

Description

HAIR COSMETIC

[Field of the Invention]

[0001]

The present invention relates to rinse-off type (i.e. of the type applied to the hair and rinsed off after the application) hair cosmetics.

[Background of the Invention]

[0002]

Rinse-off type hair cosmetics such as hair rinses and hair conditioners used after hair washing with a shampoo comprise cationic surfactants and higher alcohols as main components and are intended to provide smoothness and a moist feeling to the hair to condition the surface state of the hair. For example, Patent Documents 1 and 2 disclose hair conditioners for providing excellent feel for touch in which cationic surfactants, higher alcohols, oils and fats and silicones etc. are blended.

[0003]

Patent Document 2 discloses a hair conditioning composition in which M3T (methyl trimethicone), which is a volatile silicone, a nonvolatile silicone derivative, and a cationic surfactant are combined.

[0004]

Patent Document 3 discloses an optically transparent hair treatment agent containing a hydrophobic silicone compound, a hydrophilic silicone compound, and various activators and polymers.

[0005]

(Patent Document 1) JP-A-6-172131

(Patent Document 2) JP-A-2006-265205

(Patent Document 3) JP-A-2008-520614

[Summary of the Invention]

[0006]

The present invention provides a hair cosmetic which is used for application thereof to the hair and then rinsing off thereof, wherein the hair cosmetic comprises components (A) to (D):

(A) cationic surfactant

(B) higher alcohol

(C) silicone having polyoxyalkylene side chain and aminoalkyl side chain

(D) volatile silicone

and water.

[0007]

In addition, the present invention provides a hair treatment method comprising applying the above hair cosmetic to the hair and rinsing off the hair cosmetic with water.

[Detailed Description of the Invention]

[0008]

In recent years, hair damage due to, in addition to chemical treatment such as hair coloring and permanent wave, hair setting by heat using, for example, a curling iron and a dryer which have been familiar with mainly young women has become serious. It is known that hair damage involves the loss of 18-MEA (18-methyleicosanoic acid, which is a fatty acid) from the hair surface, and causes increase in surface friction together with increase of hydrophilicity of the hair surface. The damaged and hydrophilized hair not only loses smoothness but also cannot be easily dried

after hair washing, requires a long time for drying by a dryer etc., and imposes a physical burden. In addition, damaged hair tangles easily in wet state, and hooking during blow-drying causes further accumulation of damage and imposes a psychological burden to consumers.

[0009]

However, conventional hair treatment agents make silicones and oil agents remain on the hair in order to provide smoothness and a moist feeling to the hair, however, impose a problem that these agents have tackiness and therefore inhibit each hair fiber from loosening, and it takes time to dry the hair after hair washing.

[0010]

Therefore, the present invention relates to a hair cosmetic which enables to make each wet hair fiber extremely easy to loosen, and to allow the hair to be dried in a short time without tangling regardless of the type of the contained cationic surfactant, by application thereof to the hair after hair washing with a shampoo and then rinsing off thereof, and which further enables to provide smoothness during rinsing.

[0011]

The above-described Patent Document 2 discloses a hair conditioning composition which can be quickly dried after application of the hair conditioning composition to the hair. However, the Document specifically discloses only a leave-on type quick-drying hair conditioning composition, and the effect "quickly dried after application" in the invention also means that the drying of the hair conditioning composition itself is quick. Therefore, the Document provides no suggestion whether the moisture contained in the hair sufficiently wet during a process for rinsing

off the hair conditioning composition applied to the hair can be quickly removed or not.

[0012]

As a factor which increases such a drying quickness of the hair after hair washing, "the loosening of the hair" is important. In another word, by the loosening of the hair, at the time of towel drying, the contact area with the towel increases, and water on the hair is quickly absorbed by the towel, and at the time of blow-drying (also at the time of natural drying), the contact area with air increases, and water on the hair evaporates quickly.

[0013]

The present inventors have found that by using a combination of an amino-polyether-comodified silicone having a particular structure and a volatile silicone in a rinse-off type hair cosmetic used after shampooing, such as a hair rinse or a hair conditioner, the amount of the tacky components adsorbed on the hair is decreased, and the bulky tacky components do not easily adhere to the hair. And as a result, the present inventors have found that the tackiness of each hair fiber can be weakened, wet hair after treatment loosens extremely easily, and the drying quickness can be dramatically improved without tangling.

[0014]

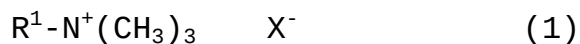
[Component (A): Cationic Surfactant]

Examples of the cationic surfactant as the component (A) include (i) alkyltrimethylammonium salts, (ii) alkoxyalkyltrimethylammonium salts, (iii) dialkyldimethylammonium salts, (iv) alkyldimethylamines and salts thereof, (v) alkoxyalkyldimethylamines and salts thereof, and (vi) alkylamidoalkyldimethylamines and salts thereof.

[0015]

(i) Alkyltrimethylammonium Salts

Examples of the alkyltrimethylammonium salts include those represented by the following formula (1):



wherein R^1 represents an alkyl group having 12 to 22 carbon atoms, and X^- represents a halide ion such as, for example, a chloride ion or a bromide ion; a methosulfate ion, an ethosulfate ion, a methophosphate ion, an ethophosphate ion, a methocarbonate ion.

[0016]

Specific examples include cetyltrimethylammonium chloride, stearyltrimethylammonium chloride, behenyltrimethylammonium chloride, and behenyltrimethylammonium methosulfate.

[0017]

(ii) Alkoxyalkyltrimethylammonium Salts

Examples of the alkoxyalkyltrimethylammonium salts include those represented by the following formula (2):



wherein R^2 represents an alkyl group having 12 to 22 carbon atoms, R^3 represents an ethylene group or a propylene group which may be substituted by a hydroxy group, and X^- represents a halide ion such as, for example, a chloride ion or a bromide ion; a methosulfate ion, an ethosulfate ion, a methophosphate ion, an ethophosphate ion, a methocarbonate ion.

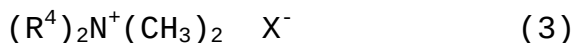
[0018]

Specific examples include stearoxypropyltrimethylammonium chloride, stearoxyethyltrimethylammonium chloride, and stearoxyhydroxypropyltrimethylammonium chloride.

[0019]

(iii) Dialkyldimethylammonium Salts

Examples of the dialkyldimethylammonium salts include those represented by the following formula (3):



wherein R^4 each independently represents an alkyl group having 12 to 22 carbon atoms or a benzyl group, and X^- represents a halide ion such as, for example, a chloride ion or a bromide ion; a methosulfate ion, an ethosulfate ion, a methophosphate ion, an ethophosphate ion, a methocarbonate ion.

