

Description

HAIR TREATMENT AGENT

Field of the Invention

[0001]

The present invention relates to a hair treatment agent.

Background of the Invention

[0002]

In recent years, hair cosmetics which show conditioning effects for imparting smoothness and styling ease to hair have been increasingly demanded. Technology for imparting smoothness and styling ease to hair by adding a cationic polymer and a fatty acid has been already reported. However, these effects are insufficiently sustained, and smoothness and styling ease have been lost by the time of shampooing on the following day. Additionally, inconveniently, when an amount of addition of the cationic polymer is increased to enhance sustainability of the conditioning effects, a sticky feel occurs during rinsing hair, the hair is less likely to be uniform after dried, and a heavy feel is left.

[0003]

As a countermeasure for the problem, Patent Literature 1 discloses a cosmetic composition comprising one or more cationic polymers and a cationic surfactant in combination, by which, as a result, clean, bright, smooth, and soft hair may be obtained, combing may be easier, and such satisfactory properties of the cosmetic may be sustained over a long period of time even after several times of shampoo. Further, Patent Literature 2 discloses that the combination of a specific cationic polymer and a specific branched fatty acid makes hair easy to be uniform, further imparts a cool feel, and achieves a continuous pleasant feel until shampooing on the following day, while maintaining the conditioning effects such as smoothness and styling ease after dried. Furthermore, Patent Literature 3 discloses a rinse-off type hair

cosmetic composition, by which, a water-insoluble complex between a specific cationic polymer and a specific mixed fatty acid is formed, and further combining silicones therewith, smoothness and styling ease may be obtained which is sustained until the next shampooing from immediately after treatment.

Cited Documents

[0004]

(Patent Literature 1) JP-A-2013-536830

(Patent Literature 2) JP-A-2013-216620

(Patent Literature 3) JP-A-2014-141485

Summary of the Invention

[0005]

The present invention provides a hair treatment agent comprising components (A) to (C), wherein the mass ratio of component (A) to component (B), $(A)/(B)$, is 0.01 or more and 0.50 or less:

(A) cationic polymer having a charge density of 3.0 meq/g or more and 24 meq/g or less

(B) cationic polymer having a charge density of less than 3.0 meq/g

(C) fatty acid or salt thereof.

[0006]

Further, the present invention provides a hair treatment kit comprising the following hair treatment agents, agent A and agent B:

agent A: a hair treatment agent comprising the components (A) to (C)

agent B: a hair treatment agent comprising components (E) and (F) below

(E) cationic surfactant

(F) higher alcohol.

[0007]

Furthermore, the present invention provides a method for treating hair comprising the following steps A and B:

step A: a step of applying a hair treatment agent comprising the components (A) to (C) (agent A) to hair

step B: a step of applying a hair treatment agent comprising components (E) and (F) below (agent B) to hair after the step A;

(E) cationic surfactant

(F) higher alcohol.

Detailed Description of the Invention

[0008]

Bed hair is an undesirably formed untidy shape of hair, which is formed by an external force applied to hair from bedclothes while sleeping, and many people find it an unpleasant state in daily life. Fixing the bed hair requires operations in which hydrogen bonds present inside the hair is once cleaved by wetting the hair with water or a hair styling agent or humidifying the hair, and subsequently the hydrogen bonds is re-formed in a more preferable shape by drying the hair using a blow dryer or a hair iron. These operations need a number of steps, and are time-consuming in addition to being typically cumbersome, and therefore, a hair treatment agent preventing such a bed hair and maintaining a good hair feel until the next shampooing has been demanded for busy people today.

[0009]

However, although Patent Literatures 1 to 3 disclose conditioning effects and the sustainability thereof, they do not suggest the effect of preventing bed hair and also the effect itself was unsatisfactory.

[0010]

Consequently, the present invention relates to a hair treatment agent which, in addition to preventing bed hair, controls stickiness during rinsing and simultaneously imparts smoothness to hair, and can maintain styling ease and smoothness of hair until the next shampooing, and further has good shampoo resistance.

[0011]

The present inventor has found that when a hair treatment agent comprising a combination of a cationic polymer having a high cation density, a cationic polymer having a low cation density, and a fatty acid or a salt thereof can achieve the effect of preventing bed hair, the effect of controlling stickiness during rinsing, the effect of imparting smoothness to hair, the effect of maintaining styling ease and smoothness of hair until the next shampooing, and the effect of shampoo resistance, and further found that treatment using a second hair treatment agent comprising cationic surfactant and higher alcohol following the treatment using the above hair treatment agent further improves the above effects.

[0012]

- Hair treatment agent

[Component (A): Cationic polymer having a charge density of 3.0 meq/g or more and 24 meq/g or less]

The charge density of the cationic polymer of component (A) is, from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, 3.0 meq/g or more, preferably 3.5 meq/g or more, more preferably 4.0 meq/g or more, further preferably 4.5 meq/g or more, further preferably 5.0 meq/g or more, and further preferably 5.5 meq/g or more, and from the same viewpoints, 24 meq/g or less, preferably 10 meq/g or less, more preferably 7.0 meq/g or less, and further preferably 6.5 meq/g or less.

[0013]

In the present invention, a charge density of a cationic polymer refers to a ratio of the number of positive charges on the polymer to the molecular weight of the polymer. When a charge density of a cationic polymer is multiplied by a molecular weight of the polymer, the number of sites positively charged on a predetermined polymer chain is determined. The charge density of a cationic polymer is defined as a milliequivalent number (meq/g) of positive charges (cationic nitrogen atoms) per g of the polymer.

The same applies to the charge density of the cationic polymer of component (B) below.

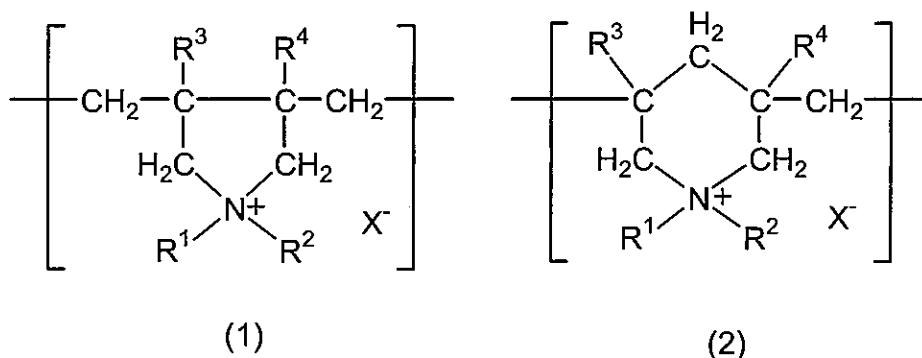
[0014]

Examples of the cationic polymer of component (A) include polymers comprising diallyl quaternary ammonium salt as a constitutional unit, quaternized polyvinyl imidazolium derivatives, polyethyleneimines and polymers of methacryloyloxyethylene trimonium chloride.

[0015]

The polymer comprising diallyl quaternary ammonium salt as a constitutional unit is preferably those having the skeleton represented by the following formula (1) or (2):

[0016]



[0017]

wherein R¹ and R² may be the same or different and represent a hydrogen atom, an alkyl group having 1 to 18 carbon atoms, an aryl group (a phenyl group etc.), a hydroxyalkyl group, an amidoalkyl group, a cyanoalkyl group, an alkoxyalkyl group or a carboalkoxyalkyl group, R³ and R⁴ may be the same or different and represent a hydrogen atom, an alkyl group having 1 to 3 carbon atoms or a phenyl group, and X⁻ represents an anion (chloride ion, bromide ion, iodide ion, sulfate anion, sulfonate anion, methyl sulfate anion, phosphate anion, and nitrate anion etc).

