

## Description

## HAIR COSMETIC

## [Field of the Invention]

[0001]

The present invention relates to a hair cosmetic.

## [Background of the Invention]

[0002]

In recent years, consumer's preference for the hair style has been changed. Accordingly, preferred performance of hairstyling agents has also been changed from a conventional type of holding the hair using a sticky polymer or a film-forming polymer to a type of providing a soft and natural feel to the hair after finished while maintaining a naturally styled feeling. In recent years, especially women prefer hairstyling agents which provide a touch as if nothing is applied to the hair to the hand, a natural appearance without bundling feeling, while providing good finger running through the hair without reducing styling ability.

[0003]

For satisfying such preference, non-aqueous hair cosmetics, particularly products typically called "hair oils" have been provided, but use of such products showed problems due to oil component contained therein: for example, during and after application thereof, oily superficial sliding feeling is maintained for a while, an unnatural bundling feeling is remained, weighty look of hair and weighty touch to the hand are provided after application, and stickiness is maintained.

[0004]

To solve the above problems due to the hair oils, for example, Patent Document 1 discloses a hair oil which employs a polyether-modified silicone having a specific structure, a volatile oil and ethanol in combination. This Document discloses that the hair oil enables to eliminate the oiliness immediately after application, to provide good compatibility to the hair, and to prevent dryness of hair over time.

[0005]

On the other hand, the non-aqueous hair cosmetic products are also used for different purposes other than use as hair oils. Patent Document 2 discloses an agent for coating split hair containing an organic solvent, a volatile oil and a specific dimethylpolysiloxane derivative. This Document discloses that the agent for coating split hair can coat the split hair without stickiness and be easily washed away.

[0006]

(Patent Document 1) JP-A-2011-195471

(Patent Document 2) JP-A-8-40839

[Summary of the Invention]

[0007]

The present invention provides a hair cosmetic which comprises the following components (A) to (C):

(A) a hair cosmetic polymer having solubility or dispersibility in water or ethanol,

(B) a  $C_{1-4}$  monohydric alcohol, and

(C) a silicone oil having a number average molecular weight of 100 or more and 1,500 or less

wherein content of the component (A) is 0.1 mass% or more and 10 mass% or less, total content of the component (B) and the

component (C) is 30 mass% or more, and mass ratio of the component (B) to the component (C),  $(B)/(C)$ , is 0.8 or more and 99 or less.

[Detailed Description of the Invention]

[0008]

The hair oil of Patent Document 1, when applied to the after-washed wet hair, can impart a setting feeling and a conditioning effect after drying; however, when applied to the dry hair, shows problems such as unsatisfactory setting and feel after drying due to possibility of uneven application. Another problem occurs when a sufficient amount is applied for uniform application of the hair oil throughout the entire hair, resulting in provision of weighty look and bundling feeling after drying.

[0009]

The Patent Document 2 describes that the agent for coating split hair preferably contains as much as 10 to 50 wt%, particularly 20 to 40 wt%, of a dimethylpolysiloxane derivative in the entire composition for coating split hair. For this reason, a large amount of dimethylpolysiloxane derivative is remained on the hair after drying, resulting in remaining weighty look or bundling feeling, and making provision of silky feel difficult.

[0010]

Thus, the present invention relates to a hair cosmetic which enables to show good wet spreadability when applied to the dry hair, to be easily dried after application, to prevent imparting friction feeling or wet hair feeling, and to provide natural setting to the hair without making tresses after drying.

[0011]

The present inventor's investigation has been carried out after considering that the above-described problems on the non-

aqueous hair cosmetics are largely due to insufficient wet spreadability on the dry hair and time consumption for volatilizing volatile oil after application thereof. As a result, the inventors found that, by employing a specific silicone oil and a lower alcohol in a specific ratio, a surface tension of a solvent remarkably increases, and the hair cosmetic applied onto the hair spontaneously moves on the hair surface, thereby enhancing coating of the hair surface with the polymer contained in the hair cosmetic. Consequently, the inventor has found that the polymer component contained therein can be immediately and uniformly applied to the hair surface, and further, a feeling of a hair cosmetic presence on the hair can be disappeared immediately after application due to immediate volatilization of the hair cosmetic, and further, the hair after drying can be easily styled, accordingly has completed the present invention.

[0012]

The hair cosmetic of the present invention spontaneously moves on the hair surface of dry hair, and immediately dries. Accordingly, the polymer in the hair cosmetic immediately spreads uniformly to form thin layer on the hair surface, the feeling of a hair cosmetic presence quickly disappears after application, a natural setting is imparted without providing touch to the hand as if something is applied and without providing unnatural bundling feeling. Further, no friction feeling or stickiness or wet-hair feeling are imparted during application.

[0013]

[Component (A): Hair cosmetic polymer having solubility or dispersibility in water or ethanol]

The component (A) is a polymer which is dissolved or stably dispersed in water or ethanol without using a surfactant and can be

stably present in a solvent having a polarity such as the component (B). Such a component (A) is a component which can impart a natural setting feeling and a natural feel to the hair without a feeling of a polymer presence when uniformly applied to the hair surface according to the formulation of the present invention. Film-forming polymers and polyether-modified silicones are preferable to be such a hair cosmetic polymer having solubility or dispersibility in water or ethanol.