[0020]

Specific examples include distearyldimethylammonium chloride.

[0021]

(iv) Alkyldimethylamines and Salts Thereof

Alkyldimethylamines react with acids to form quaternary ammonium salts, surfactants. Therefore, in the present invention, alkyldimethylamines and salts thereof are defined as cationic surfactants. Their content is converted in terms of the mass of the alkyldimethylamines. Examples of the alkyldimethylamines and salts thereof include those represented by the following formula (4) and salts thereof.



wherein R^5 represents an alkyl group having 12 to 22 carbon atoms.

[0022]

Examples of the salts include salts with organic acids or inorganic acids. Examples of the organic acids include monocarboxylic acids such as acetic acid and propionic acid; dicarboxylic acids such as malonic acid, succinic acid, glutaric acid, adipic acid, maleic acid, fumaric acid, and phthalic acid; polycarboxylic acids such as polyglutamic acid; hydroxycarboxylic acids such as glycolic acid, lactic acid, hydroxyacrylic acid, glyceric acid, malic acid, tartaric acid, and citric acid; and

acidic amino acids such as glutamic acid and aspartic acid.

Examples of the inorganic acids include hydrochloric acid, sulfuric acid, and phosphoric acid. Among these, organic acids are preferred, and dicarboxylic acids, hydroxycarboxylic acids, and acidic amino acids are preferred. As the dicarboxylic acids, maleic acid and succinic acid are more preferred. As the hydroxycarboxylic acids, glycolic acid, lactic acid, and malic acid are more preferred. As the acidic amino acids, glutamic acid is more preferred.

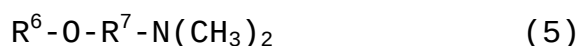
[0023]

Examples of specific alkyldimethylamines and salts thereof include N,N-dimethylbehenylamine, N,N-dimethylstearylamine, and organic acid salts thereof. The lactate of, for example, N,N-dimethylbehenylamine, the glycolate of N,N-dimethylstearylamine are preferred.

[0024]

(v) Alkoxyalkyldimethylamines and Salts Thereof

Alkoxyalkyldimethylamines react with acids to form quaternary ammonium salts, surfactants. Therefore, in the present invention, alkoxyalkyldimethylamines and salts thereof are defined as cationic surfactants. Their content is converted in terms of the mass of the alkoxyalkyldimethylamines. Examples of the alkoxyalkyldimethylamines and salts thereof include those represented by the following formula (5) and salts thereof.



wherein R^6 represents an alkyl group in which the carbon number is 12 to 22, and R^7 represents an ethylene group or a propylene group.

[0025]

Examples of the salts include salts with organic acids or inorganic acids. Examples of the organic acids include monocarboxylic acids such as acetic acid and propionic acid;

dicarboxylic acids such as malonic acid, succinic acid, glutaric acid, adipic acid, maleic acid, fumaric acid, and phthalic acid; polycarboxylic acids such as polyglutamic acid; hydroxycarboxylic acids such as glycolic acid, lactic acid, hydroxyacrylic acid, glyceric acid, malic acid, tartaric acid, and citric acid; and acidic amino acids such as glutamic acid and aspartic acid. Examples of the inorganic acids include hydrochloric acid, sulfuric acid, and phosphoric acid. Among these, organic acids are preferred, and dicarboxylic acids, hydroxycarboxylic acids, and acidic amino acids are preferred. As the dicarboxylic acids, maleic acid and succinic acid are more preferred. As the hydroxycarboxylic acids, glycolic acid, lactic acid, and malic acid are more preferred. As the acidic amino acids, glutamic acid is more preferred.

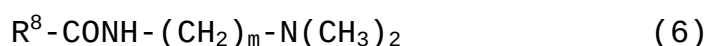
[0026]

Examples of specific alkoxyalkyldimethylamines and salts thereof include N,N-dimethyl-3-hexadecyloxypropylamine, N,N-dimethyl-3-octadecyloxypropylamine, and organic acid salts thereof. The lactate of N,N-dimethyl-3-hexadecyloxypropylamine and the glycolate of N,N-dimethyl-3-octadecyloxypropylamine are preferred.

[0027]

(vi) Alkylamidoalkyldimethylamines and Salts Thereof

Alkylamidoalkyldimethylamines react with acids to form quaternary ammonium salts, surfactants. Therefore, in the present invention, alkylamidoalkyldimethylamines and salts thereof are defined as cationic surfactants. Their content is converted in terms of the mass of the alkylamidoalkyldimethylamines. Examples of the alkylamidoalkyldimethylamines and salts thereof include those represented by the following formula (6) and salts thereof.



wherein R^8 represents an alkyl group having 12 to 22 carbon atoms, and m represents a number of 2 to 4.

[0028]

Among these, preferably, R^8 is an alkyl group having 14 to 22 carbon atoms, and more preferably, R^8 is an alkyl group having 16 to 20 carbon atoms, from the viewpoint of smoothness during rinsing and the prevention of tangling during blow-drying.

Examples of the salts include salts with organic acids or inorganic acids. Examples of the organic acids include monocarboxylic acids such as acetic acid and propionic acid; dicarboxylic acids such as malonic acid, succinic acid, glutaric acid, adipic acid, maleic acid, fumaric acid, and phthalic acid; polycarboxylic acids such as polyglutamic acid; hydroxycarboxylic acids such as glycolic acid, lactic acid, hydroxyacrylic acid, glyceric acid, malic acid, tartaric acid, and citric acid; and acidic amino acids such as glutamic acid and aspartic acid. Examples of the inorganic acids include hydrochloric acid, sulfuric acid, and phosphoric acid. Among these, organic acids are preferred, and dicarboxylic acids, hydroxycarboxylic acids, and acidic amino acids are preferred. As the dicarboxylic acids, maleic acid and succinic acid are more preferred. As the hydroxycarboxylic acids, glycolic acid, lactic acid, and malic acid are more preferred. As the acidic amino acids, glutamic acid is more preferred.

[0029]

Examples of specific alkylamidoalkyldimethylamines and salts thereof include N-(3-(dimethylamino)propyl)docosanamide and salts thereof, and N-(3-(dimethylamino)propyl)stearamide and salts thereof.

[0030]

Among these, (i) alkyltrimethylammonium salts, (ii) alkoxyalkyltrimethylammonium salts, (v) alkoxyalkyldimethylamines and salts thereof, and (vi) alkylamidoalkyldimethylamines and salts thereof are preferred, and from the viewpoint of the shortness of time until dryness is felt, (v) alkoxyalkyldimethylamines and salts thereof, and (vi) alkylamidoalkyldimethylamines and salts thereof are preferred. Further, from the viewpoint of smoothness during rinsing, the ease of loosening a tress, the prevention of tangling during blow-drying, and quick drying, N,N-dimethyl-3-hexadecyloxypropylamine and salts thereof, N,N-dimethyl-3-octadecyloxypropylamine and salts thereof, N-(3-(dimethylamino)propyl)docosanamide and salts thereof, and N-(3-(dimethylamino)propyl)stearamide and salts thereof are preferred.