[0018]

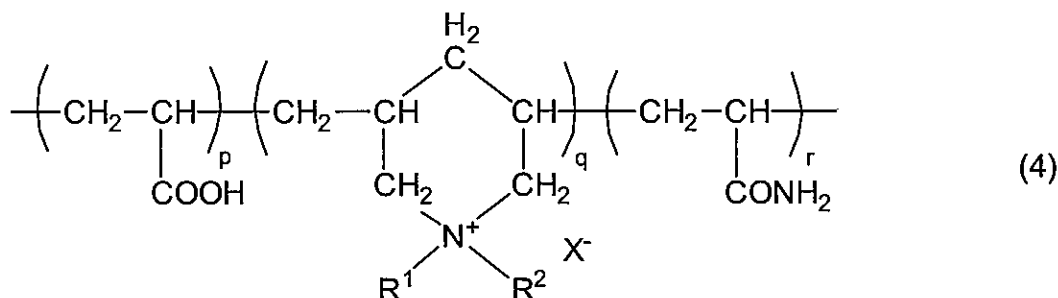
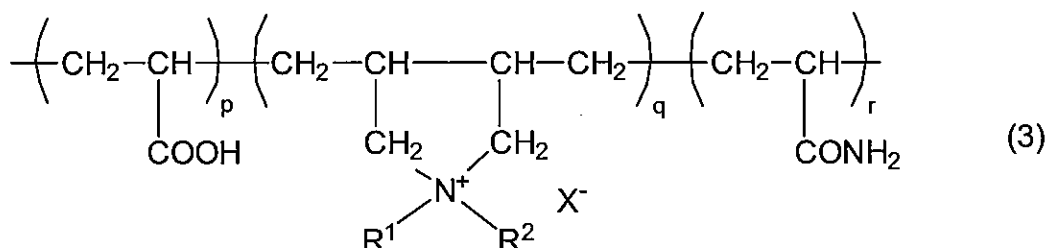
The polymer comprising diallyl quaternary ammonium salt as a constitutional unit comprises the constitutional unit represented by formula (1) or (2), from the viewpoint of further enhancing the effect for improving sustainability of conditioning effects

obtained by the combination with component (C), in a ratio of preferably 50 to 100 mol%, more preferably 65 to 100 mol%, further preferably 90 to 100 mol%, and further preferably 95 to 100 mol%, in a molecule.

[0019]

Specific examples of the polymer comprising diallyl quaternary ammonium salt as a constitutional unit include those represented by the following formula (3) or (4):

[0020]



[0021]

wherein R^1 , R^2 and X^- represent the same definition as described above, p , q and r represent molar ratios, and $p + q + r = 100$.

[0022]

p is preferably 0 to 50, more preferably 0 to 40, further preferably 0 to 30, and further preferably 0 to 25, q is preferably 50 to 100, more preferably 60 to 100, further preferably 70 to 100, and further preferably 75 to 100, and r is preferably 0 to 50, more preferably 0 to 40, further preferably 0 to 30, and further preferably 0 to 25.

[0023]

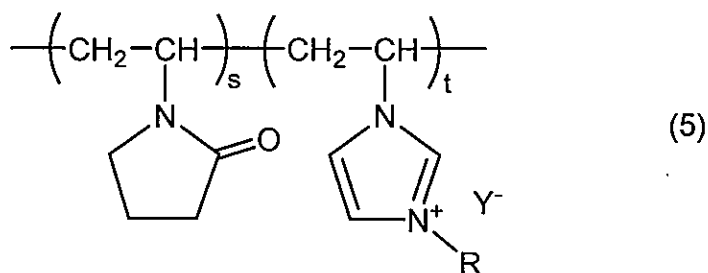
Among these, a homopolymer of diallyl quaternary ammonium salt, a copolymer of a diallyl quaternary ammonium salt and an acrylic acid, and a copolymer of diallyl quaternary ammonium salt and

acrylamide are preferable. Specific examples of the homopolymer of diallyl quaternary ammonium salt include Merquat 100 (INCI name: Polyquaternium-6, manufactured by Lubrizol Advanced Materials, Inc., charge density 6.2 meq/g, weight average molecular weight 150,000), specific examples of the copolymer of diallyl quaternary ammonium salt and an acrylic acid include Merquat 295 (INCI name: Polyquaternium-22, manufactured by Lubrizol Advanced Materials, Inc., charge density 6.0 meq/g, weight average molecular weight 190,000) and Merquat 280 (INCI name: Polyquaternium-22, manufactured by Lubrizol Advanced Materials, Inc., charge density 5.0 meq/g, weight average molecular weight 450,000), and specific examples of the copolymer of diallyl quaternary ammonium salt and acrylamide include Merquat 550 (INCI name: Polyquaternium-7, manufactured by Lubrizol Advanced Materials, Inc., charge density 3.1 meq/g, weight average molecular weight 1,600,000).

[0024]

For the quaternized polyvinyl imidazolium derivative, for example, a compound represented by the following formula (5) is preferable:

[0025]



[0026]

wherein R represents a hydrogen atom or an alkyl group having 1 to 3 carbon atoms, Y⁻ represents an anion such as chloride ion, bromide ion, iodide ion, sulfate anion, sulfonate anion, alkyl sulfate anion having 1 to 4 carbon atoms, phosphate anion, or nitrate anion, and s and t represent molar ratios, and s + t = 100.

[0027]

From the viewpoint of further enhancing the effect for improving sustainability of conditioning effects obtained by the

combination with component (C), t, representing the molar ratio of a monomer having cationic feature, is preferably 73 or more, more preferably 90 or more, and further preferably 93 or more, and preferably 99 or less.

[0028]

Specific examples of such a quaternized polyvinyl imidazolium derivative include Luviquat Excellence (manufactured by BASF, charge density 6.7 meq/g, weight average molecular weight 40,000), which is a copolymer of vinylpyrrolidone and methyl vinyl imidazolium chloride.

[0029]

Specific examples of the polyethyleneimine include polyethyleneimine having a charge density of 23.2 meq/g and a weight average molecular weight of 10,000, and sold by Wako Pure Chemical Industries, Ltd.

[0030]

Specific examples of the polymer of methacryloyloxyethylene trimonium chloride include (INCI name: Polyquaternium-37, BASF: Cosmedia Ultrigel 300, charge density 4.8 meq/g).

[0031]

The weight average molecular weight of component (A) is, from the viewpoint of forming a water-insoluble complex with component (C) and likely remaining on hair, preferably 10,000 or more, more preferably 50,000 or more, and further preferably 100,000 or more, and preferably 10,000,000 or less, more preferably 5,000,000 or less, further preferably 2,000,000 or less, further preferably 1,000,000 or less, and further preferably 800,000 or less.

[0032]

Here, a weight average molecular weight can be measured by, for example, gel permeation chromatography (GPC) under the following conditions.

Mobile phase: 50 mM LiBr, 1% CH₃COOH/ethanol:water = 3:7

Column: TSK gel α -M (2 tandem columns)

Standard substance: polyethylene glycol

[0033]

Among the cationic polymers of component (A), from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, a polymer comprising diallyl quaternary ammonium salt as a constitutional unit is preferable.

The cationic polymers of component (A) may be used alone or in combinations of two or more, and the content in the hair treatment agent is, from the viewpoints of absence of stickiness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, preferably 0.01 mass% or more, more preferably 0.05 mass% or more, and further preferably 0.10 mass% or more, and from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and preventing bed hair, preferably 1.5 mass% or less, more preferably 1.0 mass% or less, further preferably 0.5 mass% or less, further preferably 0.3 mass% or less, and further preferably 0.2 mass% or less.

[0034]

[Component (B): cationic polymer having a charge density of less than 3.0 meq/g]

The charge density of the cationic polymer of component (B) is, from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, less than 3.0 meq/g, preferably 2.0 meq/g or less, more preferably 1.5 meq/g or less, and further preferably 1.2 meq/g or less, and preferably 0.1 meq/g or more, more preferably 0.3 meq/g or more, and further preferably 0.5 meq/g or more.

