example 8	Example 9
Polysorbate 60		1.00		
Behenyl alcohol		2.00		
Ethylhexyl methoxycinnamate		6.50		
Ethylhexyl salicylate		4.50		
Bis-ethylhexyloxyphenol methoxyphenyl triazine		3.00		
Diethylaminohydroxybenzoyl hexyl benzoate		3.00		
Cyclopentasiloxane/cyclohexasiloxane		5.00		
Silica		0.70		
Purified water		to 100		
Disodium EDTA		0.05		
Phenylbenzimidazolesulfonic acid		2.00		
Tromethamine		2.00		
Propanediol		7.00		
Potassium cetyl phosphate	0.50	1	1.5	2
Hydroxyethyl acrylate/sodium		0.70		

acryloyldimethyltaurate copolymer	
Carbomer	0.50
Phenoxyethanol	0.40
Ethylhexyl glycerin	0.05
Titanium dioxide coated with aluminum hydroxide and triethoxycaprylylsilane	1.00

(The numerical values in Table 3 represent % by weight)

[Table 4]

Division	Comparative Example	Example 7	Example 8	Example 9
Feasibility on manufacture	0	0	0	0
Formulation stability	Stable for 4 weeks	Stable for 4 weeks	Stable for 4 weeks	Stable for 4 weeks
SPF	54	60	61	60
PFA	12	14	14	14
Violet light blocking ratio	50	60	60	60
Blue light blocking ratio	30	35	35	35

(The numerical values for the violet light blocking ratio and blue light blocking ratio in Table 4 are %)

As a result, the ultraviolet light and harmful visible light blocking effect was improved in a case in which the content of potassium cetyl phosphate (% by weight) was increased from 0.5% to 1.0%, but similar results with the results obtained at the content of 1% were obtained at contents higher than 1%.

It is considered that similar results with these experimental results of Experimental Examples 1 and 2 are obtained in a case in which a composition is prepared using zinc oxide or iron oxide instead of titanium dioxide, and it has been confirmed that similar results are obtained even in a case in which sodium stearyl glutamate or inulin lauryl carbamate is used instead of potassium cetyl phosphate.

Furthermore, it is considered that similar results with the above results are obtained in the case of using the coloring components such as titanium dioxide, zinc oxide, and iron oxide having a surface treated with silicones such as dimethicone, methicone, caprylylsilane, and fluorine-based silicones, amino acid derivatives such as lauroyl lysine, disodium stearyl glutamate, and sodium myristyl glutamate, or a fluorine-based surface treatment material as well.

By the present specification, it is possible to provide a stable oil-in-water cosmetic composition for blocking visible light in which a hydrophobic visible light blocking agent is homogeneously dispersed in an aqueous phase, and a method of maintaining the stability of such a composition, and this makes it possible to meet the needs of consumers who are interested in this field and to promote the development of related industries.

While the present invention has been described with respect to the specific embodiments, it will be apparent to those skilled in the art that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the following claims.

[Claims]

[Claim 1]

A cosmetic composition for blocking visible light comprising:

an oil phase portion containing an ultraviolet light blocking agent and a silicone oil;

an aqueous phase portion containing one or more selected from the group consisting of a phosphate surfactant, a glutamate surfactant, and a carbamate surfactant and a thickener; and

a hydrophobic visible light blocking agent homogeneously dispersed in the aqueous phase portion,

wherein a content of the surfactant is from 0.5% to 2% by weight with respect to a total weight of the composition, and

wherein a content of the hydrophobic visible light blocking agent is 0.5% by weight or more and less than 3% by weight with respect to a total weight of the composition.

[Claim 2]

The cosmetic composition for blocking visible light according to claim 1, wherein the surfactant is potassium cetyl phosphate.

[Claim 3]

The cosmetic composition for blocking visible light according to claim 1, wherein the hydrophobic visible light blocking agent is an inorganic powder having a hydrophobically treated surface.