[0031]

Any cationic surfactant of the component (A) can be used alone, or in combination of two or more. The content of the component (A) in the hair cosmetic of the present invention is preferably 0.1% by mass or more, more preferably 0.5% by mass or more, and further preferably 0.75% by mass or more, and preferably 10% by mass or less, more preferably 8% by mass or less, further preferably 6% by mass or less, further preferably 4% by mass or less, and further preferably 3% by mass or less, from the viewpoint of smoothness upon application of a conditioner and suitable quick-drying performance.

[0032]

[Component (B): Higher Alcohol]

The higher alcohol as the component (B) may be any of linear or branched, and saturated or unsaturated aliphatic alcohols, and the number of carbon atoms thereof is preferably 10 or more, more preferably 14 or more, and further preferably 16 or more, and

preferably 22 or less, more preferably 20 or less, and further preferably 18 or less. Specific examples include lauryl alcohol, myristyl alcohol, cetyl alcohol, stearyl alcohol, arachyl alcohol, hexyldecanol, isostearyl alcohol, oleyl alcohol, and 2-octyldodecanol. Among these, stearyl alcohol, cetyl alcohol, and myristyl alcohol are preferred. Any of these higher alcohols can be used alone, or in combination of two or more.

[0033]

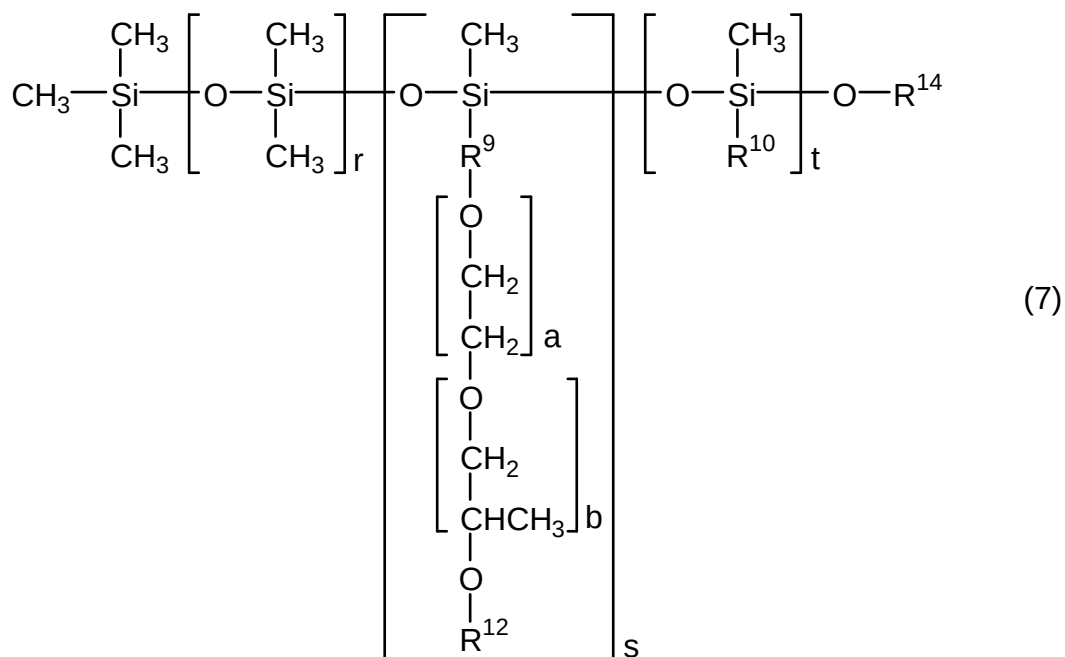
The content of the component (B) in the hair cosmetic of the present invention is preferably 1% by mass or more, more preferably 2% by mass or more, and further preferably 3% by mass or more from the viewpoint of smoothness from application to during rinsing and after drying, and preferably 10% by mass or less, more preferably 8% by mass or less, further preferably 7% by mass or less, and further preferably 6% by mass or less from the viewpoint of quick-drying performance, prevention of stickiness after drying, and adjustment of viscosity for convenience.

[0034]

[Component (C): Silicone Having Polyoxyalkylene Side Chain and Aminoalkyl Side Chain]

Examples of the silicone having a polyoxyalkylene side chain and an aminoalkyl side chain, as the component (C), include those represented by the following formula (7):

[0035]



[0036]

wherein r represents an integer of 1 to 50, s represents an integer of 1 to 50, t represents an integer of 1 to 50, a represents an integer of 0 to 50, b represents 0 to 50 with the proviso that a and b are not simultaneously 0, binding order of the structural units in parentheses is not limited and the binding form thereof may be a block form or a random form, R^9 represents a divalent hydrocarbon group having 1 to 6 carbon atoms, R^{10} represents a substituent having an amino group or an ammonium group represented by $-\text{R}^{11}\text{Z}$, wherein R^{11} represents a divalent hydrocarbon group having 1 to 6 carbon atoms, Z represents a monovalent group selected from the group consisting of $-\text{NR}^{12}_2$, $-\text{NR}^{12}(\text{CH}_2)_c\text{NR}^{12}_2$, and $-\text{NR}^{12}(\text{CH}_2)_c\text{NR}^{12}\text{C}=\text{O}(\text{R}^{13})$, R^{12} represents a hydrogen atom or a hydrocarbon group having 1 to 4 carbon atoms, R^{13} represents a hydrocarbon group having 1 to 4 carbon atoms, and c represents an integer of 2 to 6, and R^{14} represents a hydrocarbon group having 1 to 4 carbon atoms or a trimethylsilyl group.

[0037]

Among these, preferably, R^9 is a divalent hydrocarbon group having 2 to 4 carbon atoms, R^{10} is $-R^{11}-NH_2$, R^{11} is a divalent hydrocarbon group having 2 to 4 carbon atoms, and R^{12} and R^{14} are each independently a methyl group or an ethyl group.

[0038]

The viscosity of the component (C) at 25°C is preferably 4,000 mm²/s or less, more preferably 3,000 mm²/s or less, further preferably 2,000 mm²/s or less, further preferably 1,000 mm²/s or less, and further preferably 800 mm²/s or less, and preferably 100 mm²/s or more and more preferably 200 mm²/s or more, from the viewpoint of making each wet hair fiber extremely easy to loosen, improving finger passing, and moreover providing excellent smoothness during rinsing.

