

DESCRIPTION

Title of Invention

DETERGENT COMPOSITION

5

Technical Field

[0001]

The present invention relates to a detergent composition.

Priority is claimed on Japanese Patent Application No. 2016-119315, filed on

10 June 15, 2016, the content of which is incorporated herein by reference.

Background Art

[0002]

For objects to be washed such as clothing, a fluffy voluminous feeling is
15 required after cleaning.

PTL 1 proposes a detergent composition containing a copolymer of dimethyl
diallyl ammonium halide and acrylamide. According to the detergent composition of
PTL 1, it is possible to impart flexibility to objects to be washed such as clothing.

However, for the detergent composition of PTL 1, in particular, in a case where
20 the object to be washed is a textile having a nap-raised finish which is formed of a
polyester such as fleece, it is not possible to sufficiently impart a fluffy voluminous
tactile feeling.

Citation List

25 Patent Literature

[0003]

[PTL 1] Japanese Unexamined Patent Application, First Publication No.

H02-103291

5 Summary of Invention

Technical Problem

[0004]

The present invention has been made in view of the above-described
circumstances, and an object of the present invention is to provide a detergent
10 composition capable of imparting a fluffy voluminous tactile feeling.

Solution to Problem

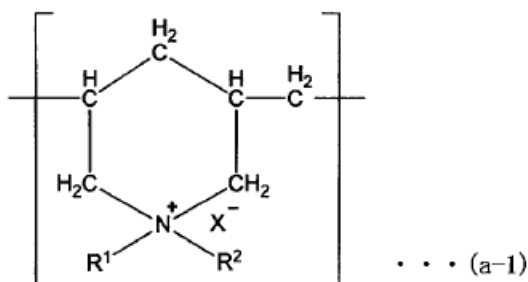
[0005]

As a result of intensive studies, the present inventors have found that the
15 following detergent composition can solve the above-mentioned problems.

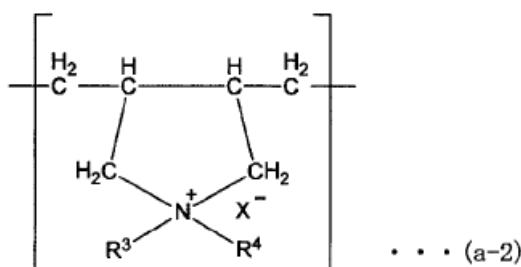
That is, the present invention has the following aspects.

[1] A detergent composition containing a component (A) and a component (B),
in which the component (A) is a polymer having at least one repeating unit
selected from the group consisting of a repeating unit represented by General Formula
20 (a-1) and a repeating unit represented by General Formula (a-2), and
the component (B) is a water-soluble polymer having a repeating unit (b1)
which is at least one member selected from the group consisting of an alkylene
terephthalate unit and an alkylene isophthalate unit and a repeating unit (b2) which is at
least one member selected from the group consisting of an oxyalkylene unit and a
25 polyoxyalkylene unit.

3



[In the formula, R^1 and R^2 are each independently an alkyl group having 1 to 3 carbon atoms or a hydroxyalkyl group having 1 to 3 carbon atoms, and X^- is a counter ion.]

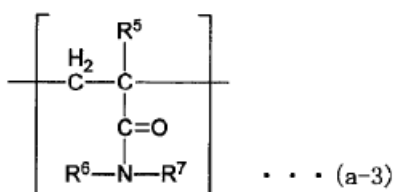


5

[In the formula, R^3 and R^4 are each independently an alkyl group having 1 to 3 carbon atoms or a hydroxyalkyl group having 1 to 3 carbon atoms, and X^- is a counter ion.]

[2] The detergent composition according to [1], in which the component (A)

10 further has a repeating unit represented by General Formula (a-3).



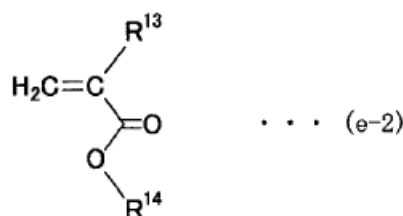
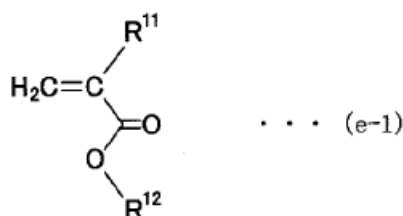
[In the formula, R^5 is a hydrogen atom or an alkyl group having 1 to 3 carbon atoms, and R^6 and R^7 are each independently a hydrogen atom, an alkyl group having 1 to 3 carbon atoms, or a hydroxyalkyl group having 1 to 3 carbon atoms.]

15 [3] The detergent composition according to [1] or [2], further containing an anionic surfactant which is at least one member selected from the group consisting of a

sulfonic acid-type anionic surfactant and a sulfate ester-type anionic surfactant.