[0035]

Examples of such a cationic polymer having a charge density of less than 3.0 meq/g include an N,N-dimethylaminoethyl methacrylate diethyl sulfate salt N,N-dimethylacrylamide-polyethylene glycol

dimethacrylate copolymer (INCI name: Polyquaternium-52, Sofcare KG-101W-E, manufactured by Kao Corporation, charge density 0.83 meq/g) and cationized celluloses such as hydroxyethyl cellulose hydroxypropyl trimethylammonium chloride ether (INCI name: Polyquaternium-10). Examples of the cationized cellulose include POIZ C-60H (manufactured by Kao Corporation, charge density 1.1 meq/g) and POIZ C-150L (manufactured by Kao Corporation, charge density 0.9 meq/g). The cationic polymer of component (B) may be used alone or in combinations of two or more, and from the viewpoints of absence of stickiness during rinsing and smoothness during rinsing, two or more are preferably used in combination.

[0036]

The content of component (B) in the hair treatment agent is, from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, preferably 0.1 mass% or more, more preferably 0.2 mass% or more, and further preferably 0.3 mass% or more, and from the viewpoints of absence of stickiness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, preferably 3 mass% or less, more preferably 2 mass% or less, further preferably 1.0 mass% or less, further preferably 0.8 mass% or less, and further preferably 0.6 mass% or less.

[0037]

The mass ratio of component (A) to component (B), (A)/(B), in the hair treatment agent is, from the viewpoints of absence of stickiness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, 0.001 or more, preferably 0.005 or more, more preferably 0.01 or more, further preferably 0.03 or more, further preferably 0.08 or more, further preferably 0.10 or more, and further preferably 0.30 or more, and from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing,

and preventing bed hair, 0.50 or less, preferably 0.45 or less, and more preferably 0.40 or less.

[0038]

[Component (C): fatty acid or a salt thereof]

Examples of the fatty acid or a salt thereof of component (C) include linear or branched fatty acids having 14 or more and 22 or less carbon atoms or salts thereof.

[0039]

For component (C), from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, the fatty acid or a salt thereof represented by formula (6) below is preferably used:



wherein R^5 represents a linear or branched, saturated or unsaturated hydrocarbon group having 13 or more and 21 or less carbon atoms, and M represents hydrogen, sodium or potassium atom.

[0040]

The number of carbon atoms of R^5 in formula (6) is, from the viewpoints of preventing bed hair, sustainability of styling ease after 1 day, and sustainability of smoothness after 1 day, preferably 15 or more and 21 or less, and more preferably 17 or more and 21 or less. Further, R^5 is preferably a linear or branched alkyl group or alkenyl group, and more preferably a linear or branched alkyl group. Specific examples of component (C) include stearic acid, isostearic acid, and behenic acid. Component (C) may be used alone or in combinations of two or more.

[0041]

The content of component (C) in the hair treatment agent is, from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, preferably 0.05 mass% or more, more preferably 0.10 mass% or more, and further preferably 0.15 mass% or

more, and preferably 1.0 mass% or less, more preferably 0.5 mass% or less, further preferably 0.30 mass% or less, and further preferably 0.25 mass% or less.

[0042]

[Component (D): Organic acid]

The hair treatment agent of the present invention may further comprise an organic acid as component (D). Examples of the organic acid 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; acidic amino acids such as glutamic acid and aspartic acid. Of these, succinic acid and lactic acid are preferable. Component (D) may be used alone or in combinations of two or more.

[0043]

The content of component (D) in the hair treatment agent is, from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, preferably 0.05 mass% or more, more preferably 0.08 mass% or more, and further preferably 0.10 mass% or more, and from the viewpoints of absence of stickiness during rinsing and smoothness during rinsing, preferably 4 mass% or less, more preferably 3 mass% or less, further preferably 2 mass% or less, further preferably 1.0 mass% or less, further preferably 0.5 mass% or less, and further preferably 0.35 mass% or less.

[0044]

[Component (E): Cationic surfactant]

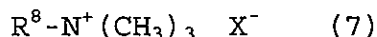
The hair treatment agent of the present invention may further comprise a cationic surfactant as component (E). Examples of the cationic surfactant include (i) alkyltrimethylammonium salts, (ii) alkoxyalkyltrimethylammonium salts, (iii) dialkyl dimethyl ammonium salts, (iv) alkyldimethylamines and salts thereof, (v)

alkoxyalkyldimethylamines and salts thereof, and (vi) alkylamidoamines and salts thereof.

[0045]

(i) Alkyltrimethylammonium salt

Examples of the alkyltrimethylammonium salt include those represented by formula (7) below:



wherein R^8 represents an alkyl group having 12 to 22 carbon atoms, and X^- represents a halide ion such as chloride ion or bromide ion; methosulfate ion, ethosulfate ion, methophosphate ion, ethophosphate ion, or methocarbonate ion.

[0046]

Examples specifically include cetyltrimethylammonium chloride, stearyltrimethylammonium chloride, behenyltrimethylammonium chloride, and behenyltrimethylammonium methosulfate.

[0047]

(ii) Alkoxyalkyltrimethylammonium salt

Examples of the alkoxyalkyltrimethylammonium salt include those represented by formula (8) below:



wherein R^9 represents an alkyl group having 12 to 22 carbon atoms, R^{10} represents an ethylene group or a propylene group optionally substituted with a hydroxy group, and X^- represents a halide ion such as chloride ion or bromide ion; methosulfate ion, ethosulfate ion, methophosphate ion, ethophosphate ion, or methocarbonate ion.

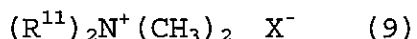
[0048]

Examples specifically include stearoxypropyltrimethylammonium chloride, stearoxyethyltrimethylammonium chloride, and stearoxyhydroxypropyltrimethylammonium chloride.

[0049]

(iii) Dialkyl dimethyl ammonium salt

Examples of the dialkyl dimethyl ammonium salt include those represented by formula (9) below:



wherein R^{11} each independently represents an alkyl group having 12 to 22 carbon atoms, and X^- represents a halide ion such as chloride ion or bromide ion; methosulfate ion, ethosulfate ion, methophosphate ion, ethophosphate ion, or methocarbonate ion.

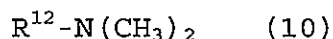
[0050]

Examples specifically include distearyldimethylammonium chloride, dicetyldimethylammonium chloride, dilauryldimethylammonium chloride, and dialkyl(C12-18)dimonium chloride.

[0051]

(iv) Alkyldimethylamine and a salt thereof

Alkyldimethylamine reacts with an acid and forms a quaternary ammonium salt, then to be a surfactant. For this reason, alkyldimethylamine and a salt thereof are herein defined as cationic surfactants. Further, the content thereof is calculated in terms of the mass of alkyldimethylamine. Examples of the alkyldimethylamine and a salt thereof include those represented by formula (10) below and salts thereof:



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

[0052]

Examples of the salt include salts with organic acids or inorganic acids. Examples of the organic acid include component (D) described above. Examples of the inorganic acid include hydrochloric acid, sulfuric acid, and phosphoric acid. Of these, the organic acids are preferable, and dicarboxylic acids, hydroxycarboxylic acids, and acidic amino acids are preferable. For the dicarboxylic acid, maleic acid and succinic acid are more preferable. For the hydroxycarboxylic acid, glycolic acid, lactic acid, and malic acid are more preferable. For the acidic amino acid, glutamic acid is more preferable.

[0053]

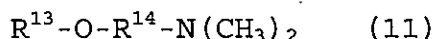
Examples of specific alkyldimethylamine and a salt thereof include N,N-dimethyl behenyl amine, N,N-dimethyl stearyl amine, and organic acid salts thereof, and from the viewpoint of smoothness of

hair during rinsing, lactate of N,N-dimethyl behenyl amine and glycolate of N,N-dimethyl stearyl amine are preferable.