[0039]

The viscosity at 25°C is obtained by measuring, using a capillary viscometer, the duration in which a certain volume of liquid flows through the capillary of the viscometer at 25°C and 1013.25 hPa, and calculating from this efflux time and the viscometer constant using the following formula. Ubbelohde type and Cannon-Fenske type capillary viscometer are generally used.

[0040]

<Method for Calculating Viscosity>

viscosity (mm²/s) = efflux time (seconds) × viscometer constant

[0041]

Specific examples of the component (C) include ABIL SOFT AF100 (manufactured by Evonik Industries AG: viscosity 400 mm²/s), X-22-3939A (manufactured by Shin-Etsu Chemical Co., Ltd.: viscosity 2,800 mm²/s), and Silsense A21 (manufactured by The Lubrizol Corporation: viscosity 250 mm²/s).

[0042]

Any silicone having a polyoxyalkylene side chain and an aminoalkyl side chain of the component (C) can be used alone, or in combination of two or more. The content of the component (C) in the hair cosmetic of the present invention is preferably 0.05% by mass or more, more preferably 0.1% by mass or more, further preferably 0.2% by mass or more, and further preferably 0.3% by mass or more from the viewpoint of making wet hair easy to loosen and drying the hair in a short time without tangling, and preferably 5% by mass or less, more preferably 4% by mass or less, further preferably 3% by mass or less, and further preferably 2.5% by mass or less from the viewpoint of smoothness during rinsing, the prevention of tangling during drying, quick-drying performance, prevention of stickiness after drying, and adjustment of viscosity for convenience.

[0043]

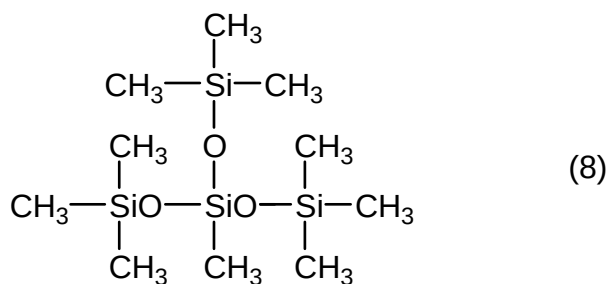
[Component (D): Volatile Silicone]

As the volatile silicone as the component (D), one or two or more selected from the group consisting of linear and cyclic silicone oils having a boiling point of 260°C or less at 1013.25 hPa can be used. From the viewpoint of stability during storage, the boiling point at 1013.25 hPa is preferably 35°C or more.

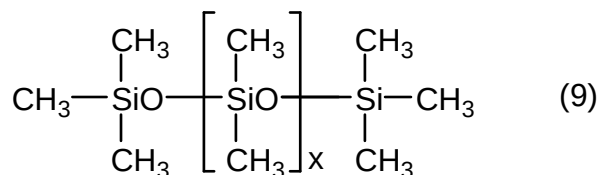
[0044]

Examples of the linear volatile silicones include a linear silicone represented by the following formula (8) or the following formula (9). Examples of the cyclic volatile silicones include a cyclic silicone represented by the following formula (10).

[0045]

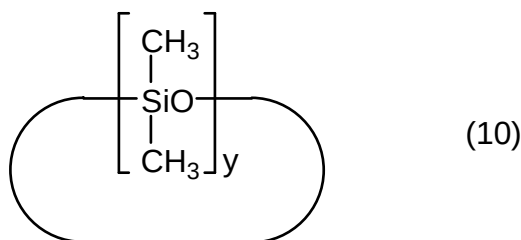


[0046]



wherein x represents an integer of 0 to 5.

[0047]



wherein y represents an integer of 3 to 6.

[0048]

Among these, methyl trimethicone represented by the formula (8) is preferred from the viewpoint of making each wet hair fiber extremely easy to loosen, improving finger passing, and moreover providing excellent smoothness during rinsing.

[0049]

Any volatile silicone of the component (D) can be used alone, or in combination of two or more. The content of the component (D) in the hair cosmetic of the present invention is preferably 0.05% by mass or more, more preferably 0.1% by mass or more, and further preferably 0.5% by mass or more from the viewpoint of making wet hair easy to loosen and drying the hair in a short time without

tangling, and preferably 10% by mass or less, more preferably 8% by mass or less, further preferably 6% by mass or less, further preferably 4% by mass or less, further preferably 3% by mass or less, and further preferably 2% by mass or less from the viewpoint of the ease of loosening the hair, quick drying, prevention of friction during rinsing, and prevention of stickiness after drying.
[0050]

The mass ratio of the component (C) to the component (D), $(C)/(D)$, is preferably 0.01 or more, more preferably 0.05 or more, further preferably 0.08 or more, further preferably 0.1 or more, and further preferably 0.2 or more, and preferably 5 or less, more preferably 4 or less, further preferably 3 or less, further preferably 2 or less, further preferably 1 or less, and further preferably 0.8 or less, from the viewpoint of allowing uniform adsorption of the conditioning component on the entire hair surface to weaken the tackiness of each hair fiber and make wet hair after treatment extremely easy to loosen so that drying quickness is dramatically improved without tangling.

[0051]

[Water]

The hair cosmetic of the present invention contains water as a medium. Water constitutes the balance excluding the components (A) to (D) and other components.

[0052]

[Other Optional Components]

Other components generally used in hair cosmetics can be further blended into the hair cosmetic of the present invention according to the purpose. Examples of the other components include silicones other than the components (C) and (D), such as dimethylpolysiloxane, cyclic silicones, amino-modified silicones,

dimethiconol, polyether-modified silicones, polyglycidol-modified silicones, methylphenylpolysiloxane, fatty acid-modified silicones, alcohol-modified silicones, alkoxy-modified silicones, epoxy-modified silicones, fluorine-modified silicones, and alkyl-modified silicones; polymer compounds such as cationized cellulose, hydroxyalkyl celluloses, and highly polymerized polyethylene oxide; nonionic surfactants such as polyoxyethylene alkyl ethers, polyoxyethylene sorbitan fatty acid esters, glycerin mono-fatty acid esters, polyglycerin fatty acid esters, polyoxyethylene hydrogenated castor oil, sucrose fatty acid esters, polyglycerin alkyl ethers, fatty acid alkanolamides, and alkyl glycosides; hydrocarbons such as squalene, squalane, liquid paraffins, liquid isoparaffins, and cycloparaffins; glycerides such as castor oil, cacao oil, mink oil, avocado oil, and olive oil; waxes such as beeswax, whale wax, lanolin, and carnauba wax; esters such as isopropyl palmitate, isopropyl myristate, octyldodecyl myristate, hexyl laurate, cetyl lactate, propylene glycol monostearate, oleyl oleate, hexadecyl 2-ethylhexanoate, isononyl isononanoate, and tridecyl isononanoate; higher fatty acids such as capric acid, lauric acid, myristic acid, palmitic acid, stearic acid, behenic acid, oleic acid, coconut oil fatty acids, lanolin fatty acids, isostearyl acid, and isopalmitic acid; oil agents such as isostearyl glyceryl ether and polyoxypropylene butyl ether; alcohols such as ethanol, 1-propanol, 2-propanol, butanol, ethylene glycol, propylene glycol, benzyl alcohol, phenoxyethanol, 2-benzyloxyethanol, methyl carbitol, ethyl carbitol, propyl carbitol, butyl carbitol, triethylene glycol monoethyl ether, triethylene glycol monobutyl ether, and glycerin; anti-dandruff agents such as zinc pyrithione and benzalkonium chloride; pH-adjusting agents; vitamin preparations; disinfectants; anti-inflammatory agents;