[4] The detergent composition according to any one of [1] to [3], further containing a nonionic surfactant.

[5] The detergent composition according to any one of [1] to [4], further containing a polymer having at least one repeating unit selected from the group consisting of a repeating unit derived from a monomer represented by General Formula (e-1) and a repeating unit derived from a monomer represented by General Formula (e-2).



[In Formula (e-1), R¹¹ is a hydrogen atom or a methyl group, and R¹² is a hydrogen atom. In Formula (e-2), R¹³ is a hydrogen atom or a methyl group, and R¹⁴ is an alkyl group having 1 to 40 carbon atoms.]

Advantageous Effects of Invention

[0006]

According to the present invention, it is possible to provide a detergent composition capable of imparting a fluffy voluminous tactile feeling.

Description of Embodiments

[0007]

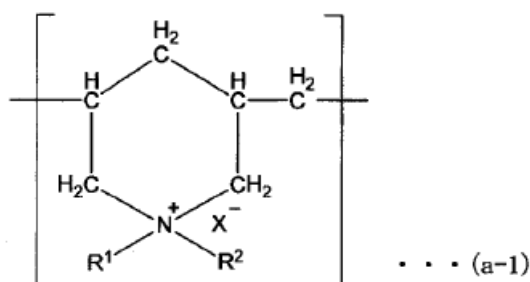
The detergent composition of the present invention contains the following
 5 components (A) and (B).

[0008]

<Component (A): Polymer having at least one repeating unit selected from
 group consisting of repeating unit represented by General Formula (a-1) and repeating
 unit represented by General Formula (a-2)>

10 The component (A) is a polymer having at least one repeating unit selected from
 the group consisting of a repeating unit represented by General Formula (a-1) and a
 repeating unit represented by General Formula (a-2). By containing the component (A),
 the detergent composition of the present invention is capable of imparting a fluffy
 voluminous tactile feeling to a washed object after cleaning.

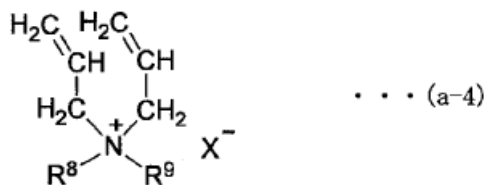
15 [0009]



[0010]

[In the formula, R^1 and R^2 are each independently an alkyl group having 1 to 3
 carbon atoms or a hydroxyalkyl group having 1 to 3 carbon atoms, and X^- is a counter
 20 ion.]

[0011]



[0018]

[In the formula, R^8 and R^9 are each independently an alkyl group having 1 to 3 carbon atoms or a hydroxyalkyl group having 1 to 3 carbon atoms, and X^- is a counter ion.]

[0019]

As X^- in General Formulas (a-1), (a-2), and (a-4), a halogen ion such as a chlorine ion and a bromine ion, an inorganic acid ion such as a sulfate ion, a nitrate ion, and a sulfite ion, an organic acid ion such as a methyl sulfate ion, an acetate ion, and a lactate ion, and the like are mentioned.

[0020]

A weight average molecular weight of the component (A) is usually 1,000 to 5,000,000, preferably 3,000 to 2,000,000, and more preferably 10,000 to 2,000,000. In the present specification, the weight average molecular weight means a value obtained by gel permeation chromatography (GPC) using polyethylene glycol as a standard substance.

[0021]

A form of polymerization of the component (A) is not particularly limited, and may be any of block polymerization, random polymerization, or graft polymerization.

A content ratio of the repeating unit represented by (a-1) and the repeating unit represented by (a-2) to the repeating unit represented by (a-3) in the component (A) is not particularly limited, and, in terms of a molar ratio of the repeating unit represented by (a-1) and the repeating unit represented by (a-2) to the repeating unit represented by (a-3),

[total of repeating unit represented by (a-1) and repeating unit represented by (a-2)]:repeating unit represented by (a-3) is preferably 1:9 to 7:3, and more preferably 2:8 to 6:4.

[0022]

5 As the polymer having at least one repeating unit selected from the group consisting of the repeating unit represented by General Formula (a-1) and the repeating unit represented by General Formula (a-2), a polymer derived from diallyl dimethyl ammonium chloride is mentioned. Examples of a commercially available product thereof include a trade name "Merquat 100" manufactured by Lubrizol Corporation.

10 [0023]

 As the polymer having at least one repeating unit selected from the group consisting of the repeating unit represented by General Formula (a-1) and the repeating unit represented by General Formula (a-2), and the repeating unit represented by General Formula (a-3), a diallyl dimethyl ammonium chloride-acrylamide copolymer, a diallyl
15 dimethyl ammonium chloride-acrylamide-acrylic acid terpolymer, and the like are mentioned.

 For these polymers, synthetic products may be used or commercially available products may be used.