[0054]

(v) Alkoxyalkyldimethylamine and a salt thereof

Alkoxyalkyldimethylamine reacts with an acid and forms a quaternary ammonium salt, then to be a surfactant. For this reason, alkoxyalkyldimethylamine and a salt thereof are herein defined as cationic surfactants. Further, the content thereof is calculated in terms of the mass of alkoxyalkyldimethylamine. Examples of the alkoxyalkyldimethylamine and a salt thereof include those represented by formula (8) below and a salt thereof:



wherein R^{13} represents an alkyl group having 12 to 22 carbon atoms, and R^{14} represents an ethylene group or a propylene group.

[0055]

Examples of the salt include salts with organic acids or inorganic acids. Examples of the organic acid include component (D) described above. Examples of the inorganic acid include an inorganic acid used to neutralize alkyldimethylamine represented by formula (10) described above.

[0056]

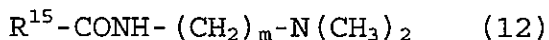
Specific examples of the alkoxyalkyldimethylamine and a salt thereof include N,N-dimethyl-3-hexadecyloxy propylamine, N,N-dimethyl-3-octadecyloxy propylamine and organic acid salts thereof, and from the viewpoint of smoothness of hair during rinsing, lactate of N,N-dimethyl-3-hexadecyloxy propylamine and glycolate of N,N-dimethyl-3-octadecyloxy propylamine are preferable.

[0057]

(vi) Alkylamidoamine and a salt thereof

Alkylamidoamine reacts with an acid and forms a quaternary ammonium salt, then to be a surfactant. For this reason, alkylamidoamine and a salt thereof are herein defined as cationic surfactants. Further, the content thereof is calculated in terms of the mass of alkylamidoamine. Examples of the alkylamidoamine and a

salt thereof include those represented by formula (12) below and salts thereof:



wherein R^{15} represents an alkyl group having 12 to 22 carbon atoms, and m represents a number of 2 to 4.

[0058]

Among these, those wherein R^{15} is an alkyl group having 14 to 22 carbon atoms are preferable.

Examples of the salt include salts with organic acids or inorganic acids. Examples of the organic acid include component (D) described above. Examples of the inorganic acid include an inorganic acid used to neutralize the alkyldimethylamine represented by formula (10) described above.

[0059]

Specific examples of the alkylamidoamine and a salt thereof include N-(3-(dimethylamino)propyl)docosanamide and salts thereof and N-(3-(dimethylamino)propyl)stearamide and salts thereof.

[0060]

Among these, (i) alkyltrimethylammonium salts, (ii) alkoxyalkyltrimethylammonium salts, (iii) dialkyl dimethyl ammonium salts, (v) alkoxyalkyldimethylamines and a salt thereof, and (vi) alkylamidoamines and a salt thereof are preferable, and from the viewpoints of making hair smooth during rinsing and controlling tangling of hair while drying after rinsed, (i) alkyltrimethylammonium salts, (iii) dialkyl dimethyl ammonium salts, (v) alkoxyalkyldimethylamines and a salt thereof, and (vi) alkylamidoamines and a salt thereof are preferable. Further, N,N-dimethyl-3-hexadecyloxy propylamine and a salt thereof, N,N-dimethyl-3-octadecyloxy propylamine and a salt thereof, N-(3-(dimethylamino)propyl)docosanamide and a salt thereof, N-(3-(dimethylamino)propyl)stearamide and a salt thereof, alkyl(C12-18)trimonium chloride, and dialkyl(C12-18)dimonium chloride are preferable, and of these alkyl(C12-18)trimonium chloride is more preferable.

[0061]

The cationic surfactant of component (E) may be used alone or in combinations of two or more. The content of component (E) in the hair treatment agent is, from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing, sustainability of styling ease after 1 day, and sustainability of smoothness after 1 day, preferably 1.0 mass% or more, more preferably 1.2 mass% or more, and further preferably 1.5 mass% or more, and preferably 10 mass% or less, more preferably 5 mass% or less, and further preferably 3 mass% or less.

[0062]

[Component (F): Anionic surfactants other than component (C)]

The hair treatment agent of the present invention may further comprise, as component (F), an anionic surfactant other than the fatty acid salt of component (C). Examples of the anionic surfactant other than the fatty acid salt include sulfuric acid ester salts having a hydrophobic moiety such as alkyl sulfate, alkenyl sulfate, polyoxyalkylene alkylether sulfate, polyoxyalkylene alkenylether sulfate, and polyoxyalkylene alkyl phenyl ether sulfate; sulfonates having a hydrophobic moiety such as alkyl sulfosuccinate salt, polyoxyalkylene alkyl sulfosuccinate salt, alkanesulfonate, acyl isethionate, and acyl methyl taurate; carboxylates having a hydrophobic moiety such as polyoxyalkylene alkyl ether acetate; and amino acid salts having a hydrophobic moiety such as acyl glutamate, alanine derivatives, glycine derivatives, and arginine derivatives. Examples of the counter ion to anionic groups of these anionic surfactants include alkali metal ions such as sodium ion and potassium ion; alkali earth metal ions such as calcium ion and magnesium ion; ammonium ion; alkanolamine salts having 1 to 3 alkanol groups with 2 or 3 carbon atoms (for example, monoethanolamine salt, diethanolamine salt, triethanolamine salt, and triisopropanolamine salt).

[0063]

The anionic surfactant of component (F) may be used alone or in combinations of two or more. The content of component (F) in the hair treatment agent is, from the viewpoints of absence of

stickiness during rinsing, smoothness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, preferably 1.0 mass% or less, more preferably 0.8 mass% or less, further preferably 0.6 mass% or less, further preferably 0.4 mass% or less, further preferably 0.2 mass% or less, and further preferably 0.1 mass% or less.

[0064]

[Component (G): Higher alcohol]

The hair treatment agent of the present invention may further comprise higher alcohol as component (G). Examples of the higher alcohol include any of linear or branched, or saturated or unsaturated aliphatic alcohols, and the number of carbon atoms thereof is preferably 12 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. These higher alcohols may be used alone or in combinations of two or more.

[0065]

The content of component (G) in the hair treatment is, from the viewpoints of absence of stickiness during rinsing, smoothness during rinsing, preventing bed hair, sustainability of styling ease after 1 day, sustainability of smoothness after 1 day, and shampoo resistance, preferably 2 mass% or less, more preferably 1.0 mass% or less, further preferably 0.5 mass% or less, and further preferably 0.3 mass% or less.

[0066]

[Water]

The hair treatment agent of the present invention preferably comprises water as the medium. Water is the balance of components (A) to (C) and other components.

[0067]

[Other optional components]