preservatives; chelating agents; moisturizing agents such as panthenol; colorants such as dyes and pigments; extracts such as polar solvent extracts of eucalyptus, proteins obtained from shells having nacreous layers or pearls, or hydrolysates thereof, proteins obtained from silk, or hydrolysates thereof, protein-containing extracts obtained from the seeds of leguminous plants, Asian ginseng extract, rice germ extract, fucus extract, camellia extract, aloe extract, Alpinia speciosa leaf extract, and chlorella extract; pearl powders such as titanated mica; refrigerants such as menthol; perfumes; coloring matter; ultraviolet-absorbing agents; antioxidants; and other components described in *ENCYCLOPEDIA OF SHAMPOO INGREDIENTS* (MICELLE PRESS).

[0053]

[pH]

The pH of the hair cosmetic of the present invention is preferably 2.0 or more and further preferably 2.5 or more, and preferably 7.5 or less, further preferably 6.5 or less, and further preferably 5.5 or less. In the present invention, the pH of the hair cosmetic refers to the value at 25°C when it is diluted 20 times by mass with water.

[0054]

The hair cosmetic of the present invention is used by applying it to the hair and then rinsing it off. Examples of the hair cosmetic of the present invention include those used in bathrooms, such as hair rinses, hair conditioners, hair treatments, and hair packs.

[0055]

In order to perform hair conditioning treatment using the hair cosmetic of the present invention, it is only required to apply the hair cosmetic of the present invention to the hair and then rinse

it off with water. It makes the smoothness during rinsing excellent, makes each wet hair fiber extremely easy to loosen, and allows the hair to be dried in a short time without tangling and with good finger passing.

[0056]

Regarding the above-described embodiments, preferred aspects of the present invention will be further disclosed below.

[0057]

<1> A hair cosmetic which is used for application thereof to the hair and then rinsing off thereof, wherein the hair cosmetic comprises components (A) to (D):

(A) cationic surfactant

(B) higher alcohol

(C) silicone having polyoxyalkylene side chain and aminoalkyl side chain

(D) volatile silicone

and water.

[0058]

<2> The hair cosmetic according to <1>, wherein the component (A) is preferably one or two or more compounds selected from the group consisting of alkyltrimethylammonium salts, alkoxyalkyltrimethylammonium salts, dialkyldimethylammonium salts, alkyldimethylamines and salts thereof, alkoxyalkyldimethylamines and salts thereof, and alkylamidoalkyldimethylamines and salts thereof.

[0059]

<3> The hair cosmetic according to <1> or <2>, wherein a content of the component (A) is preferably 0.1% by mass or more, more preferably 0.5% by mass or more, and further preferably 0.75% by mass or more, and preferably 10% by mass or less, more preferably

8% by mass or less, further preferably 6% by mass or less, further preferably 4% by mass or less, and further preferably 3% by mass or less.

[0060]

<4> The hair cosmetic according to any one of <1> to <3>, wherein the component (B) is a linear or branched, saturated or unsaturated aliphatic alcohol having preferably 10 or more carbon atoms, more preferably 14 or more carbon atoms, and further preferably 16 or more carbon atoms, and preferably 22 or less carbon atoms, more preferably 20 or less carbon atoms, and further preferably 18 or less carbon atoms.

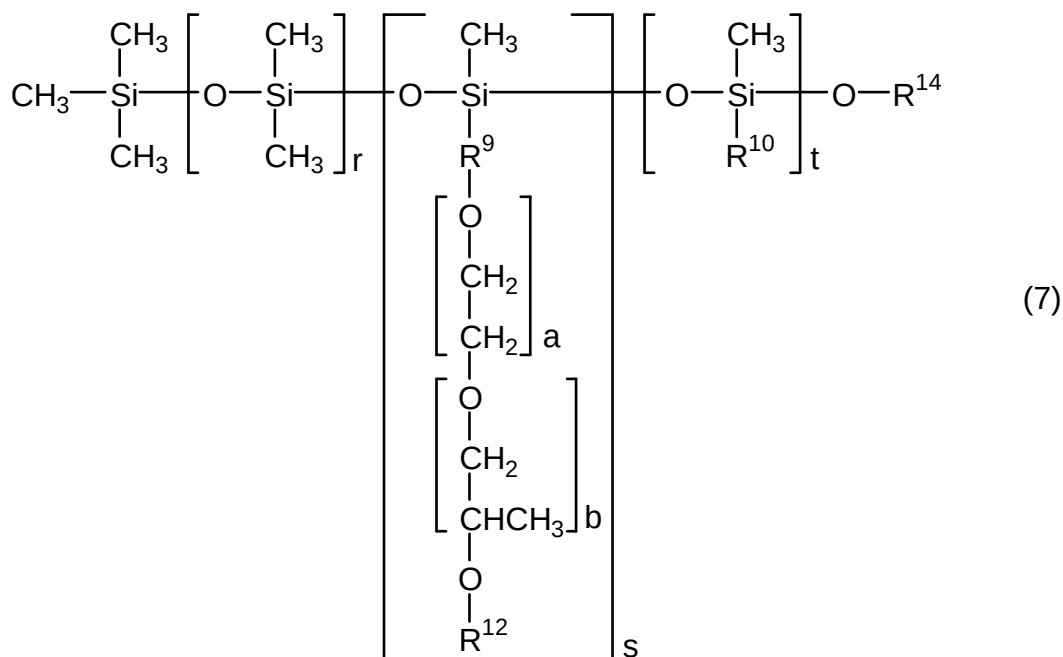
[0061]

<5> The hair cosmetic according to any one of <1> to <4>, wherein a content of the component (B) is preferably 1% by mass or more, more preferably 2% by mass or more, and further preferably 3% by mass or more, and preferably 10% by mass or less, more preferably 8% by mass or less, further preferably 7% by mass or less, and further preferably 6% by mass or less.