[0024]

20 The polymer is not particularly limited, and production thereof can be made by ordinary radical polymerization. For example, the production can be made by carrying out polymerization of a monomer constituting the component (A) such as diallyl dimethyl ammonium chloride and acrylamide with a polymerization method such as bulk polymerization, solution polymerization, emulsion polymerization, and suspension
25 polymerization. In addition, during the polymerization, it is preferable to use a

polymerization initiator used for ordinary radical polymerization, and, for example, it is possible to use a peroxide such as benzoyl peroxide and potassium persulfate, and an azo compound including azobisisobutyronitrile, azobiscyanovaleric acid, and the like.

[0025]

5 Examples of commercially available products of the copolymer include trade names "Merquat 550", "Merquat 740", "Merquat 2200", "Noverite 300", and "Noverite 302", manufactured by Lubrizol Corporation.

 In addition, examples of commercially available products of the terpolymer include trade names "Merquat 3330" and "Merquat 3940", manufactured by Lubrizol
10 Corporation.

 For these (A) components, one type may be used alone, or two or more types may be used in combination.

[0026]

 A content of the component (A) is preferably 0.1% to 5% by mass, more
15 preferably 0.1% to 1.2% by mass, and even more preferably 0.1% to 0.6% by mass, with respect to a total mass of the detergent composition. In a case where the content of the component (A) is lower than the above upper limit value, it is easy to impart a fluffy voluminous tactile feeling. In a case where the content of the component (A) is equal to or higher than the lower limit value, it is easy to impart a fluffy voluminous tactile
20 feeling.

[0027]

 <Component (B): Water-soluble polymer having a repeating unit (b1) which is at least one member selected from group consisting of alkylene terephthalate unit and alkylene isophthalate unit, and a repeating unit (b2) which is at least one member
25 selected from group consisting of oxyalkylene unit and polyoxyalkylene unit>

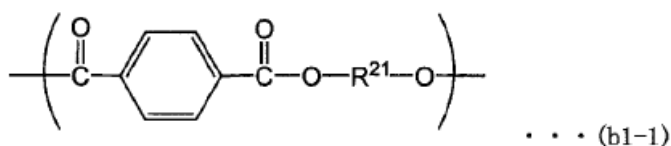
[0028]

Among the "repeating unit which is at least one member selected from the group consisting of an alkylene terephthalate unit and an alkylene isophthalate unit"

(hereinafter also referred to as "unit (b1)") constituting the water-soluble polymer of the

5 component (B), the alkylene terephthalate unit is a unit represented by Formula (b1-1).

[0029]



[0030]

[In the formula, R^{21} is a lower alkylene group.]

10

[0031]

The number of carbon atoms of R^{21} is 1 to 4, and preferably 2 to 4.

Specific examples of the alkylene terephthalate unit include an ethylene terephthalate unit, a n-propylene terephthalate unit, an isopropylene terephthalate unit, a n-butylene terephthalate unit, an isobutylene terephthalate unit, a sec-butylene

15 terephthalate unit, and a tert-butylene terephthalate unit. Among these, an isopropylene terephthalate unit is preferable.

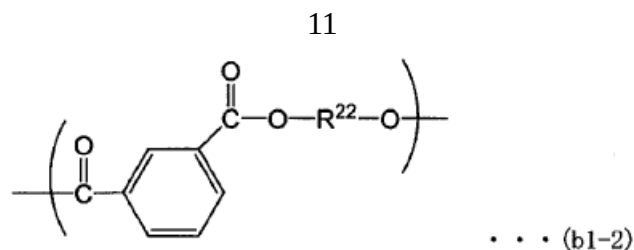
[0032]

As the unit (b1), a single type of alkylene terephthalate unit may be used alone, or a plurality of types of alkylene terephthalate units may be used in combination.

20

Among the units (b1) constituting the water-soluble polymer, the alkylene isophthalate unit is a unit represented by Formula (b1-2).

[0033]



[0034]

[In the formula, R²² is a lower alkylene group.]

[0035]

5 The number of carbon atoms of R²² is 1 to 4, and preferably 2 to 4.

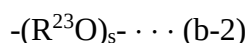
Specific examples of the alkylene isophthalate unit include an ethylene isophthalate unit, a propylene isophthalate unit, a n-butylene isophthalate unit, a sec-butylene isophthalate unit, and a tert-butylene isophthalate unit. Among these, a propylene isophthalate unit is preferable.

10 As the unit (b1), a single type of alkylene isophthalate unit may be used alone, or a plurality of types of alkylene isophthalate units may be used in combination.

For the unit (b1), a unit selected from the alkylene terephthalate unit and the alkylene isophthalate unit can be used alone, or two or more selected therefrom can be used in combination. That is, the unit (b1) may be composed of only the alkylene terephthalate unit, may be composed of only the alkylene isophthalate unit, or may be composed of a mixture of the alkylene terephthalate unit and the alkylene isophthalate unit.