[0014]

From the standpoint of further enhancing a setting feeling, a film-forming polymer is preferably used as the component (A). The film-forming polymer suitable for use as the component (A) is not particularly limited as long as it has solubility or dispersibility in water or ethanol, and any polymer typically used in hairstyling agents, from those having a strong setting power to those having a comparatively low setting power, can be used.

[0015]

Examples of the film-forming polymer include silicone-based graft polymers, urethane-based polymer compounds, polyvinylpyrrolidone polymer compounds, anionic vinyl ether-based polymer compounds, anionic polyvinyl acetate-based polymer compounds, anionic (meth)acrylic polymer-based compounds, amphoteric (meth)acrylic-based polymer compounds, nonionic (meth)acrylic-based polymer compounds, cationic (meth)acrylic-based polymer compounds, and maleimide-based polymer compounds.

[0016]

Examples of the silicone-based graft polymer include polysilicone-9 such as poly(N-formylethyleneimine)organopolysiloxane, poly(N-acetyleneimine)organopolysiloxane, and poly(N-

propionylethyleneimine)organopolysiloxane; organopolysiloxane graft polymers described in International Publication No. WO2014/002707 such as polysilicone-28; alkyl acrylate copolymer methylpolysiloxane esters such as KP-545 (Shin-Etsu Chemical Co., Ltd.); polysilicone-17 such as Silsoft Spread TT (Momentive Performance Materials Inc.); and alkyl acrylate-methacrylic acid-silicone copolymers such as Luviflex Silk (BASF). Among these, polysilicone-9 such as poly(N-formylethyleneimine)organopolysiloxane, poly(N-acetyleneimine)organopolysiloxane, and poly(N-propionylethyleneimine)organopolysiloxane; organopolysiloxane graft polymers described in International Publication No. WO2014/002707 such as polysilicone-28; and alkyl acrylate copolymer methylpolysiloxane esters such as KP-545 (Shin-Etsu Chemical Co., Ltd.) are more preferable from the standpoint of setting property, absence of stickiness when drying, softness after application, and finger running property after application.

[0017]

Examples of the urethane-based polymer compound include polyurethanes such as Luviset P.U.R. (BASF Japan); and polyurethane-14-AMP-acrylates copolymers such as Dynam X (Akzo Nobel).

[0018]

Examples of the polyvinylpyrrolidone-based polymer compounds include polyvinylpyrrolidones such as Luviskol K12, Luviskol K17, Luviskol K30, Luviskol L60, Luviskol K80, and Luviskol K90 (BASF); and PVP K15, PVP K17, PVP K30, PVP K60, PVP K90, and PVP K120 (all from Ashland Inc.); polyvinyl caprolactams such as Luviskol VA28, Luviskol VA37, Luviskol VA55, Luviskol VA64P, Luviskol VA73 (all from BASF); and Luviskol Plus (BASF); (vinylpyrrolidone/vinyl

acetate) copolymers such as PVP/VA E-735, PVP/VA E-635, PVP/VA E-535, PVP/VA E-335, PVP/VA S-630, and PVP/VA W-735 (all from Ashland Inc.); polyvinylpyrrolidone/vinyl acetate/vinyl propionate terpolymers such as Luviskol VAP343 (BASF); polyvinylpyrrolidone/dimethylaminomethyl/acrylic acid copolymers such as Luviflex (BASF); copolymer 845, copolymer 937, and copolymer 958 (all from Ashland Inc.); polyvinylpyrrolidone/dimethylaminoethylmethacrylate/vinylcaprolactam copolymers such as copolymer VC-713 (Ashland Inc.); (VP/methacrylamide/vinylimidazole) copolymers such as Luviset Clear (BASF); and vinyl methylimidazolium metachloride/vinylpyrrolidone copolymers such as Luviquat HM552 (BASF). Among these, (vinylpyrrolidone/vinyl acetate) copolymers and polyvinylpyrrolidones are more preferable from the standpoint of smoothness immediately after application, setting property, absence of stickiness when drying, and softness after application.

[0019]

Examples of the anionic vinyl ether-based polymer compound include (vinyl methyl ether/ethyl maleate) copolymers such as Gantrez ES-225 (Ashland Inc.); and (vinyl methyl ether/butyl maleate) copolymers such as Gantrez ES-425 (Ashland Inc.). Of these, (vinyl methyl ether/butyl maleate) copolymers are preferable from the standpoint of setting property, absence of stickiness when drying, and softness after application.

[0020]

Examples of the anionic polyvinyl acetate-based polymer compound include vinyl acetate/crotonic acid copolymers such as Resyn 28-1310 (Akzo Nobel) and Luviset CA66 (BASF); (vinyl acetate/crotonic acid/vinyl neodecanoate) copolymers such as Resyn

28-2930 (Akzo Nobel); and vinyl acetate/crotonic acid /vinyl propionate copolymers such as Luviset CAP (BASF).

[0021]

Examples of the anionic (meth)acrylic-based polymer compound include acrylic resin alkanolamine solutions such as Plascize L-53P and Plascize L-9540B (all from Goo Chemical Co., Ltd.); acrylic acid/acrylic ester copolymers such as Diahold (Mitsubishi Chemical Corporation); acrylic acid/acrylic acid amide/ethyl acrylate copolymers such as Ultrahold 8, Ultrahold strong (all from BASF), Amphomer V-42, and Dermacryl 79 (all from Akzo Nobel); and alkyl acrylate copolymers such as Aniset NF-1000 and Aniset HS-3000 (all from OSAKA ORGANIC CHEMICAL INDUSTRY LTD).