Other components commonly used in hair cosmetics may further be added to the hair treatment agent of the present invention in accordance with purposes. Examples of the components include

silicones such as dimethylpolysiloxane, cyclic silicones, amino-modified silicones, dimethiconol, polyether-modified silicones, polyglycidol-modified silicones, methyl phenyl polysiloxane, fatty acid-modified silicones, alcohol-modified silicones, alkoxy-modified silicones, epoxy-modified silicones, fluorine-modified silicones, and alkyl-modified silicones; polymer compounds other than components (A) and (B) such as hydroxyalkyl cellulose and highly polymerized polyethylene oxide; nonionic surfactants such as polyoxyethylene alkyl ether, polyoxyethylene sorbitan fatty acid ester, glycerol mono fatty acid ester, polyglycerol fatty acid ester, ethoxylated hydrogenated castor oil, sucrose fatty acid ester, polyglycerol alkyl ether, fatty acid alkanolamide, and alkyl glycoside; hydrocarbons such as squalene, squalane, liquid paraffin, liquid isoparaffin, and cycloparaffin; 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 palmitate, isopropyl myristate, octyldodecyl myristate, hexyl laurate, cetyl lactate, propylene glycol monostearate, oleyl oleate, hexadecyl 2-ethylhexanoate, isononyl isononanoate, and tridecyl isononanoate; oil agents such as isostearyl glyceryl ether and polyoxypropylene butyl ether; alcohols such as ethanol, 1-propanol, 2-propanol, butanol, ethylene glycol, propylene glycol, dipropylene glycol, benzyl alcohol, phenoxy ethanol, 2-benzyloxy ethanol, methyl carbitol, ethyl carbitol, propyl carbitol, butyl carbitol, triethylene glycol monoethyl ether, triethylene glycol monobutyl ether, and glycerol; anti-dandruff agents such as zinc pyrithione and benzalkonium chloride; pH adjusting agents; vitamins; antiseptic agents; anti-inflammatory agents; preservatives; chelating agents, moisturizing agents such as panthenol; coloring agents such as dyes and pigments; extracts such as polar solvent extract of eucalyptus, proteins obtained from shells having a nacreous layer or a pearl or hydrolyzates thereof, proteins obtained from silk or hydrolyzates thereof, protein-containing extracts obtained from seeds of leguminous plants, Asian ginseng extract, rice germ extract, rockweed extract, camellia

extract, aloe extract, shell-flower leaf extract, and chlorella extract;

pearl powders such as titanium mica; cooling agents such as menthol; perfumes; colors; UV absorbers; antioxidants; other components described in ENCYCLOPEDIA OF SHAMPOO INGREDIENTS (MICELLE PRESS).

[0068]

[pH]

The pH of the hair treatment agent of the present invention is preferably 2.0 or more, more preferably 2.5 or more, and further preferably 3.0 or more, and preferably 6.0 or less, more preferably 5.5 or less, further preferably 5.0 or less, and further preferably 4.5 or less. In the present invention, the pH of the hair treatment agent refers to the value obtained by diluting 20 mass fold with water at 25°C.

[0069]

[Form of hair treatment agent]

Additionally, examples of the form of the hair treatment agent of the present invention include hair conditioning compositions such as hair rinse, hair conditioner, hair treatment, and hair pack, and of these, compositions used by rinsing off after applied to hair are preferable.

[0070]

[Method for treating hair]

The conditioning treatment of hair using the hair treatment agent of the present invention may be carried out by applying the hair treatment agent of the present invention to hair after shampooing and then rinsing off with water. By doing this, hair after dried is prevented to have bed hair, smoothness is imparted to hair, and styling ease and smoothness of hair may be maintained until the next shampooing.

[0071]

- Second hair treatment agent

Following hair treatment with the hair treatment agent (agent A) of the present invention comprising the components (A) to (C)

described above, treatment with a second hair treatment agent (agent B) comprising components (H) and (I) below is carried out to thereby further improve the above effects. The second hair treatment agent (agent B) may be used, after agent A is applied to hair, by applying to the hair with or without rinsing with water. Agent B is, from the viewpoints of absence of stickiness during rinsing and smoothness during rinsing, more preferably an agent for applying, after agent A is applied to hair, to the hair without rinsing with water.

(H) cationic surfactant

(I) higher alcohol

[0072]

[Component (H): Cationic surfactant]

Agent B comprises a cationic surfactant as component (H). Examples of the cationic surfactant of component (H) include the same cationic surfactants described as component (E) in the above agent A. Of the cationic surfactants as component (E) in the above agent A, the cationic surfactant as component (H) in agent B is preferably, from the viewpoints of preventing bed hair, sustainability of styling ease after 1 day, and sustainability of smoothness after 1 day, (i) alkyltrimethylammonium salts, (ii) alkoxyalkyltrimethylammonium salts, (v) alkoxyalkyldimethylamine and a salt thereof, and (vi) alkylamidoamine and a salt thereof. Further, N,N-dimethyl-3-hexadecyloxy propylamine and a salt thereof, N,N-dimethyl-3-octadecyloxy propylamine and a salt thereof, N-(3-(dimethylamino)propyl)docosanamide and a salt thereof, N-(3-(dimethylamino)propyl)stearamide and a salt thereof, and alkyl(C12-18)trimonium chloride are preferable, and of these, N,N-dimethyl-3-hexadecyloxy propylamine and a salt thereof, N,N-dimethyl-3-octadecyloxy propylamine and a salt thereof are more preferable. Any of these cationic surfactants may be used alone or in combinations of two or more.

[0073]

The content of component (H) in agent B is, from the viewpoints of preventing bed hair, sustainability of styling ease

after 1 day, and sustainability of smoothness after 1 day, preferably 0.1 mass% or more, more preferably 1.0 mass% or more, and further preferably 1.5 mass% or more, and preferably 10 mass% or less, more preferably 4.0 mass% or less, further preferably 3.5 mass% or less, and further preferably 3.0 mass% or less.

[0074]

[Component (I): Higher alcohol]

Agent B comprises higher alcohol as component (I). The higher alcohol of component (I) may be any of linear and branched or saturated and unsaturated aliphatic alcohols. The number of carbon atoms thereof is preferably 12 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. Examples specifically include lauryl alcohol, myristyl alcohol, cetyl alcohol, stearyl alcohol, cetearyl alcohol, arachyl alcohol, hexyldecanol, isostearyl alcohol, oleyl alcohol, and 2-octyldodecanol. Of these, from the viewpoint of easy spreadability when applied, stearyl alcohol, cetyl alcohol, myristyl alcohol, and cetearyl alcohol are preferable. Any of these higher alcohols may be used alone or in combinations of two or more.

[0075]

The content of component (I) in agent B is, from the viewpoints of preventing bed hair, sustainability of styling ease after 1 day, and sustainability of smoothness after 1 day, preferably more than 2 mass%, more preferably 3 mass% or more, and further preferably 4 mass% or more, and from the same viewpoints, preferably 20 mass% or less, more preferably 10 mass% or less, further preferably 8 mass% or less, and further preferably 7 mass% or less.

[0076]

[Water]

Agent B preferably comprises water as the medium. Water is the balance of components (H) to (I) and other components.

[0077]

[Other optional components]

Other components commonly used in hair cosmetics may further be added to agent B in accordance with purposes. For example, the components described in the "Other optional components" of agent A described above may be used.

[0078]

In the present invention, any agent B may be used without particular limitation as long as a hair treatment agent comprises the components (H) and (I) described above. For example, hair conditioning compositions typically used for hair rinse, hair conditioner, hair treatment, and hair pack may also be used.

[0079]

[Method for treating hair]

The conditioning treatment of hair using agent A and agent B is carried out by a method for treating hair comprising the following steps A and B.

Step A: a step of applying agent A to hair

Step B: a step of applying agent B to hair after the step A

[0080]

Step A is preferably performed to the wet hair after shampooed with a cleansing agent and rinsed. Further, from the viewpoints of absence of stickiness during rinsing and smoothness during rinsing, it is preferable to carry out step B without rinsing off agent A on hair after the step A.

[0081]

After step B, the agents are rinsed off with water, preferably hot water.

[0082]

Regarding the embodiments described above, preferable embodiments of the present invention are further disclosed below.

[0083]

<1> A hair treatment agent comprising components (A) to (C), wherein the mass ratio of component (A) to component (B), $(A)/(B)$, is 0.001 or more and 0.50 or less:

(A) cationic polymer having a charge density of 3.0 meq/g or more and 24 meq/g or less

(B) cationic polymer having a charge density of less than 3.0 meq/g

(C) fatty acid or salt thereof.

[0084]

<2> The hair treatment agent according to <1>, wherein the charge density of the cationic polymer of component (A) is preferably 3.5 meq/g or more, more preferably 4.0 meq/g or more, further preferably 4.5 meq/g or more, further preferably 5.0 meq/g or more, and further preferably 5.5 meq/g or more, and preferably 10 meq/g or less, more preferably 7.0 meq/g or less, and further preferably 6.5 meq/g or less.