[Claim 4]

The cosmetic composition for blocking visible light according to claim 3, wherein the surface treatment is conducted using one or more selected from the group consisting of dimethicone, methicone, caprylylsilane having a substituent, lauroyl lysine, disodium stearyl glutamate, sodium myristyl glutamate, silica, alumina, and aluminum hydroxide.

[Claim 5]

The cosmetic composition for blocking visible light

according to claim 3, wherein the inorganic powder includes one or more selected from the group consisting of titanium dioxide, micro titanium oxide (micro TiO_2), zinc oxide (ZnO), micro zinc oxide (micro ZnO), iron oxides (FeO (II), Fe_2O_3 (III), Fe_3O_4 (IV)), aluminum oxide (alumina, Al_2O_3), barium sulfate (BaSO_3), silicon dioxide (silica, SiO_2), talc, kaolin, sericite, and mica.

[Claim 6]

The cosmetic composition for blocking visible light according to claim 1, wherein the hydrophobic visible light blocking agent is titanium dioxide coated with aluminum hydroxide and triethoxycaprylylsilane.

[Claim 7]

The cosmetic composition for blocking visible light according to claim 1, wherein the ultraviolet light blocking agent is one or more selected from the group consisting of ethylhexyl methoxycinnamate, ethylhexyl salicylate, bis-ethylhexyloxyphenol methoxyphenyl triazine, and diethylaminohydroxybenzoyl hexyl benzoate.

[Claim 8]

The cosmetic composition for blocking visible light according to claim 1, wherein the silicone oil is one or more of cyclopentasiloxane or cyclohexasiloxane.

[Claim 9]

The cosmetic composition for blocking visible light according to claim 1, wherein the ultraviolet light blocking agent is one or more of an organic ultraviolet light blocking agent or an inorganic ultraviolet light blocking agent.

[Claim 10]

The cosmetic composition for blocking visible light according to claim 1, wherein the thickener is one or more aqueous phase thickeners selected from the group consisting of a carbomer, a polyacrylamide, an ammonium acryloyldimethyltaurate-VP copolymer, xanthan gum, a cellulose ether, a polyvinyl derivative, an alginate, a polyacrylate, and any mixture of these.

[Claim 11]

The cosmetic composition for blocking visible light according to claim 1, wherein the visible light is one or more of violet light having a wavelength of from 380 to 430 nm or blue light having a wavelength of from 430 to 500 nm.

[Claim 12]

The cosmetic composition for blocking visible light according to claim 1, wherein the cosmetic composition blocks violet light by 60% or more.

[Claim 13]

The cosmetic composition for blocking visible light according to claim 1, wherein the cosmetic composition blocks blue light by 35% or more.

[Claim 14]

The cosmetic composition for blocking visible light according to claim 1, wherein the cosmetic composition is an emulsion or cream formulation.

[Claim 15]

The cosmetic composition for blocking visible light according to claim 1, wherein the cosmetic composition is an oil-in-water (O/W) emulsion formulation.

[Claim 16]

The cosmetic composition for blocking visible light according to claim 1, wherein the cosmetic composition maintains stability of formulation for 4 weeks or longer at room temperature.

[Claim 17]

The cosmetic composition for blocking visible light according to claim 1, wherein the cosmetic composition is for blocking visible light and, at the same time, skin tone improvement.

[Claim 18]

A method of enhancing formulation stability of a cosmetic composition for blocking visible light containing an oil phase portion containing an ultraviolet light blocking agent and a silicone oil; an aqueous phase portion containing one or more selected from the group consisting of a phosphate surfactant, a glutamate surfactant, and a carbamate surfactant and a thickener; and a hydrophobic visible light blocking agent homogeneously dispersed in the aqueous phase portion, the method comprising:

adjusting a content of the surfactant to be from 0.5% to 2% by weight with respect to a total weight of the composition in the cosmetic composition and a content of the hydrophobic visible light blocking agent to be 0.5% by weight or more and less than 3% by weight with respect to a total weight of the composition.