[0022]

Examples of the amphoteric (meth)acrylic-based polymer compound include (methacryloyloxyethylcarboxybetaine/alkyl methacrylate) copolymers such as Yukaformer M-75, Yukaformer R205, Yukaformer 301, Yukaformer SM (all from Mitsubishi Chemical Corporation), and RAM Resin (OSAKA ORGANIC CHEMICAL INDUSTRY LTD); (octylacrylamide/hydroxypropyl acrylate/butylaminoethyl methacrylate) copolymers such as Amphomer 28-4910 and Amphomer LV-71 (all from Akzo Nobel); (alkyl acrylate/octylacrylamide) copolymers such as Amphomer HC (Akzo Nobel); and (acrylates/lauryl acrylate/stearyl acrylate/ethylamine oxide methacrylate) copolymers such as DIAFORMER Z-651 (Mitsubishi Chemical Corporation). Among these, (methacryloyloxyethylcarboxybetaine/alkyl methacrylate) copolymers are preferable from the standpoint of setting property, absence of stickiness when drying, and softness after application.

[0023]

Examples of the nonionic (meth)acrylic-based polymer compound include (dimethylacrylamide/hydroxyethyl acrylate/methoxyethyl

acrylate) copolymers such as Plascize L-2700 and Plascize L-2714 (all from Goo Chemical Co., Ltd.).

[0024]

Examples of the cationic (meth)acrylic-based polymer compound include alkylacrylamide/acrylate/alkylaminoalkylacrylamide/polyethyleneglycol methacrylate copolymers described in JP-A-2-180911; alkylacrylamide/alkylaminoalkylacrylamide/polyethyleneglycol methacrylate copolymers described in JP-A-8-291206; Polyquaternium-99 such as Plascize L-515 (Goo Chemical Co., Ltd.); (PVP/vinylcaprolactam/acrylic acid DMAPA) copolymers such as AQUAFLEX SF-40 (Ashland Inc.); (vinylpyrrolidone/acrylic acid DMAPA) copolymers such as Styleze CC-10 (Ashland Inc.); and quaternary compounds of vinylpyrrolidone/dimethylaminomethacrylate copolymers (Polyquaternium-11) such as Luviquat PQ11 (BASF), GAFQUAT 734, and GAFQUAT 755 (all from Ashland Inc.). Among these, alkylacrylamide/acrylate/alkylaminoalkylacrylamide/polyethyleneglycol methacrylate copolymers described in JP-A-2-180911, alkylacrylamide/alkylaminoalkylacrylamide/polyethyleneglycol methacrylate copolymers described in JP-A-8-291206, and Polyquaternium-11 are preferable.

[0025]

Examples of the maleimide-based polymer compound include (isobutylene/ethylmaleimide/hydroxyethylmaleimide) copolymers such as AQUAFLEX FX-64 (ISP Japan Ltd.).

[0026]

Among these film-forming polymers, silicone graft polymers, polyvinylpyrrolidone-based polymer compounds, anionic polyvinyl acetate-based polymer compounds, amphoteric (meth)acrylic-based polymer compounds, nonionic(meth)acrylic-based polymers, and

cationic (meth)acrylic-based compounds are more preferable from the standpoint of setting property, absence of stickiness when drying, and softness after application.

[0027]

On the other hand, a polyether-modified silicone is preferably used as the component (A) from the standpoint of further enhancing the absence of friction immediately after application and a setting after drying. The polyether-modified silicone used to be the component (A) is not particularly limited as long as it has solubility or dispersibility in water or ethanol, and examples include polyoxyethylene-modified silicones, polypropylene-modified silicones, polyoxyethylene/polyoxypropylene-modified silicones, and polyglycerol-modified silicones, with examples of the modification form including pendant forms (side-chain modification forms) and straight-chain copolymer forms.

[0028]

The polyether-modified silicone is preferably a copolymer having a block chain of an organosiloxane chain and a polyalkylene chain, and examples include (PEG-40/PPG-8 methylaminopropyl/hydropropyl dimethicone) copolymers such as Silsoft A+ (Momentive Performance Materials Inc.); polysilicone-13 such as FZ-2222, FZ-2233, and CB2250 (Dow Corning Toray Co., Ltd.); PEG-12 dimethicones such as Silwet L-8600 (Momentive Performance Materials Inc.), PPG-12 dimethicones such as Silsoft 900 (Momentive Performance Materials Inc.); PEG-10 dimethicones such as Silsoft 860 (Momentive Performance Materials Inc.); (bisisobutyl PEG-14/amodimethicone) copolymers such as Silstyle 104 (Dow Corning Toray Co., Ltd.); (bisisobutyl PEG/PPG-20/35/amodimethicone) copolymers such as Silstyle 401 (Dow Corning Toray Co., Ltd.); bis-isopropanolamino-PG-propyl dimethicone/bis-isobutyl PEG-14

copolymers such as CE-8411 Smooth Plus Emulsion (Dow Corning Toray Co., Ltd.); and (bisisobutyl PEG-15/amodimethicone) copolymers such as DOW CORNING TORAY SS-3588 (Dow Corning Toray Co., Ltd.). Of these, a copolymer having a block chain of an amino-modified organopolysiloxane chain and a polyoxyalkylene chain is preferable, straight-chain copolymer amino-polyether-modified silicones such as (bisisobutyl PEG-14/amodimethicone) copolymers, (bisisobutyl PEG/PPG-20/35/amodimethicone) copolymers, bis-isopropanolamino-PG-propyl dimethicone/bis-isobutyl PEG-14 copolymers, and (bisisobutyl PEG-15/amodimethicone) copolymers are more preferable, and (bisisobutyl PEG-15/amodimethicone) copolymers are further preferable.