[0036]

The "repeating unit which is at least one member selected from the group consisting of an oxyalkylene unit and a polyoxyalkylene unit" (hereinafter also referred to as "unit (b2)") constituting the water-soluble polymer of the component (B) is a unit represented by Formula (b-2).



[In the formula, R^{23} is a lower alkylene group, and s is an integer of 1 to 100.]

[0037]

The number of carbon atoms of R^{23} is 1 to 4, and preferably 2 to 4.

In Formula (b-2), a case where s is 1 becomes an oxyalkylene unit, and a case
 5 where s is equal to or higher than 2 becomes a polyoxyalkylene unit. s is an integer of 1
 to 100, preferably 1 to 80, and particularly preferably 1 to 50.

Specific examples of the unit (b2) include an oxyethylene unit and a
 polyoxyethylene unit; an oxypropylene unit and a polyoxypropylene unit; and a
 polyoxyethylene polyoxypropylene unit, and an oxyethylene unit and a polyoxyethylene
 10 unit are preferable.

For the unit (b2), a unit selected from the oxyalkylene unit and the
 polyoxyalkylene unit can be used alone, or two or more selected therefrom can be used in
 combination. That is, the unit (b2) may be composed of only an oxyalkylene unit, may
 be composed of only a polyoxyalkylene unit, and may be composed of a mixture of the
 15 oxyalkylene unit and the polyoxyalkylene unit.

[0038]

The component (B) is preferably a polymer compound in which the unit (b1)
 and the unit (b2) are polymerized randomly or in blocks, and particularly preferably a
 polymer compound polymerized in blocks.

20 The component B may contain units (for example, units originated from a
 polymerization initiator, a polymerization terminator, or the like, or other
 copolymerizable units) other than the units (b1) and (b2). In that case, it is preferable
 that equal to or higher than 80% by mol, preferably equal to or higher than 90% by mol,
 of the component (B) is composed of the units (b1) and (b2).

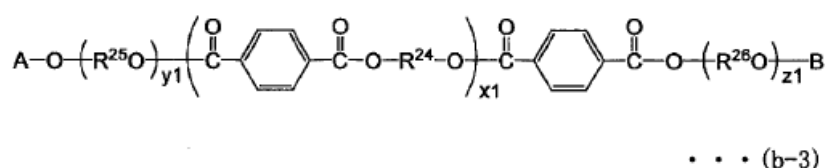
25 The term "water-soluble polymer" in the component (B) means that after 10 g of

the polymer is added to 1,000 g of water at a condition of 40°C and stirred (200 rpm) for 12 hours with a stirrer (8 mm in thickness, 50 mm in length, 1 liter beaker), the polymer is completely dissolved.

[0039]

- 5 Suitable specific examples of the component (B) include compounds represented by Formula (b-3) or (b-4).

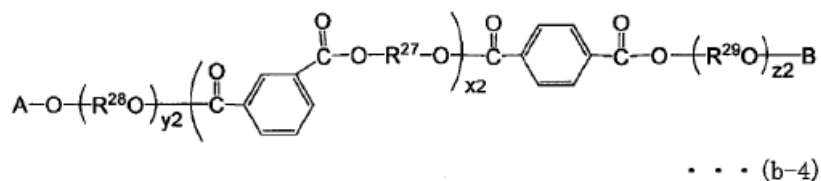
[0040]



[0041]

- 10 [In the formula, A and B are each independently a hydrogen atom or a methyl group, and both are preferably methyl groups, R^{24} , R^{25} , and R^{26} are each independently an alkylene group having 2 to 4 carbon atoms, and preferably an alkylene group having 2 to 3 carbon atoms, x_1 is 0 to 10, preferably 0.5 to 5, and particularly preferably 0.5 to 2.5, y_1 is 1 to 100, preferably 1 to 80, more preferably 1 to 50, even more preferably 10 to 50,
- 15 and particularly preferably 20 to 30, z_1 is 1 to 100, preferably 1 to 80, more preferably 1 to 50, even more preferably 10 to 50, and particularly preferably 20 to 30.]

[0042]



- 20 [In the formula, A and B are each independently a hydrogen atom or a methyl group, and both are preferably a methyl group, R^{27} , R^{28} , and R^{29} are each independently an alkylene group having 2 to 4 carbon atoms, and preferably an alkylene group having 2

to 3 carbon atoms, x_2 is 0 to 10, preferably 0.5 to 5, particularly preferably 0.5 to 2.5, y_2 is 1 to 100, preferably 1 to 80, more preferably 1 to 50, even more preferably 10 to 50, particularly preferably 20 to 30, z_2 is 1 to 100, preferably 1 to 80, more preferably 1 to 50, even more preferably 10 to 50, and particularly preferably 20 to 30.]