[0085]

<3> The hair treatment agent according to <1> or <2>, wherein the cationic polymer of component (A) is preferably one or two or more selected from the group consisting of polymers comprising diallyl quaternary ammonium salt as a constitutional unit, quaternized polyvinyl imidazolium derivatives, polyethyleneimine and polymers of methacryloyloxyethylene trimonium chloride, and more preferably one or two or more polymers comprising diallyl quaternary ammonium salt as a constitutional unit selected from the group consisting of Polyquaternium-6, Polyquaternium-22, and Polyquaternium-7.

[0086]

<4> The hair treatment agent according to any one of <1> to <3>, wherein a content of component (A) is preferably 0.01 mass% or more, more preferably 0.05 mass% or more, and further preferably 0.10 mass% or more, and preferably 1.5 mass% or less, more preferably 1.0 mass% or less, further preferably 0.5 mass% or less, further preferably 0.3 mass% or less, and further preferably 0.2 mass% or less.

[0087]

<5> The hair treatment agent according to any one of <1> to <4>, wherein the charge density of the cationic polymer of component (B) is preferably 2.0 meq/g or less, more preferably 1.5 meq/g or less, and further preferably 1.2 meq/g or less, and preferably 0.1 meq/g

or more, more preferably 0.3 meq/g or more, and further preferably 0.5 meq/g or more.

[0088]

<6> The hair treatment agent according to any one of <1> to <5>, wherein the cationic polymer of component (B) is preferably one or two or more selected from the group consisting of Polyquaternium-52 and Polyquaternium-10.

[0089]

<7> The hair treatment agent according to any one of <1> to <6>, wherein a content of component (B) is preferably 0.1 mass% or more, more preferably 0.2 mass% or more, and further preferably 0.3 mass% or more, and preferably 3 mass% or less, more preferably 2 mass% or less, further preferably 1.0 mass% or less, further preferably 0.8 mass% or less, and further preferably 0.6 mass% or less.

[0090]

<8> The hair treatment agent according to any one of <1> to <7>, wherein the mass ratio of component (A) to component (B), (A)/(B), is preferably 0.005 or more, more preferably 0.01 or more, further preferably 0.03 or more, further preferably 0.08 or more, further preferably 0.10 or more, and further preferably 0.30 or more, and preferably 0.45 or less, and more preferably 0.40 or less.

[0091]

<9> The hair treatment agent according to any one of <1> to <8>, wherein component (C) is preferably a fatty acid or a salt thereof represented by formula (6) below:



wherein R^5 represents a linear or branched, saturated or unsaturated hydrocarbon group having 13 or more and 21 or less, preferably 15 or more and 21 or less, and more preferably 17 or more and 21 or less carbon atoms, and M represents hydrogen, sodium or potassium.

[0092]

<10> The hair treatment agent according to any one of <1> to <9>, wherein a content of component (C) is preferably 0.05 mass% or more, more preferably 0.10 mass% or more, and further preferably 0.15 mass% or more, and preferably 1.0 mass% or less, more preferably

0.5 mass% or less, further preferably 0.30 mass% or less, and further preferably 0.25 mass% or less.

[0093]

<11> The hair treatment agent according to any one of <1> to <10>, further preferably comprising organic acid as component (D).

[0094]

<12> The hair treatment agent according to <11>, wherein component (D) is preferably one or two or more selected from the group consisting of acetic acid, propionic acid, malonic acid, succinic acid, glutaric acid, adipic acid, maleic acid, fumaric acid, phthalic acid, polyglutamic acid, glycolic acid, lactic acid, hydroxyacrylic acid, glyceric acid, malic acid, tartaric acid, citric acid, glutamic acid, and aspartic acid, and more preferably one or two selected from the group consisting of succinic acid and lactic acid.

[0095]

<13> The hair treatment agent according to <11> or <12>, wherein a content of component (D) is preferably 0.05 mass% or more, more preferably 0.08 mass% or more, and further preferably 0.10 mass% or more, and preferably 4 mass% or less, more preferably 3 mass% or less, further preferably 2 mass% or less, further preferably 1.0 mass% or less, further preferably 0.5 mass% or less, and further preferably 0.35 mass% or less.

[0096]

<14> The hair treatment agent according to any one of <1> to <13>, further preferably comprising cationic surfactant as component (E).

[0097]

<15> The hair treatment agent according to <14>, wherein component (E) is preferably one or two or more selected from the group consisting of alkyltrimethylammonium salts, alkoxyalkyltrimethylammonium salts, dialkyl dimethyl ammonium salts, alkyldimethylamines and a salt thereof, alkoxyalkyldimethylamines and a salt thereof, and alkylamidoamines and a salt thereof, more preferably one or two or more selected from the group consisting of alkyltrimethylammonium salts, alkoxyalkyltrimethylammonium salts,

dialkyl dimethyl ammonium salts, alkoxyalkyldimethylamines and a salt thereof, and alkylamidoamine and a salt thereof, and further preferably one or two or more selected from the group consisting of alkyltrimethylammonium salts, dialkyl dimethyl ammonium salts, alkoxyalkyldimethylamines and a salt thereof, and alkylamidoamines and a salt thereof.

[0098]

<16> The hair treatment agent according to any one of <1> to <15>, further preferably comprising higher alcohol as component (G).

[0099]

<17> The hair treatment agent according to <16>, wherein component (G) is preferably a linear or branched, saturated or unsaturated aliphatic alcohol, and the number of carbon atoms thereof is preferably 12 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.

[0100]

<18> The hair treatment agent according to <16> or <17>, wherein a content of component (G) is preferably 2 mass% or less, more preferably 1.0 mass% or less, further preferably 0.5 mass% or less, and further preferably 0.3 mass% or less.

[0101]

<19> A hair treatment kit comprising the following hair treatment agents, agent A and agent B:

agent A: the hair treatment agent according to any of <1> to <18>

agent B: a hair treatment agent comprising components (H) and (I) below

(H) cationic surfactant

(I) higher alcohol.

[0102]

<20> The hair treatment kit according to <19>, wherein component (H) is preferably one or two or more selected from the group consisting of alkyltrimethylammonium salts, alkoxyalkyltrimethylammonium salts, dialkyl dimethyl ammonium salts, alkyldimethylamine and a salt thereof, alkoxyalkyldimethylamine and

a salt thereof, and alkylamidoamine and a salt thereof, and more preferably one or two or more selected from the group consisting of alkyltrimethylammonium salts, alkoxyalkyltrimethylammonium salts, alkoxyalkyldimethylamine and a salt thereof, and alkylamidoamine and a salt thereof.

[0103]

<21> The hair treatment kit according to <19> or <20>, wherein a content of component (H) in agent B is preferably 0.1 mass% or more, more preferably 1.0 mass% or more, and further preferably 1.5 mass% or more, and preferably 10 mass% or less, more preferably 4.0 mass% or less, further preferably 3.5 mass% or less, and further preferably 3.0 mass% or less.

[0104]

<22> The hair treatment kit according to any one of <19> to <21>, wherein component (I) is preferably a linear or branched, saturated or unsaturated aliphatic alcohol, and the number of carbon atoms thereof is preferably 12 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.

[0105]

<23> The hair treatment kit according to any one of <19> to <22>, wherein a content of the higher alcohol in agent A is preferably 2 mass% or less, more preferably 1.0 mass% or less, further preferably 0.5 mass% or less, and further preferably 0.3 mass% or less, and a content of component (I) in agent B is preferably more than 2 mass%, more preferably 3 mass% or more, and further preferably 4 mass% or more, and from the same viewpoint, preferably 20 mass% or less, more preferably 10 mass% or less, further preferably 8 mass% or less, and further preferably 7 mass% or less.