[0029]

These polymers for hair cosmetic can be used alone or in combinations of two or more, but from the standpoint of further enhancing both of a natural setting feeling and a natural feel, the above film-forming polymer and polyether-modified silicone are used in combination as the component (A).

[0030]

Additionally, the component (A) is preferably an amphiphilic film-forming polymer or polyether-modified silicone from the standpoint of remaining uniformly to form a thin layer on the hair without causing stickiness when drying and further imparting a natural feel and a setting. The amphiphilic film-forming polymer is a set polymer containing 10 to 98% in terms of mass ratio of a hydrophobic part, and examples of the amphiphilic set polymer include polysilicone-9 and polysilicone-28 with polysilicone-9 being particularly preferable.

[0031]

The content of the component (A) in the hair cosmetic of the present invention is, from the standpoint of imparting a hair setting, 0.1 mass% or more, preferably 0.5 mass% or more, and more preferably 1 mass% or more. Further, the content is, from the standpoint of imparting a natural feel and a setting feeling without causing a weighty look and a bundling feeling to the hair, 10 mass% or less, preferably 7 mass% or less, and more preferably 5 mass% or less.

[0032]

[Component (B): C<sub>1-4</sub> monohydric alcohol]

The component (B), in combination with the component (C), is a component for controlling the wet spreadability and drying speed on the hair of the hair cosmetic containing the component (A). For the monohydric alcohol having 1 to 4 carbon atoms for the component (B), saturated or unsaturated aliphatic alcohols can be used. These monohydric alcohols can be used singly or in combinations of two or more. For the alcohol, ethanol, propanol, isopropanol, and tert-butyl alcohol are preferable, with ethanol and isopropanol being more preferable, and ethanol being further preferable.

[0033]

The content of the component (B) in the hair cosmetic of the present invention is, from the standpoint of drying speed and absence of a bundling feeling, preferably 45 mass% or more, more preferably 55 mass% or more, and further preferably 60 mass% or more, and is, from the standpoint of the absence of friction after application, preferably 98 mass% or less, more preferably 90 mass% or less, more preferably 80 mass% or less, and further preferably 75 mass% or less.

[0034]

[Component (C): Silicone having a number average molecular weight of 100 or more and 1,500 or less]

The component (C) is a silicone having a number average molecular weight of 100 or more and 1,500 or less, and is, in combination with the component (B), a component for controlling the wet spreadability of the hair cosmetic and drying speed on the hair of the hair cosmetic. Examples of the silicone include cyclic silicones such as octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane, dodecamethylcyclohexasiloxane, and methylcyclopolysiloxane; chain silicones such as octamethyltrisiloxane, tetradecamethylhexasiloxane, methyl trimethicone, and methylpolysiloxane having a kinetic viscosity of, for example, 0.5 mm<sup>2</sup>/s or more and 10 mm<sup>2</sup>/s or less at 25°C. Of these, chain silicones such as decamethylcyclopentasiloxane, methyl trimethicone, and methylpolysiloxane having a kinetic viscosity of 0.5 mm<sup>2</sup>/s or more and less than 6 mm<sup>2</sup>/s at 25°C are preferable, and decamethylcyclopentasiloxane and methyl trimethicone are more preferable.

[0035]

The number average molecular weight of the component (C) is, from the standpoint of slipping property and goodness in finger running after application, preferably 100 or more, more preferably 150 or more, and more preferably 200 or more. Further, the number average molecular weight is, from the standpoint of the absence of a bundling feeling and lightness after drying, preferably 1000 or less, more preferably 700 or less, and more preferably 500 or less.

[0036]

Additionally, the component (C) is preferably a volatile silicone from the standpoint of lightness and the absence of a feeling of an agent presence after drying. Volatile silicone is a

highly volatile organic compound or volatile organic compound defined by WHO (World Health Organization) and a silicone having a boiling point of 260°C or less. Further, a volatile silicone having a boiling point of 50°C or more is preferable.

[0037]

The content of the component (C) in the hair cosmetic of the present invention is, from the standpoint of slipping property and goodness in finger running after application, preferably 1 mass% or more, more preferably 10 mass% or more, further preferably 20 mass% or more, and further preferably 25 mass% or more, and is, from the standpoint of the absence of a bundling feeling and lightness after drying, preferably 52 mass% or less, more preferably 45 mass% or less, further preferably 40 mass% or less, and further preferably 35 mass% or less.