5 In Formula (b-3), $x_1:y_1$ which is a ratio of x_1 to y_1 is preferably 1:5 to 1:20, and more preferably 1:8 to 1:18.

 In Formula (b-4), $x_2:y_2$ which is a ratio of x_2 to y_2 is preferably 1:5 to 1:20, and more preferably 1:8 to 1:18.

[0043]

10 A weight average molecular weight of the component (B) is preferably 500 to 8,000. The weight average molecular weight represents a value obtained by converting a value, which is measured by gel permeation chromatography (GPC) using tetrahydrofuran (THF) as a solvent, using polyethylene glycol (PEG) as a calibration curve. A lower limit value of the weight average molecular weight is more preferably
15 equal to or higher than 800, and particularly preferably equal to or higher than 1,000. An upper limit value of the weight average molecular weight is equal to or lower than preferably 7,000, and particularly preferably equal to or lower than 6,000. Therefore, the weight average molecular weight is preferably 800 to 7,000, and particularly preferably 1,000 to 6,000.

20 A pH (5% aqueous solution at 20°C) of the component (B) is preferably 3 to 7.

 A melting point of the component (B) is preferably 25°C to 60°C.

 A viscosity (50°C) of the component (B) is preferably 100 to 1,000 mPa·s. The viscosity is a value measured with a Brookfield viscometer using rotor No. 2.

[0044]

25 The component (B) is a known substance and can be easily obtained in the

market. In addition, the component (B) can be produced by synthesis methods disclosed in literature or the like, for example, methods described in Journal of Polymer Science, Vol. 3, pages 609 to 630 (1948), Journal of Polymer Science, Vol. 8, pages 1 to 22 (1951), and Japanese Unexamined Patent Application, First Publication No.

5 S61-218699.

Specific examples of the component (B) include a trade name TexCare SRN-100 (weight average molecular weight of 2,000 to 3,000, manufactured by Clariant) and a trade name TexCare SRN-300 (weight average molecular weight of 7,000, manufactured by Clariant) which are commercially available. Among these, TexCare SRN-100 which
10 exhibits a high solubility in water and less decrease in washing performance after storage is preferable. As a particularly preferable one, it is possible to use a 70% aqueous solution of TexCare SRN-100 which is commercially available under a trade name TexCare SRN-170 (manufactured by Clariant).

For these (B) components, one type may be used alone or two or more types
15 may be used in combination.

[0045]

A content of the component (B) is preferably 0.1% to 5% by mass, more preferably 0.1% to 3% by mass, and even more preferably 0.2% to 1% by mass, with respect to a total mass of the detergent composition. In a case where the content of the
20 component (B) is equal to or lower than the upper limit value, it is easy to impart a fluffy voluminous tactile feeling. In a case where the content of the component (B) is equal to or higher than the lower limit value, it is easy to impart a fluffy voluminous tactile feeling.

[0046]

25 A mass ratio represented by component (A)/component (B) (hereinafter also

referred to as A/B ratio) is preferably 0.02 to 50, more preferably 0.03 to 12, and even more preferably 0.1 to 3.

By setting the A/B ratio within the above range, it is possible to impart a fluffy voluminous tactile feeling.

5 [0047]

<Optional components>

The detergent composition of the present invention can, if necessary, contain other components than the above components (A) to (B) to the extent that an effect of the present invention is not impaired, and examples of the other components include an
10 anionic surfactant, a nonionic surfactant, a cationic surfactant, an amphoteric surfactant, a polymer other than the components (A) and (B), water, an organic solvent, a viscosity reducing agent and a solubilizing agent, a metal ion trapping agent (chelating agent), an antioxidant, a preservative, a washing performance enhancer, an enzyme (protease, lipase, cellulase, or the like), a texture enhancer, an alkali builder (alkanolamine or the like), a
15 hydrotropic agent, a fluorescent agent, a color migration-preventing agent, a recontamination-preventing agent, a pearlescent agent, a soil release agent, a coloring agent, an emulsifying agent, a fragrance, insoluble particles, and an extract of a natural product or the like.

[0048]

20 [Anionic surfactant]

The anionic surfactant in the present invention is a known substance and can be easily obtained in the market. Among these, an anionic surfactant (hereinafter also referred to as component (C)) which is at least one member selected from the group consisting of a sulfonic acid-type anionic surfactant and a sulfate ester-type anionic
25 surfactant is preferable. Here, the sulfonic acid-type anionic surfactant is an anionic

surfactant having $\text{-SO}_3^-\text{M}^+$ in a molecule. The sulfate ester-type anionic surfactant is an anionic surfactant having $\text{-OSO}_3^-\text{M}^+$ in a molecule, where M^+ is a counter ion. As the counter ion, a metal ion, a protonated amine, ammonium, or the like is mentioned.

Specific examples of the component (C) include a linear alkylbenzene sulfonate;
 5 an α -olefin sulfonate; a linear or branched alkyl sulfate ester salt; an alkyl ether sulfate ester salt or alkenyl ether sulfate ester salt; an alkane sulfonate having an alkyl group; and an α -sulfo fatty acid ester salt.