[0106]

<24> A method for treating hair comprising the following steps A and B:

step A: a step of applying the hair treatment agent according to any of <1> to <18> (agent A) to hair

step B: a step of applying a hair treatment agent comprising components (H) and (I) below (agent B) after the step A

(H) cationic surfactant

(I) higher alcohol.

[0107]

<25> The method for treating hair according to <24>, wherein agent B is preferably applied after the step A without rinsing off agent A on hair.

[0108]

<26> The method for treating hair according to <24> or <25>, wherein a content of the higher alcohol in agent A is preferably 2 mass% or less, more preferably 1 mass% or less, further preferably 0.5 mass% or less, and further preferably 0.3 mass% or less, and a content of component (I) in agent B is preferably more than 2 mass%, more preferably 3 mass% or more, and further preferably 4 mass% or more, and from the same viewpoints, preferably 20 mass% or less, more preferably 10 mass% or less, further preferably 8 mass% or less, and further preferably 7 mass% or less.

Examples

[0109]

Examples 1 to 8, Comparative Examples 1 to 6

The hair treatment agents, agent A and agent B shown in Table 1, were prepared following a routine method. Either one or both of these hair treatment agents were used for carrying out the evaluations described below.

[0110]

Absence of stickiness/smoothness during rinsing

Using 20 g (about 30 cm in length) of human hair from a person who used a hair color at a frequency of 4 times a year, a hair tress was prepared. The hair tress was shampooed with 1 g of a model shampoo below and then the shampoo was rinsed off with hot water at 40°C for 30 seconds while running fingers through the hair. Subsequently, 1 g of agent A was applied, sufficiently spread throughout the entire hair, and the sensory evaluations from the

viewpoints of stickiness and smoothness during rinsing with hot water at 40°C for 30 seconds were carried out. For Example 5 and Comparative Example 3, agent A was applied to and sufficiently spread on hair, subsequently 1 g of agent B was applied without rinsing off and sufficiently spread throughout the entire hair, and then the sensory evaluations from the viewpoints of stickiness and smoothness during rinsing with hot water at 40°C for 30 seconds were carried out. For Comparative Example 6, the hair tress was shampooed with 1 g of the model shampoo, the shampoo was rinsed off, subsequently 1 g of agent B was applied without applying agent A and sufficiently spread throughout the entire hair, and then the sensory evaluations from the viewpoints of stickiness and smoothness during rinsing with hot water at 40°C for 30 seconds were carried out.

Panelists selected one from, for absence of stickiness during rinsing, "not sticky"/"neither"/"sticky", and one from, for smoothness during rinsing, "smooth"/"neither"/"not smooth", respectively.

The evaluation was made by 7 panelists, and the number of panelists who selected "not sticky"/"neither"/"sticky" and "smooth"/"neither"/"not smooth" is shown in this order.

[0111]

(Composition of model shampoo)

(Component)	(mass%)
Sodium polyoxyethylene(2.5)lauryl ether sulfate	15.5
Lauric acid diethanolamide	2.28
Edetate disodium	0.1
Sodium benzoate	0.5
Oxybenzone	0.03
Phosphoric acid	0.075
Dibutylhydroxytoluene	0.01
Sodium chloride	0.8
Perfume	0.26
Purified water	Balance
(Total)	100

[0112]

Sustainability of styling ease, sustainability of smoothness

The hair tress was towel-dried after evaluated on the absence of stickiness · smoothness during rinsing, dried sufficiently using a blow dryer, then allowed to stand while suspended under laboratory conditions for 1 day (24 hours), followed by carrying out the sensory evaluations from the viewpoints of styling ease and smoothness.

Panelists selected one from, for the sustainability of styling ease, "styled"/"neither"/"not styled", and one from, for the sustainability of smoothness, "smooth"/"neither"/"not smooth".

The evaluation was made by 7 panelists, and the number of panelists who selected "styled"/"neither"/"not styled" and "smooth"/"neither"/"not smooth" is shown in this order.

[0113]

Shampoo resistance

The tress, after the above sustainability evaluations, was shampooed with 1 g of the model shampoo, and the sensory evaluation was carried out from the viewpoint of smoothness while rinsing with hot water at 40°C for 30 seconds.

Panelists selected one from, for smoothness during rinsing, "smooth"/"neither"/"not smooth". The evaluation was carried out by 7 panelists, and the number of panelists who selected "smooth"/"neither"/"not smooth" was shown in this order.

[0114]

Prevention of bed hair

As an evaluation wig, a wig made of straight hair from Chinese person (manufactured by Beaulax Co., Ltd.) cut to a short hair was used. The wig was shampooed with 3 g of the model shampoo and then the shampoo was rinsed off with hot water at 40°C for 30 seconds while running fingers through the hair. Subsequently, 3 g of agent A was applied and spread for 30 seconds while running fingers through the hair, and rinsed off with hot water at 40°C for 30 seconds while running fingers through the hair. For Example 5 and Comparative Example 3, agent A was applied to and sufficiently

spread on hair, and subsequently 3 g of agent B was applied without rinsing off and sufficiently spread throughout the entire hair, and then rinsed off with hot water at 40°C for 30 seconds while running fingers through the hair. For Comparative Example 6, the hair was shampooed with 3 g of the model shampoo, the shampoo was rinsed off, and subsequently 3 g of agent B was applied without applying agent A and sufficiently spread throughout the entire hair, and then rinsed off with hot water at 40°C for 30 seconds.

Then, excess water was wiped off from the wig with a towel, and the wig was dried for 3 minutes using a blow dryer (maker; TESCOM, model number; NB1902), which was subjected to the evaluation. 2 Sheets of towels (made of cotton, 80 cm in length x 34 cm in width) were half-folded at the center of longways, and were piled on a hot plate (manufactured by CAMAG, TLC PLATE HEATER) set and heated at 35°C in advance, and inserting a non-woven fabric (20 cm in length x 14 cm in width) containing 5 g of moisture spread out between the towels, to prepare a pseudo pillow having a predetermined amount of moisture. Subsequently, the evaluation wig after treated with the above shampooing agent composition was placed on the towels (pseudo pillow) face up, moved 10 cm toward the neck direction of the wig by dragging, to evaluate the prevention of bed hair, and allowed to stand still for 1 hour.

Thereafter, the wig was picked upright, and an area on the hair with bed hair was lightly stroked 3 times while finger combing at a speed of 20 cm/second.

With regard to the state of hair after the strokes, 7 panelists were asked to select one from "bed hair was prevented"/"neither"/"bed hair was not prevented". The number of panelists who selected "bed hair was prevented"/"neither"/"bed hair was not prevented" was shown in this order.

[0115]

[Table 1]