[0038]

Further, the mass ratio of the component (B) to the component (C),  $(B)/(C)$ , in the hair cosmetic of the present invention is 0.8 or more and 99 or less. The hair cosmetic of the present invention in this range has a very high surface tension, and thus droplets thereof spontaneously move from top to down on the hair surface while spreading transversely when applied to the hair. As a result, it is inferred that the polymer contained in the hair cosmetic wets and spreads spontaneously and immediately on the hair surface and simultaneously the hair cosmetic dries immediately on the hair surface. For this reason, tresses are hardly formed after application, a feeling of a hair cosmetic presence disappears immediately, and a natural setting is imparted while touch to the hand is as if nothing is applied. Further, there is no superficial sliding feeling or slimy feeling during application, and the hair does not have a wet feel. From the standpoint of further enhancing

these effects, the mass ratio of the component (B) to the component (C),  $(B)/(C)$ , is preferably 1 or more, more preferably 1.2 or more, further preferably 1.5 or more, and further preferably 2 or more, and preferably 50 or less, more preferably 30 or less, further preferably 10 or less, and further preferably 5 or less.

[0039]

Further, the total content of the component (B) and the component (C) in the hair cosmetic of the present invention is, from the standpoint of lightness after drying and the absence of a feeling of an agent presence, 30 mass% or more, preferably 50 mass% or more, and preferably 70 mass% or more. Additionally, the total content is preferably 99.9 mass% or less, more preferably 99 mass% or less, and further preferably 98 mass% or less.

[0040]

[Component (D): Stabilizer]

The hair cosmetic of the present invention preferably further contains, from the standpoint of allowing stable preservation even at a high temperature without the hair cosmetic being separated, one or two or more selected from the group consisting of polyols, urea, organic acids, polyoxyalkylene alkyl glucosides and polyoxyalkylene glyceryl ethers as a component (D). Examples of the preferable polyol include 1,3-butanediol, glycerin, and polyglycerin. Further, examples of the preferable organic acid include lactic acid, malic acid, and citric acid. Furthermore, examples of the preferable polyoxyalkylene alkyl glucoside include PPG-10 methyl glucose, PPG-20 methyl glucose, methyl gluceth-10, and methyl gluceth-20. Additionally, examples of the preferable polyoxyalkylene glyceryl ether include PEG/PPG/polybutyleneglycol-8/5/3 glycerin. Of these, from the standpoint of high-temperature

preservation stability, urea, lactic acid, glycerin are preferable, with urea being more preferable.

[0041]

The content of the component (D) in the hair cosmetic of the present invention is, from the standpoint of ensuring high-temperature stability, preferably 0.1 mass% or more, and more preferably 0.5 mass% or more, and is, from the standpoint of keeping a natural feel, preferably 3 mass% or less, and more preferably 2 mass% or less.

[0042]

[Water]

The hair cosmetic of the present invention does not preferably contain water. However, a trace to small amount (e.g., 0.0001 mass% or more) of water contamination may be inevitable but, even in such a case, a water content is preferably small. Specifically, the content of water is preferably less than 5 mass%, more preferably less than 3 mass%, and further preferably less than 0.5 mass%.

[0043]

[Optional components]

The hair cosmetic of the present invention may contain an oil agent for cosmetic other than the components (A) and (C) in addition to the components described so far within a limit which does not impair the effect of the present invention. The content of the oil agent for cosmetic other than the components (A) and (C) in the hair cosmetic is preferably 0.1 to 10 mass%. Examples of the oil agent for cosmetic include glycerides such as castor oil, cacao oil, mink oil, avocado oil, and olive oil; waxes such as beeswax, spermaceti, lanolin, and carnauba wax; esters such as isopropyl myristate, hexyl laurate, cetyl lactate, propylene glycol monostearate, oleyl oleate, hexadecyl 2-ethylhexanoate,

octyldodecyl myristate; and silicone derivatives excluding those contained in the component (A) or (C) such as dimethylpolysiloxane, methylphenylpolysiloxane, epoxy-modified silicone oil, amino-modified silicone oils, and alkyl-modified silicone oil.

[0044]

Further, the hair cosmetic of the present invention can contain a fragrance and a coloring for enhancing the product value and preservatives and antioxidants for protecting the hair cosmetic from quality deterioration with the lapse of time, and may further contain as necessary a surfactant, a curing agent, an anti-static agent, a defoaming agent, a dispersant, a thickener, an ultraviolet absorber, an antioxidant, a preservative, a colored dye, a dye fixer, or a propellant.

[0045]

[Agent form]

The agent form of hair cosmetic of the present invention is not particularly limited and can be in the form of a clear liquid, a lotion, an emulsion, a mist (hair mist, hair spray), or a foam (hair mousse), but, of these, the agent form that is applied in the form of a mist is preferable, and the agent form of non-aerosol form is more preferable. Note that when the agent form is non-aerosol, the component (A) is preferably an amphiphilic film-forming polymer or polyether-modified silicone from the standpoint of having good dispersibility or solubility in both the component (B) and component (C).

[0046]

When the hair cosmetic of the present invention is used as an aerosol form hair cosmetic consisting of an aerosol stock solution and a propellant, the content of each component refers to a content

in the entire composition of aerosol stock solution excluding the propellant.

[0047]

[Hair styling method]

The hair cosmetic of the present invention can be preferably used as a hair styling agent. The method of use as the hair styling agent, that is, the hair styling method, can be any method as long as a method arranges a hair style by applying the hair cosmetic of the present invention to the hair. The hair cosmetic of the present invention may apply to the wet hair or dry hair but applying to the dry hair is preferable.