In addition, as these anionic surfactants, the following ones are preferable.

For the linear alkylbenzene sulfonate, those in which the linear alkyl group has 8
 10 to 16 carbon atoms are preferable, and those in which the linear alkyl group has 10 to 14 carbon atoms are particularly preferable.

As the α -olefin sulfonate, those having 10 to 20 carbon atoms are preferable.

As the alkyl sulfate ester salt, those having 10 to 20 carbon atoms are preferable.

As the alkyl ether sulfate ester salt or alkenyl ether sulfate ester salt, those which
 15 have a linear or branched alkyl group or alkenyl group having 10 to 20 carbon atoms and to which an average of 1 to 10 mol of ethylene oxide is added (that is, polyoxyethylene alkyl ether sulfate ester salts or polyoxyethylene alkenyl ether sulfate ester salts) are preferable.

The number of carbon atoms of the alkanesulfonate is 10 to 20, and preferably
 20 14 to 17, and a secondary alkanesulfonate is particularly preferable.

As the α -sulfo fatty acid ester salt, a compound represented by Formula (c-1) is preferable.



(In Formula (c-1), R^{43} is a hydrocarbon group having 8 to 18 carbon atoms, R^{44}
 25 is a hydrocarbon group having 1 to 6 carbon atoms, and M is a counter ion.)

In Formula (c-1), the hydrocarbon group of R^{43} has 8 to 18 carbon atoms. That is, the number of carbon atoms of the fatty acid residue possessed by the α -sulfo fatty acid ester salt is 10 to 20.

[0049]

5 The hydrocarbon group of R^{43} may be linear or branched, or may contain a cyclic structure. The hydrocarbon group of R^{43} is preferably an aliphatic hydrocarbon group, more preferably a linear or branched alkyl group, or a linear or branched alkenyl group, and even more preferably a linear alkyl group or a linear alkenyl group.

[0050]

10 In Formula (c-1), the number of carbon atoms of R^{44} is 1 to 6, and preferably 1 to 3.

 The hydrocarbon group of R^{44} may be linear or branched, or may contain a cyclic structure. The hydrocarbon group of R^{44} is preferably an aliphatic hydrocarbon group, more preferably a linear or branched alkyl group, or a linear or branched alkenyl group, and even more preferably a linear alkyl group or a branched alkyl group.

 As R^{44} , a methyl group, an ethyl group, a n-propyl group, an isopropyl group, and the like are preferable, and a methyl group, an ethyl group, and a n-propyl group are more preferable, and a methyl group is particularly preferable.

[0051]

20 In Formula (c-1), as the counter ion of M, one capable of forming a water-soluble salt with $R^{43}CH(COOR^{44})SO_3^-$ is preferable, and examples thereof include an alkali metal ion, a protonated amine, and an ammonium ion. As an alkali metal which can be the counter ion, sodium and the like are mentioned. Examples of an amine which can be the counter ion include primary to tertiary amines and the like. A total number of carbon atoms of the amine is preferably 1 to 6. In addition, the amine

25

may have a hydroxy group. The amine preferably has a hydroxy group from the viewpoint that solubility of the α -sulfo fatty acid ester salt in water is increased. As the amine having a hydroxy group, alkanolamine is mentioned, and the alkanol group preferably has 1 to 3 carbon atoms. As the alkanolamine, monoethanolamine, diethanolamine, triethanolamine, and the like are mentioned.

As M, an alkali metal ion is preferable, and a sodium ion is particularly preferable from the viewpoint of easy availability, the viewpoint that a low-temperature stability of a liquid detergent is more easily increased, and the like.

As the α -sulfo fatty acid ester salt, compounds of Formula (c-1) in which R^{43} is a linear or branched alkyl group, or a linear or branched alkenyl group, having 14 to 16 carbon atoms, and R^{44} is a methyl group are particularly preferable.

[0052]

Among the above specific examples, the linear alkylbenzene sulfonate, the alkane sulfonate, the polyoxyethylene alkyl ether sulfate, and the α -olefin sulfonate are preferable.

As a salt, an alkali metal salt such as a sodium salt and a potassium salt, an ammonium salt, an alkanol amine salt such as a monoethanolamine salt, a diethanolamine salt, a triethanolamine salt, 2-amino-2-methylpropanol salt, and 2-amino-2-methylpropanediol, a basic amino acid salt such as lysine and arginine, and the like are mentioned.

It is also possible that the above-mentioned component (C) is in a salt form in a detergent composition by causing the component (C) to be blended in the detergent composition in an acid form such as a linear alkylbenzene sulfonic acid, and neutralized with an alkaline agent such as caustic soda or monoethanolamine.

For these (C) components, one type may be used alone, or two or more types

may be used in combination.