[0062]

<6> The hair cosmetic according to any one of <1> to <5>, wherein the component (C) is preferably represented by the following formula (7):

[0063]



[0064]

wherein r represents an integer of 1 to 50, s represents an integer of 1 to 50, t represents an integer of 1 to 50, a represents an integer of 0 to 50, b represents 0 to 50, with the proviso that a and b are not simultaneously 0, a binding order of structural units in parentheses is not limited, a binding form thereof may be a block form or a random form, R^9 represents a divalent hydrocarbon group having 1 to 6 carbon atoms, R^{10} represents a substituent having an amino group or an ammonium group represented by $-\text{R}^{11}\text{Z}$, wherein R^{11} represents a divalent hydrocarbon group having 1 to 6 carbon atoms, Z represents a monovalent group selected from the group consisting of $-\text{NR}^{12}_2$, $-\text{NR}^{12}(\text{CH}_2)_c\text{NR}^{12}_2$, and $-\text{NR}^{12}(\text{CH}_2)_c\text{NR}^{12}\text{C}=\text{O}(\text{R}^{13})$, R^{12} represents a hydrogen atom or a hydrocarbon group having 1 to 4 carbon atoms, R^{13} represents a hydrocarbon group having 1 to 4 carbon atoms, and c represents an integer of 2 to 6, and R^{14} represents a hydrocarbon group having 1 to 4 carbon atoms or a trimethylsilyl group.

[0065]

<7> The hair cosmetic according to any one of <1> to <6>, wherein a viscosity of the component (C) at 25°C is preferably 4,000 mm²/s or less, more preferably 3,000 mm²/s or less, further preferably 2,000 mm²/s or less, further preferably 1,000 mm²/s or less, and further preferably 800 mm²/s or less, and preferably 100 mm²/s or more and more preferably 200 mm²/s or more.

[0066]

<8> The hair cosmetic according to any one of <1> to <7>, wherein a content of the component (C) is preferably 0.05% by mass or more, more preferably 0.1% by mass or more, further preferably 0.2% by mass or more, and further preferably 0.3% by mass or more, and preferably 5% by mass or less, more preferably 4% by mass or less, further preferably 3% by mass or less, and further preferably 2.5% by mass or less.

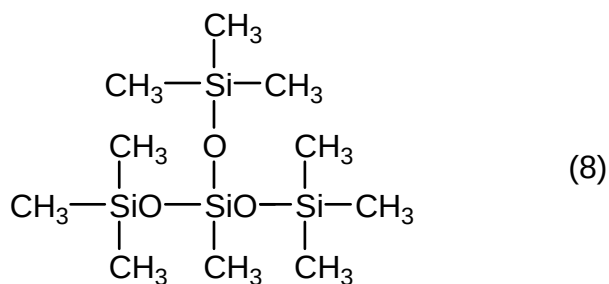
[0067]

<9> The hair cosmetic according to any one of <1> to <8>, wherein the component (D) is preferably one or two or more selected from the group consisting of linear and cyclic silicone oils having a boiling point of 260°C or less at 1013.25 hPa.

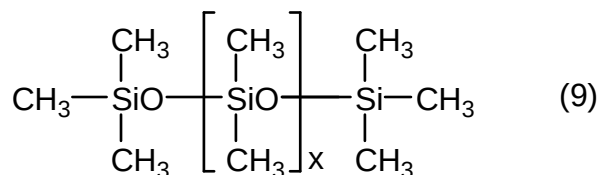
[0068]

<10> The hair cosmetic according to <9>, wherein the component (D) is preferably one or two or more volatile silicones selected from the group consisting of a linear silicone represented by the formula (8), a linear silicone represented by the formula (9), and a cyclic silicone represented by the formula (10),

[0069]

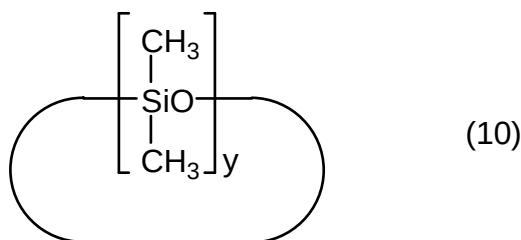


[0070]



wherein x represents an integer of 0 to 5,

[0071]



wherein y represents an integer of 3 to 6.

[0072]

<11> The hair cosmetic according to any one of <1> to <10>, wherein a content of the component (D) is preferably 0.05% by mass or more, more preferably 0.1% by mass or more, and further preferably 0.5% by mass or more, and preferably 10% by mass or less, more preferably 8% by mass or less, further preferably 6% by mass or less, further preferably 4% by mass or less, further preferably 3% by mass or less, and further preferably 2% by mass or less.

[0073]

<12> The hair cosmetic according to any one of <1> to <11>, wherein a mass ratio of the component (C) to the component (D), (C)/(D), is preferably 0.01 or more, more preferably 0.05 or more, further

preferably 0.08 or more, further preferably 0.1 or more, and further preferably 0.2 or more, and preferably 5 or less, more preferably 4 or less, further preferably 3 or less, further preferably 2 or less, further preferably 1 or less, and further preferably 0.8 or less.

[0074]

<13> The hair cosmetic according to any one of <1> to <12>, having a pH of preferably 2.0 or more and more preferably 2.5 or more and preferably 7.5 or less, more preferably 6.5 or less, and further preferably 5.5 or less at 25°C when diluted 20 times by mass with water.

[0075]

<14> A hair treatment method comprising applying the hair cosmetic according to any one of <1> to <13> to the hair and rinsing off the hair cosmetic with water.

[Examples]

[0076]

Examples 1 to 11 and Comparative Examples 1 to 3

Hair conditioners shown in Table 1 were prepared, and sensory evaluation and the measurement of quickness of drying were performed according to the following methods and criteria.

[0077]

(Method for Making Tress for Evaluation)

A Japanese human hair tress made using hair having a length of 40 cm and a dry weight of 20 g was subjected to bleaching treatment (a bleaching agent in an amount 5 times by mass that of the hair was applied, and treatment was performed at room temperature for 30 minutes) twice with a commercial bleaching agent (Bubble Color High Bleach manufactured by Kao Corporation), subjected to washing

treatment twice with a plain shampoo, and used for the following evaluations.

The composition of the plain shampoo (pH 7.0) is as follows.