[0048]

For example, it is preferable that the hair cosmetic be directly applied in the form of mist and a hair style is arranged while combing by hand, a comb or brush.

[Examples]

[0049]

Hereinafter, although the present invention is further specifically described in reference to Examples, the present invention is not limited to embodiments described in these Examples.

[0050]

[Examples 1 to 6 and Comparative Examples 1 to 5]

Hair cosmetics described in Table 1 were prepared by a routine method, and high-temperature stability and wet spreadability were evaluated in accordance with the following methods and criteria.

[0051]

"High-temperature stability evaluation"

A 50 mL glass bottle (standard wide mouth bottle PS-NO.6; Sansyo Co., Ltd.) was charged with 40 mL of the hair cosmetic shown

in Table 3 and hermetically sealed with the lid on. The bottle was left to stand in a 50°C thermostatic chamber for 2 hours. Subsequently, the bottle was removed from the thermostatic chamber, and the state of hair cosmetic in the glass bottle was visually observed. The evaluation was carried out by the following criteria.

A: No separation

B: Clouded but returned to the homogeneous solution when the temperature was returned to room temperature

C: Never returned to the homogeneous solution even after returning to room temperature and shaking the bottle

[0052]

"Wet spreadability evaluation"

A 200×200×3 mm glass plate with the hydrophobic surface (Glass plate for adsorbent coating 100-2a, manufactured by AS ONE Corporation) was used as a model of the hair in a dry condition. The glass plate was placed to form 5° slope (no tilt was formed in transverse direction). 50 µL of each of the hair cosmetics described in Table 1 was dropped from a 5 mm height on the above glass plate using a micropipette (Research Plus V 3120, manufactured by Eppendorf AG) to measure a distance of moving the liquid within 1 minute.

[0053]

Additionally, the hair cosmetic described in Table 1 was filled in a Yoshino Seisakusho pump spray container (in this Example, a sprayer which sprays mist of the hair cosmetics of Examples and Comparative Examples having an average particle diameter of 60 µm was used) and performance was evaluated in accordance with the following methods and criteria. As the composition of Comparative Example 4 had a high viscosity and thus failed to be applied by a mist spray using the sprayer, in order to

evaluate the performance in accordance with the following methods and criteria, the liquid was taken in hand and then applied to tresses.

[0054]

(Tress for the evaluation)

Japanese tender curly hair having no chemical treatment history was used to prepare a tress having a length of 30 cm and a weight of 8 g. 3 g of "SUCCESS medicated Shampoo h" (manufactured by Kao Corporation) was applied to the tress, foamed and cleansed for 30 seconds, and rinsed out for 30 seconds with tap water at 40°C. The shampooing procedure was repeated twice. Subsequently, 3 g of a model rinse having the following formula was applied, incubated for 15 seconds, and then rinsed out for 30 seconds with tap water at 40°C. Subsequently, the tress was towel dried and then air dried under the laboratory conditions for 6 hours, to prepare a tress for use in evaluation.

[0055]

(Composition of the model rinse)

| <u>Component</u>           | <u>(mass%)</u> |
|----------------------------|----------------|
| Cetearyl Alcohol           | 2.0            |
| Steartrimonium Chloride    | 0.76           |
| Distearyldimonium Chloride | 2.7            |
| Propylene glycol           | 5.0            |
| Isopropanol                | 0.6            |
| Ethylparaben               | 0.1            |
| <u>Deionized water</u>     | <u>balance</u> |
| Total                      | 100            |

[0056]

(Evaluation method)

"Drying speed immediately after application"

0.2 g of each hair cosmetic filled in the pump spray was sprayed throughout the entire tress for the evaluation. After sprayed, the tress for the evaluation was combed by hand 30 times. The drying speed while combing by hand was evaluated on the following criteria.

The evaluation was carried out by letting seven panelists choose one from "fast drying"/"not either"/"slow drying" when the tress was treated by the above procedure using each composition. The number of panelists who answered "fast drying"/"not either"/"slow drying" are shown in this order.

[0057]

"Absence of friction immediately after application"

The tress was treated by the same method as the "Drying speed immediately after application", and the absence of a friction feeling while repeatedly combing the tress by the hand 1 to 10 times was evaluated on the following criteria.

The evaluation was carried out by letting seven panelists choose one from "friction feeling is absent"/"not either"/"friction feeling is present" when the tress was treated by the above procedure using each composition. The number of panelists who answered "friction feeling is absent"/"not either"/"friction feeling is present" are shown in this order.

[0058]

"Goodness in finger running immediately after application"

The tress was treated by the same method as the "Drying speed immediately after application", and the goodness in finger running while repeatedly combing the tress by the hand 1 to 10 times was evaluated on the following criteria.

The evaluation was carried out by letting seven panelists choose one from "good finger running"/"not either"/"poor finger

running" when the tress was treated by the above procedure using each composition. The number of panelists who answered "good finger running"/"not either"/"poor finger running" are shown in this order.

[0059]

"Absence of stickiness when hand combing"

The tress was treated by the same method as the "Drying speed immediately after application", and the absence of stickiness while combing the tress by the hand was evaluated on the following criteria.

The evaluation was carried out by letting seven panelists choose one from "stickiness is absent"/"not either"/"sticky" when the tress was treated by the above procedure using each composition. The number of panelists who answered "good finger running"/"not either"/"poor finger running" are shown in this order.