[0053]

A content of the component (C) is preferably 2% to 20% by mass, more preferably 5% to 18% by mass, and even more preferably 10% to 16% by mass, with
5 respect to a total mass of the detergent composition. In a case where the content of the component (C) is equal to or lower than the above upper limit value, it is easy to impart a fluffy voluminous tactile feeling. In a case where the content of the component (C) is equal to or higher than the lower limit value, it is easy to impart a fluffy voluminous tactile feeling.

10 [0054]

A mass ratio (hereinafter also referred to as A/C ratio) represented by component (A)/component (C) is preferably 0.1/20 to 5/2, and more preferably 0.1/18 to 1.2/5.

By setting the A/C ratio within the above range, it is possible to impart a fluffy voluminous tactile feeling.

15 [0055]

As the anionic surfactant other than the component (C), a carboxylic acid-type anionic surfactant such as a higher fatty acid salt, an alkyl ether carboxylate, a polyoxyalkylene ether carboxylate, an alkyl (or alkenyl) amido ether carboxylate, and an acylamino carboxylate, a phosphate ester-type anionic surfactant such as an alkyl
20 phosphate ester salt, a polyoxyalkylene alkyl phosphate ester salt, a polyoxyalkylene alkyl phenyl phosphate ester salt, and a glycerin fatty acid ester monophosphate ester salt, and the like are mentioned.

[0056]

It is preferable to use the component (C) and a salt of a fatty acid having 8 to 22
25 carbon atoms (hereinafter also referred to as "higher fatty acid") in combination.

Examples of the higher fatty acid include a salt of a single fatty acid such as caprylic acid, capric acid, lauric acid, myristic acid, palmitic acid, stearic acid, isostearic acid, hydroxystearic acid, oleic acid, and behenic acid, and a mixed fatty acid such as coconut oil fatty acid and beef tallow fatty acid.

5 As salts of these higher fatty acids, alkali metal salts such as sodium salts and potassium salts, ammonium salts, alkanolamine salts such as monoethanolamine salts, diethanolamine salts, triethanolamine salts, 2-amino-2-methylpropanol salts, and 2-amino- 2-methylpropanediol, basic amino acid salts such as lysine and arginine, and the like are mentioned.

10 [0057]

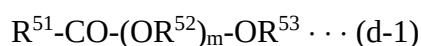
[Nonionic surfactant]

The nonionic surfactant (hereinafter also referred to as component (D)) is not particularly limited, and examples thereof include a polyoxyalkylene-type nonionic surfactant, an alkylphenol, an alkylene oxide adduct such as a fatty acid having 8 to 22 carbon atoms or an amine having 8 to 22 carbon atoms, a polyoxyethylene polyoxypropylene block copolymer, a fatty acid alkanolamine, a fatty acid alkanolamide, a polyhydric alcohol fatty acid ester or an alkylene oxide adduct thereof, a polyhydric alcohol fatty acid ether, an alkyl (or alkenyl) amine oxide, an alkylene oxide adduct of a hardened castor oil, a sugar fatty acid ester, a N-alkyl polyhydroxy fatty acid amide, and an alkyl glycoside. For these nonionic surfactants, any one type may be used alone, or two or more types may be used in combination.

Among these, as the component (D), a polyoxyalkylene-type nonionic surfactant is preferable (provided that a component (F) is not contained) from the viewpoint that an appearance stability is improved while maintaining a viscosity of a liquid detergent at an appropriate level.

[0058]

Examples of the polyoxyalkylene-type nonionic surfactant include a compound represented by General Formula (d-1) (hereinafter referred to as "compound (d1)") and a compound represented by General Formula (d-2) (hereinafter referred to as "compound (d2)"). For these polyoxyalkylene-type nonionic surfactants, any one type may be used alone, or two or more types may be used in combination.



[0059]

In Formula (d-1), R^{51} is a hydrocarbon group having 9 to 13 carbon atoms, R^{52} is an alkylene group having 2 to 4 carbon atoms, and R^{53} is an alkyl group having 1 to 4 carbon atoms. m represents an average repeating number of OR^{52} and is the number of 5 to 25.

In Formula (d-2), R^{54} is a hydrocarbon group having 10 to 22 carbon atoms, EO is an oxyethylene group, and PO is an oxypropylene group. s represents an average repeating number of EO and is a number of 5 to 20, and t represents an average repeating number of PO and is the number of 0 to 4.

[0060]

Compound (d1):

In Formula (d-1), the hydrocarbon group in R^{51} may be linear or branched, or may contain a cyclic structure.

In addition, the hydrocarbon group in R^{51} is preferably an aliphatic hydrocarbon group, and more preferably a linear or branched alkyl group, or a linear or branched alkenyl group.