25% sodium polyoxyethylene (2.5) lauryl ether sulfate	62% by mass
lauric acid diethanolamide	2.3% by mass
disodium edetate	0.15% by mass
sodium benzoate	0.5% by mass
sodium chloride	0.8% by mass
75% phosphoric acid	q.s.
perfume and methylparaben	trace amounts
purified water	balance
total	100% by mass

[0078]

(Sensory Evaluation)

"Smoothness during Rinsing"

A tress for evaluation made by the above method was washed with a plain shampoo, and then water was lightly removed. 1 g of a conditioner described in Table 1 was applied to the tress, and the tress was rinsed with tap water. The sensory evaluation of "smoothness" was carried out by five researchers. The evaluation was performed based on the following scale of 1 to 5, and the total points of the five researchers were calculated.

- 5: very smooth
- 4: smooth
- 3: undeterminable
- 2: not very smooth
- 1: not smooth

[0079]

"Ease of Loosening Tress"

After the evaluation of the above "Smoothness during Rinsing", the water content of the tress used for the evaluation was adjusted to be 10 g. Then, a paper towel (Elleair PROWIPE manufactured by DAIO PAPER CORPORATION), an acrylic plate, and a weight (the total weight of the acrylic plate and the weight 1.3 kg) were placed in order on each of the top and bottom of the tress to remove excess water. The ease of disentangling the tress and the ease of forming small tresses, when the fingers were passed through the tress, were used for evaluation of "the ease of loosening a tress", and sensory evaluation was carried out by five researchers. The evaluation was performed based on the following scale of 1 to 5, and the total points of the five researchers were calculated.

5: very easy to loosen

4: easy to loosen

3: undeterminable

2: somewhat difficult to loosen

1: difficult to loosen

[0080]

"Prevention of Tangling during Blow-Drying"

After the evaluation of the above "Ease of Loosening Tress", the tress used for the evaluation was placed downward, and a dryer (TURBODRY1300 manufactured by National) was fixed for adjusting the distance from the nozzle of the dryer to the center portion of the hair tress to be 25 cm, and adjusting the angle of blowing warm air to be from about 45° diagonally upward. Then, blow-drying was performed while the fingers were passed through the tress once every 4 seconds. During this process, sensory evaluation of "the prevention of tangling" until the tress dried completely was performed by five researchers. The evaluation was performed on the

following scale of 1 to 5, and the total points of the five researchers were calculated.

5: not tangled

4: hardly tangled

3: neither

2: somewhat easily tangled

1: easily tangled

[0081]

(Quickness of Drying)

A tress for evaluation made by the above method was washed with a plain shampoo, and then water was lightly removed. 1 g of a conditioner described in Table 1 was applied to the tress, and then the tress was rinsed with tap water and subjected to drainage by gravity for 60 seconds. Then, a paper towel (Elleair PROWIPE manufactured by DAI0 PAPER CORPORATION), an acrylic plate, and a weight (the total weight of the acrylic plate and the weight 1.3 kg) were placed in order on the tress to remove excess water.

This hair tress was placed downward, and a dryer (Nobby NB2501 manufactured by Tescom Co., Ltd.) (low warm air mode: 600 W) was fixed for adjusting the distance from the nozzle of the dryer to the center portion of the hair tress was 45 cm. Then, blow-drying was performed while the fingers were passed through the tress once every 4 seconds. During this process, the time interval (seconds) from the start of blow-drying until the time when the researcher was able to determine that the hair was completely dried was measured. This operation and measurement were repeated three times, and the average value was used for evaluation of quick-drying property.

[0082]

[Table 1]

(% by mass)		Examples											Comparative Examples		
		1	2	3	4	5	6	7	8	9	10	11	1	2	3
(A)	Stearoxypropyldimethylamine (*1)	1.37	1.37	1.37	-	-	-	-	-	1.37	1.37	1.37	1.37	1.37	1.37
	Stearamidopropyldimethylamine (*2)	-	-	-	1.42	-	-	-	-	-	-	-	-	-	-
	Behenamidopropyldimethylamine (*3)	-	-	-	-	1.63	-	-	-	-	-	-	-	-	-
	Behentrimonium chloride (*4)	-	-	-	-	-	1.55	-	-	-	-	-	-	-	-
	Cetrimonium chloride (*5)	-	-	-	-	-	-	1.28	1.32	-	-	-	-	-	-
(B)	Stearyl alcohol (*6)	4.79	4.79	4.79	4.79	4.79	4.79	4.79	1.92	4.79	4.79	4.79	4.79	4.79	4.79
	Cetyl alcohol (*7)	-	-	-	-	-	-	-	2.87	-	-	-	-	-	-
(C)	Methoxy PEG/PPG-7/3 aminopropyl dimethicone (*8)	0.50	-	0.50	0.50	0.50	0.50	0.50	0.50	0.20	3.00	3.20	-	0.50	-
	PEG7-amodimethicone (*9)	-	0.50	-	-	-	-	-	-	-	-	-	-	-	-
(C')	Amodimethicone (*10)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50
(D)	Methyl trimethicone (*11)	1.34	1.34	-	1.34	1.34	1.34	1.34	1.34	3.50	1.34	1.00	1.34	-	1.34
	Cyclopentasiloxane (*12)	-	-	1.34	-	-	-	-	-	-	-	-	-	-	-
Others	Dipropylene glycol	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Lactic acid	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.
	Purified water	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	q.s.
Mass ratio (C)/(D) or (C')/(D)		0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.06	2.24	3.20	-	-	0.37
Performance	Smoothness during rinsing	24	20	23	24	20	25	20	20	24	19	16	23	14	24
	Ease of loosening tress	24	24	23	24	25	20	25	25	18	23	23	10	12	8
	Prevention of tangling during blow-drying	24	23	24	24	20	24	24	23	23	18	17	14	15	10
	Quickness of drying (seconds)	95	96	94	97	89	94	90	88	112	95	96	136	132	140

[0083]

*1: FARMIN DM-E80 (manufactured by Kao Corporation)

*2: NIKKOL Amidoamine MPS (manufactured by NIPPON SURFACTANT INDUSTRIES CO., LTD.)

*3: AMIDET APA-22 (manufactured by Kao Corporation S.A.)