[0060]

"Absence of a bundling feeling after drying"

The tress was treated by the same method as the "Drying speed immediately after application" and allowed to stand for 3 minutes after hand combing was completed. Subsequently, the absence of a bundling feeling was evaluated on the following criteria.

The evaluation was carried out by letting seven panelists choose one from "bundling feeling is absent"/"moderate bundling feeling is present"/"bundling feeling is present" when the tress was treated by the above procedure using each composition. The number of panelists who answered "bundling feeling is absent"/"moderate bundling feeling is present"/"bundling feeling is present" are shown in this order.

[0061]

"Setting after drying"

The tress was treated by the same method as the "Drying speed immediately after application" and allowed to stand for 3 minutes after hand combing was completed. Subsequently, the setting was evaluated on the following criteria.

The evaluation was carried out by letting seven panelists choose one from "styled easily"/"styled moderately"/"not styled" when the tress was treated by the above procedure using each composition. The number of panelists who answered "styled easily"/"styled moderately"/"not styled" are shown in this order.  
[0062]

"Absence of a feeling of a hair styling agent presence after drying"

The tress was treated by the same method as the "Drying speed immediately after application" and allowed to stand for 3 minutes after hand combing was completed. Subsequently, the hair styling agent on the tress for evaluation, particularly the feeling of a polymer presence, was evaluated on the following criteria.

The evaluation was carried out by letting seven panelists choose one from "feeling of a presence is absent"/"not either"/"feeling of a presence is present" when the tress was treated by the above procedure using each composition. The number of panelists who answered "feeling of a presence is absent"/"not either"/"feeling of a presence is present" are shown in this order.  
[0063]

"Goodness in finger running after drying"

The tress was treated by the same method as the "Drying speed immediately after application" and allowed to stand for 3 minutes after hand combing was completed. Subsequently, the finger running through the tress for evaluation was evaluated on the following criteria.

The evaluation was carried out by letting seven panelists were asked to select any one of "good finger running"/"not either"/"poor finger running" when the tress was treated by the above procedure using each composition. The number of panelists who answered "good finger running"/"not either"/"poor finger running" are shown in this order.

[0064]

"Tension and stiffness after drying"

The tress was treated by the same method as the "Drying speed immediately after application" and allowed to stand for 3 minutes after hand combing was completed. Subsequently, the finger running through the tress for evaluation was evaluated on the following criteria.

The evaluation was carried out by letting seven panelists choose one from "tension and stiffness are present"/"not either"/"tension and stiffness are absent" when the tress was treated by the above procedure using each composition. The number of panelists who answered "tension and stiffness are present"/"not either"/"tension and stiffness are absent" are shown in this order.

[0065]

[Table 1]