(mass%: active amount)		Example								Comparative Example					
		1	2	3	4	5	6	7	8	1	2	3	4	5	6
Agent A	(A)	0.17	0.01	0.23	0.17	0.17	0.17	0.17	-	-	0.17	0.17	0.17	0.28	-
	Polyquaternium-6 (*1)														
	Polyquaternium-22 (*2)	-	-	-	-	-	-	-	0.17	-	-	-	-	-	-
	(B)	0.3	0.8	0.3	0.3	0.3	0.5	-	0.3	0.3	-	-	0.3	0.3	-
	Polyquaternium-10 (*3)														
	Polyquaternium-52 (*4)	0.17	0.3	0.17	0.17	0.17	-	0.5	0.17	0.17	-	-	0.17	0.17	-
	(C)	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	-	0.11	-
	Stearic acid (*5)														
	Isostearic acid (*6)	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	-	0.07	-
	(D)	-	-	-	1.2	1.2	-	-	-	-	-	-	-	-	-
Agent B	Succinic acid														
	Lactic acid	0.14	0.14	0.14	0.27	0.27	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	-
	Sodium hydroxide aqueous solution	0.06	0.06	0.06	0.44	0.44	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	-
	Purified water	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	-
	Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	Mass ratio (A)/(B)	0.36	0.01	0.49	0.36	0.36	0.34	0.34	0.36	-	-	-	0.36	0.60	-
	(H)	-	-	-	-	1.67	-	-	-	-	-	1.67	-	-	1.67
	Stearoxypropyl dimethylamine (*7)														
	(I)	-	-	-	-	5.6	-	-	-	-	-	5.6	-	-	5.6
	Stearyl alcohol (*8)														
Evaluation	Others	-	-	-	-	Balance	-	-	-	-	-	Balance	-	-	Balance
	Purified water														
	Total	-	-	-	-	100	-	-	-	-	-	100	-	-	100
	Absence of stickiness during rinsing	7/0/0	4/3/0	5/2/0	3/4/0	7/0/0	2/5/0	5/2/0	7/0/0	0/6/1	5/2/0	6/1/0	0/1/6	5/1/1	0/2/5
	Smoothness during rinsing	7/0/0	7/0/0	4/3/0	4/3/0	7/0/0	6/1/0	2/4/0	5/2/0	0/3/4	5/2/0	7/0/0	0/4/3	0/0/7	4/3/0
	Sustainability of styling ease after 1 day	6/1/0	4/3/0	6/1/0	6/1/0	7/0/0	6/1/0	6/1/0	4/3/0	0/0/7	4/1/2	5/1/1	1/4/3	2/3/2	4/3/0
	Sustainability of smoothness after 1 day	6/1/0	4/3/0	6/1/0	6/1/0	7/0/0	6/1/0	6/1/0	5/2/0	0/0/7	3/2/2	4/2/1	0/4/3	2/4/1	3/4/0
Evaluation	Shampoo resistance	7/0/0	1/5/1	7/0/0	7/0/0	7/0/0	7/0/0	7/0/0	6/1/0	0/0/7	3/3/1	3/3/1	2/3/2	7/0/0	0/0/7
	Prevention of bed hair	6/1/0	5/2/0	5/2/0	7/0/0	7/0/0	7/0/0	5/2/0	6/1/0	0/2/5	0/0/7	0/2/5	1/5/1	0/1/6	0/0/7

[0116]

- *1: Merquat 100 (manufactured by Lubrizol Advanced Materials: charge density 6.2 meq/g)
- *2: Merquat 280 (manufactured by Lubrizol Advanced Materials: charge density 5.0 meq/g)
- *3: POIZ C-150L (manufactured by Kao Corporation: charge density 0.9 meq/g)
- *4: Sofcare KG-101W-E (2.4%) manufactured by Kao Corporation: charge density 0.83 meq/g)
- *5: LUNAC S-98 (manufactured by Kao Corporation)
- *6: Isostearic acid EX (manufactured by KOKYU ALCOHOL KOGYO CO., LTD.)
- *7: FARMIN DM E-80 (manufactured by Kao Corporation)
- *8: KALCOL 8098 (manufactured by Kao Corporation)

[0117]

Examples 9 to 12

The hair treatment agents, agent A and agent B, shown in Table 2 were prepared following a routine method. Either one or both of these hair treatment agents were used for the various evaluations in the same manner as in Table 1.

Provided that, in Example 9, the evaluations were made after agent A was applied to hair and treatment was carried out with agent B without rinsing off; in Example 10, the evaluations were made after agent A was applied to hair and treatment was carried out with agent B after rinsing off; in Example 11, the evaluations were made after treatment was carried out only with agent A; and in Example 12, the evaluations were made after treatment with agent A was repeated twice.

[0118]

[Table 2]

(mass%)			Example			
			9 (*10)	10 (*11)	11	12
Agent A	(A)	Polyquaternium-6 (*1)	0.17	0.17	0.17	0.17
	(B)	Polyquaternium-10 (*3)	0.3	0.3	0.3	0.3
		Polyquaternium-52 (*4)	0.17	0.17	0.17	0.17
	(C)	Stearic acid (*5)	0.11	0.11	0.11	0.11
		Isostearic acid (*6)	0.07	0.07	0.07	0.07
	(D)	Succinic acid	1.2	1.2	1.2	1.2
		Lactic acid	0.27	0.27	0.27	0.27
	(E)	Cetyltrimethylammonium chloride (*9)	1.74	1.74	1.74	1.74
	(G)	Stearyl alcohol (*8)	-	-	3	3
		Sodium hydroxide aqueous solution (48%)	0.45	0.45	0.45	0.45
	Others	Purified water	Balance	Balance	Balance	Balance
Total			100	100	100	100
Mass ratio (A)/(B)			0.36	0.36	0.36	0.36
Agent B	(H)	Stearoxypropyl dimethylamine (*7)	1.67	1.67	-	Agent A
	(I)	Stearyl alcohol (*8)	5.6	5.6	-	
	Others	Purified water	Balance	Balance	-	
	Total		100	100	-	
Evaluation	Absence of stickiness during rinsing		7/0/0	4/3/0	3/4/0	3/4/0
	Smoothness during rinsing		7/0/0	6/1/0	3/4/0	3/4/0
	Sustainability of styling ease after 1 day		7/0/0	7/0/0	4/3/0	5/2/0
	Sustainability of smoothness after 1 day		7/0/0	7/0/0	4/3/0	4/3/0
	Shampoo resistance		7/0/0	7/0/0	7/0/0	7/0/0
	Prevention of bed hair		7/0/0	7/0/0	5/2/0	4/3/0

[0119]

*1 and *3 to *8: same as Table 1

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

*10: After agent A was applied to hair without rinsing off, treatment was carried out with agent B

*11: After agent A was applied to hair and rinsing off the same, treatment was carried out with agent B

Claims

1. A hair treatment agent comprising components (A) to (C), wherein the mass ratio of component (A) to component (B), (A)/(B), is 0.001 or more and 0.50 or less:

(A) cationic polymer having a charge density of 3.0 meq/g or more and 24 meq/g or less

(B) cationic polymer having a charge density of less than 3.0 meq/g

(C) fatty acid or salt thereof.

2. The hair treatment agent according to claim 1, further comprising organic acid as component (D).

3. The hair treatment agent according to claim 1 or 2, wherein the mass ratio of component (A) to component (B), (A)/(B), is 0.03 or more and 0.40 or less.

4. The hair treatment agent according to any of claims 1 to 3, wherein the charge density of component (A) is 4.5 meq/g or more.

5. The hair treatment agent according to any of claims 1 to 4, wherein the charge density of component (A) is 7.0 meq/g or less.

6. The hair treatment agent according to any of claims 1 to 5, wherein the charge density of component (B) is 0.3 meq/g or more.

7. The hair treatment agent according to any of claims 1 to 6, wherein component (C) is a fatty acid or a salt thereof represented by the following formula (6):



wherein R^5 represents a linear or branched, saturated or unsaturated hydrocarbon group having 13 or more and 21 or less carbon atoms, and M represents hydrogen, sodium or potassium.

8. A hair treatment kit comprising the following hair treatment agents, agent A and agent B:

agent A: the hair treatment agent according to any of claims 1 to 7

agent B: a hair treatment agent comprising components (H) and (I) below

(H) cationic surfactant

(I) higher alcohol.

9. The hair treatment kit according to claim 8, wherein
the content of the higher alcohol in agent A is 2 mass% or less,

the content of component (I) in agent B is more than 2 mass% and 20 mass% or less.

10. A method for treating hair comprising the following steps A and B:

step A: a step of applying the hair treatment agent according to any of claims 1 to 7 (agent A) to hair

step B: a step of applying a hair treatment agent comprising components (H) and (I) below (agent B) to hair after the step A;

(H) cationic surfactant

(I) higher alcohol.

11. The method for treating hair according to claim 10, wherein agent B is applied after the step A without rinsing off agent A on hair.

12. The method for treating hair according to claim 10 or 11, wherein

the content of the higher alcohol in agent A is 2 mass% or less,

the content of component (I) in agent B is more than 2 mass% and 20 mass% or less.