*4: QUARTAMIN 2285E-(E) (manufactured by Kao Corporation)

*5: QUARTAMIN 60W (manufactured by Kao Corporation)

*6: KALCOL 8098 (manufactured by Kao Corporation)

*7: KALCOL 6098 (manufactured by Kao Corporation)

*8: ABIL SOFT AF100 (manufactured by Evonik Industries AG; viscosity 400 mm²/s)

*9: Silsense A21 (manufactured by The Lubrizol Corporation;
viscosity 250 mm²/s)

*10: XS65-C0032 (Momentive Performance Materials Japan LLC)

*11: TMF-1.5 (manufactured by Shin-Etsu Chemical Co., Ltd.; boiling
point 191°C)

*12: Silicone SH245FLUID (manufactured by Dow Corning Toray Co.,
Ltd.; boiling point 205°C)

Claims

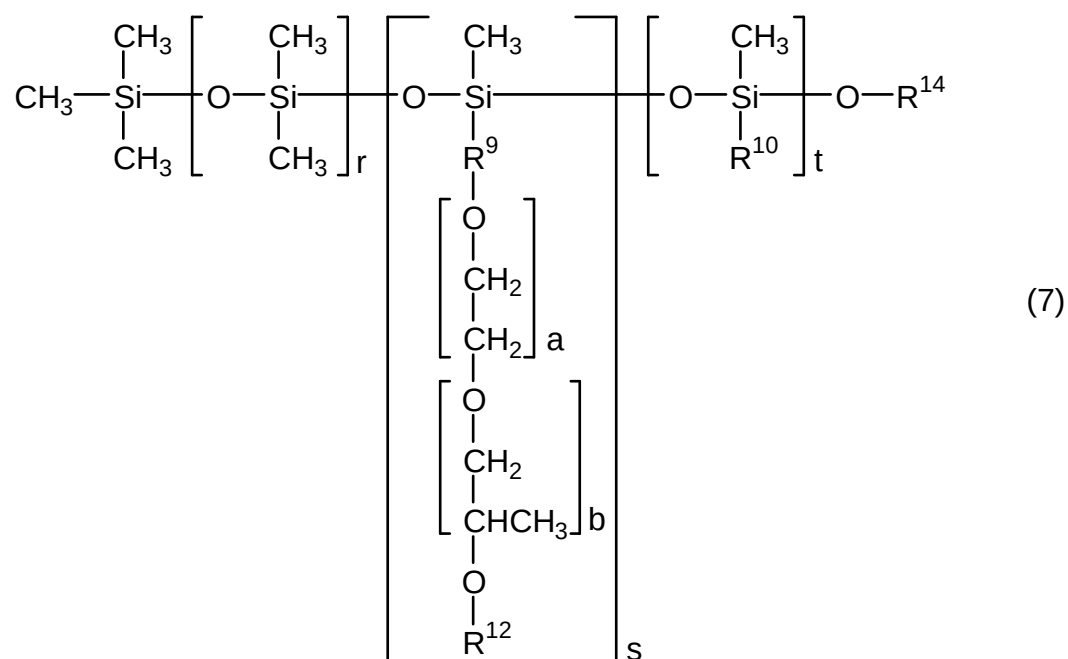
1. A hair cosmetic which is used for application thereof to the hair and then rinsing off thereof,

wherein the hair cosmetic comprises components (A) to (D):

(A) 0.1% by mass or more and 10% by mass or less of cationic surfactant;

(B) 1% by mass or more and 10% by mass or less of linear or branched, and saturated or unsaturated aliphatic alcohol having 10 or more and 22 or less of carbon number;

(C) 0.05% by mass or more and 5% by mass or less of silicone having polyoxyalkylene side chain and aminoalkyl side chain represented by the following formula (7):



wherein r represents an integer of 1 to 50, s represents an integer of 1 to 50, t represents an integer of 1 to 50, a represents an integer of 0 to 50, b represents 0 to 50 with the proviso that a and b are not simultaneously 0, binding order of the structural units in parentheses is not limited and the binding form thereof

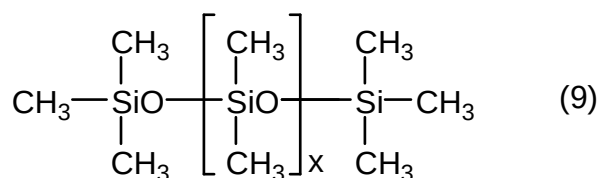
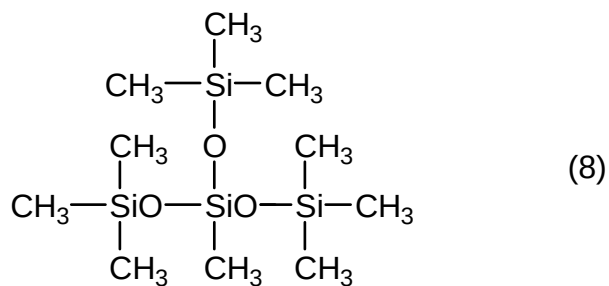
may be a block form or a random form, R^9 represents a divalent hydrocarbon group having 1 to 6 carbon atoms, R^{10} represents a substituent having an amino group or an ammonium group represented by $-R^{11}Z$, wherein R^{11} represents a divalent hydrocarbon group having 1 to 6 carbon atoms, Z represents a monovalent group selected from the group consisting of $-NR^{12}_2$, $-NR^{12}(CH_2)_cNR^{12}_2$, and $-NR^{12}(CH_2)_cNR^{12}C=O(R^{13})$, R^{12} represents a hydrogen atom or a hydrocarbon group having 1 to 4 carbon atoms, R^{13} represents a hydrocarbon group having 1 to 4 carbon atoms, and c represents an integer of 2 to 6, and R^{14} represents a hydrocarbon group having 1 to 4 carbon atoms or a trimethylsilyl group;

(D) 0.05% by mass or more and 10% by mass or less of one or two or more volatile silicone selected from the group consisting of linear and cyclic silicone oil having a boiling point of 260°C or less at 1013.25 hPa; and water.

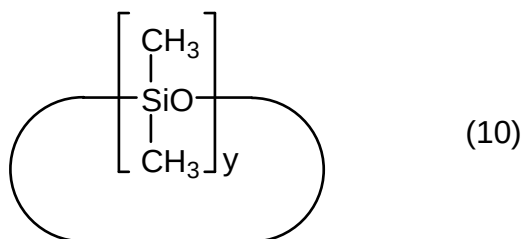
2. The hair cosmetic according to claim 1, wherein mass ratio of the component (C) to the component (D), $(C)/(D)$, is 0.01 or more and 5 or less.

3. The hair cosmetic according to claim 1 or 2, wherein viscosity of the component (C) at 25°C is 4,000 mm²/s or less.

4. The hair cosmetic according to any one of claims 1 to 3, wherein the component (D) is one or two or more volatile silicones selected from the group consisting of a linear silicone represented by the formula (8), a linear silicone represented by the formula (9), and a cyclic silicone represented by the formula (10),



wherein x represents an integer of 0 to 5,



wherein y represents an integer of 3 to 6.

5. The hair cosmetic according to any one of claims 1 to 4, wherein the pH of the hair cosmetic at 25°C when diluted 20 times by mass with water is 2.0 or more and 7.5 or less.

6. A hair treatment method comprising applying the hair cosmetic according to any one of claims 1 to 5 to the hair and rinsing off the hair cosmetic with water.