| (Mass%)                       |                                                                              | Example |       |       |       |       |       | Comparative Example |       |       |       |       |
|-------------------------------|------------------------------------------------------------------------------|---------|-------|-------|-------|-------|-------|---------------------|-------|-------|-------|-------|
|                               |                                                                              | 1       | 2     | 3     | 4     | 5     | 6     | 1                   | 2     | 3     | 4     | 5     |
| (A)                           | Polysilicone-9 (*1)                                                          | 3       | 3     | 3     | -     | 3     | 3     | -                   | 3     | 3     | 30    | 20    |
|                               | Polyvinylpyrrolidone (*2)                                                    | -       | -     | -     | 3     | -     | -     | 3                   | -     | -     | -     | -     |
|                               | (Bisisobutyl PEG-15/amodimethicone) copolymer (*3)                           | -       | -     | 0.15  | -     | -     | -     | -                   | -     | -     | -     | -     |
| (B)                           | Ethanol                                                                      | 87      | 67    | 60.05 | 67    | 67    | 67    | 97                  | 27    | 67    | 45    | 30    |
| (C)                           | Cyclopentasiloxane (number average molecular weight 371)                     | -       | -     | -     | 30    | -     | 30    | -                   | -     | -     | 30    | -     |
|                               | Methyl trimethicone (number average molecular weight 310)                    | 4.8     | 30    | 35.6  | -     | -     | -     | -                   | 70    | -     | -     | -     |
|                               | Dimethicone (5 mm <sup>2</sup> /s: number average molecular weight 650) (*4) | -       | -     | -     | -     | 30    | -     | -                   | -     | -     | -     | 10    |
| (C')                          | Octyldodecyl Lactate                                                         | -       | -     | -     | -     | -     | -     | -                   | -     | 30    | -     | -     |
|                               | Isododecane                                                                  | -       | -     | -     | -     | -     | -     | -                   | -     | -     | -     | 40    |
| (D)                           | Urea                                                                         | 0.33    | -     | 1     | -     | -     | -     | -                   | -     | -     | -     | -     |
|                               | Lactic acid                                                                  | 0.33    | -     | -     | -     | -     | -     | -                   | -     | -     | -     | -     |
|                               | Glycerin                                                                     | 0.33    | -     | -     | -     | -     | -     | -                   | -     | -     | -     | -     |
|                               | Octyldecanol                                                                 | 4       | -     | -     | -     | -     | -     | -                   | -     | -     | -     | -     |
|                               | Fragrance                                                                    | 0.20    | -     | 0.20  | -     | -     | -     | -                   | -     | -     | -     | -     |
| (B)/(C)                       |                                                                              | 18.1    | 2.2   | 1.7   | 2.2   | 2.2   | 2.2   | -                   | 0.4   | -     | 1.5   | 3.0   |
| (B)+(C)                       |                                                                              | 91.8    | 97.0  | 95.7  | 97.0  | 97.0  | 97.0  | 97.0                | 97.0  | 67.0  | 75.0  | 40.0  |
| High-temperature stability    |                                                                              | A       | B     | A     | B     | B     | B     | A                   | B     | B     | B     | C     |
| Wet spreadability (cm)        |                                                                              | 14.4    | >19   | 17.2  | >19   | 10.5  | 16.5  | 5.4                 | 4.6   | 7.5   | 0.7   | 1     |
| Immediately after application | Drying speed/Absence of a wet feel                                           | 7/0/0   | 6/1/0 | 4/3/0 | 6/1/0 | 3/3/1 | 6/1/0 | 5/1/1               | 0/3/4 | 0/3/4 | 0/2/5 | 0/3/4 |
|                               | Absence of friction                                                          | 4/2/1   | 6/1/0 | 7/0/0 | 6/1/0 | 6/1/0 | 5/2/0 | 2/2/4               | 6/0/1 | 2/3/2 | 1/5/1 | 3/2/2 |
|                               | Slipping property/Goodness in finger running                                 | 3/3/1   | 6/1/0 | 7/0/0 | 6/1/0 | 7/0/0 | 5/2/0 | 2/2/3               | 5/1/1 | 1/3/3 | 0/4/3 | 1/3/3 |
|                               | Absence of stickiness when drying                                            | 6/1/0   | 7/0/0 | 4/3/0 | 3/3/1 | 4/3/0 | 7/0/0 | 0/3/4               | 4/2/1 | 0/4/3 | 0/0/7 | 0/2/5 |
| After drying                  | Absence of bundling feeling                                                  | 7/0/0   | 5/2/0 | 4/2/1 | 5/2/0 | 4/2/1 | 6/1/0 | 2/3/2               | 0/3/4 | 0/3/4 | 0/0/7 | 0/0/7 |
|                               | Setting                                                                      | 4/3/0   | 6/1/0 | 7/0/0 | 6/1/0 | 6/1/0 | 5/2/0 | 0/3/4               | 5/1/1 | 5/1/1 | 4/3/0 | 3/3/1 |
|                               | Lightness/absence of feeling of a presence                                   | 6/1/0   | 5/2/0 | 4/2/1 | 5/2/0 | 3/3/1 | 6/1/0 | 3/2/2               | 0/4/3 | 0/4/3 | 0/0/7 | 0/0/7 |
|                               | Slipping property/Goodness in finger running                                 | 4/2/1   | 6/1/0 | 7/0/0 | 4/2/1 | 6/1/0 | 6/1/0 | 1/2/4               | 5/2/0 | 1/3/3 | 0/0/7 | 0/4/3 |
|                               | tension and stiffness                                                        | 4/2/1   | 5/2/0 | 4/3/0 | 6/1/0 | 6/1/0 | 5/2/0 | 2/2/3               | 1/2/4 | 1/2/4 | 2/3/2 | 1/4/2 |

\*1: Organopolysiloxane A described in Synthesis Example 1 of JP-A-2013-40162

\*2: Luviskol K30 (BASF)

\*3: DOW CORNING TORAY SS-3588 (Dow Corning Toray Co., Ltd.)

\*4: KF-96L-5cs (Shin-Etsu Chemical Co., Ltd.)

# Claims

1. A hair cosmetic comprising the following components (A) to (C):

(A) a hair cosmetic polymer having solubility or dispersibility in water or ethanol,

(B) a C<sub>1-4</sub> monohydric alcohol, and

(C) a silicone oil having a number average molecular weight of 100 or more and 1,500 or less;

wherein content of the component (A) is 0.1 mass% or more and 10 mass% or less, total content of the component (B) and the component (C) is 30 mass% or more, and mass ratio of the component (B) to the component (C), (B)/(C), is 0.8 or more and 99 or less.

2. The hair cosmetic according to claim 1, wherein the content of the component (B) is 45 mass% or more and 98 mass% or less.

3. The hair cosmetic according to claim 1 or 2, wherein the content of the component (C) is 1 mass% or more and 52 mass% or less.

4. The hair cosmetic according to any one of claims 1 to 3, wherein the content of water is less than 3 mass%.

5. The hair cosmetic according to any one of claims 1 to 4, wherein the component (A) is a film-forming polymer or a polyether-modified silicone.

6. The hair cosmetic according to any one of claims 1 to 5, wherein the total content of the component (B) and the component (C) is 50 mass% or more and 99.9 mass% or less.
7. The hair cosmetic according to any one of claims 1 to 6, wherein the component (B) is ethanol.
8. The hair cosmetic according to any one of claims 1 to 7, further comprising, as a component (D), one or two or more selected from the group consisting of polyols, urea, organic acids, polyoxyalkylene alkyl glucosides and polyoxyalkylene glyceryl ethers.
9. The hair cosmetic according to any one of claims 1 to 8, used in the form of a mist.
10. The hair cosmetic according to claim 9, used in a non-aerosol form.