R^{51} has 9 to 13 carbon atoms, preferably 10 to 13 carbon atoms, and more

preferably 11 to 13 carbon atoms. In a case where R^{51} has 9 or higher carbon atoms, a further increased detergent power is exhibited. On the other hand, in a case where R^{51} has 13 or lower carbon atoms, an improved storage stability is exhibited, and, in particular, gelling is easily suppressed.

5 The compound (d1) may be a mixture of compounds having a single chain length or may be a mixture of compounds having a plurality of chain lengths. R^{51} is originated from a fatty acid (R^{51} -COOH) of a raw material.

 In Formula (d-1), R^{53} is an alkyl group having 1 to 4 carbon atoms, and preferably an alkyl group having 1 to 3 carbon atoms. As R^{53} , specifically, a methyl
10 group, an ethyl group, a n-propyl group, an isopropyl group, and a n-butyl group are mentioned, with a methyl group and an ethyl group being preferable, and with a methyl group being more preferable. In a case where R^{53} has 1 or higher carbon atoms, precipitation during low-temperature storage is easily suppressed. On the other hand, in a case where R^{53} has 4 or lower carbon atoms, a solubility of a liquid detergent in water
15 under a low-temperature condition is further increased.

 In Formula (d-1), R^{52} is an alkylene group having 2 to 4 carbon atoms, with an ethylene group or a propylene group being preferable.

 A plurality of R^{52} 's in the formula may be the same as or different from one another. That is, for the alkylene group of R^{52} , one type may be used alone, or two or
20 more types may be used in combination. Among these, from the viewpoints of exhibiting good foaming during washing and of being inexpensive, it is preferable that m pieces of OR^{52} in the formula are all oxyethylene groups, or are in a form where an oxyethylene group and an oxypropylene group are mixed.

 In a case where two or more types are used in combination for the alkylene
25 group of R^{52} , an addition method of OR^{52} is not particularly limited, and, for example, an

addition method in a case where an oxyethylene group and an oxypropylene group are mixed may be random addition or block addition. As a method of block addition, a method of adding an ethylene oxide and then adding a propylene oxide, a method of adding a propylene oxide and then adding an ethylene oxide, a method of adding an ethylene oxide, then adding a propylene oxide, and further adding an ethylene oxide, and the like are mentioned.

In Formula (d-1), m represents an average repeating number of OR⁵² and is the number of 5 to 25. In a case where m is equal to or higher than the lower limit value, a detergent power, in particular, a detergent power against sebum stains, is further improved. On the other hand, in a case where m is equal to or lower than the upper limit value, a solubility of a liquid detergent in water is further improved.

In a case where all OR⁵² are oxyethylene groups, m is preferably 5 to 20, and more preferably 12 to 18.

In a case where OR⁵² is in a form where an oxyethylene group and an oxypropylene group are mixed, m is particularly preferably 12 to 21. Among these, an average repeating number of the oxypropylene group is preferably equal to or lower than 5, more preferably equal to or lower than 4, and even more preferably equal to or lower than 3. In a case where the average repeating number of the oxypropylene group exceeds 5, a detergent power and a storage stability (odor, temporal stability, and the like) as a liquid detergent may be decreased.

In the compound (d1), a narrow rate indicating a proportion of distribution of compounds having different repeating numbers of OR⁵² is preferably equal to or higher than 20% by mass. It is preferable that an upper limit value of the narrow rate is substantially equal to or lower than 80% by mass.

The narrow rate is more preferably 20% to 50% by mass, and even more

preferably 30% to 45% by mass from the viewpoint that a storage stability and a solubility in water are further improved.

The higher the narrow rate, the better a detergent power is easily obtained. In addition, in a case where the narrow rate is preferably equal to or higher than 20% by mass, and particularly preferably equal to or higher than 30% by mass, a liquid detergent having less raw material smell originated from the compound (d1) is easily obtained. This is because, after production of the compound (d1), a less amount of a fatty acid ester which is a raw material of the compound (d1) and an alkylene oxide adduct of Formula (d-1) in which m is 1 or 2 coexists with the compound (d1).

Among compounds contained as impurities in the compound (d1), a proportion of a total of the fatty acid ester which is a raw material of the compound (d1) and the alkylene oxide adduct of Formula (d-1) in which m is 1 or 2 is preferably equal to or lower than 0.5% by mass, and more preferably equal to or lower than 0.2% by mass, with respect to a total mass of the compound (d1). In a case where the proportion is equal to or lower than 0.5% by mass, a liquid detergent having less raw material smell of a surfactant is easily obtained.

In the present specification, the "narrow rate" refers to a proportion of distribution of an alkylene oxide adduct having a different addition molar number of alkylene oxide, and is a value represented by Expression (S).

[0061]

$$\text{Narrow rate} = \sum_{i=m_{\max}-2}^{i=m_{\max}+2} Y_i \quad \cdot \cdot \cdot (S)$$

[0062]

In Expression (S), $m_{\max}$ represents a repeating number (addition molar number) of OR⁵² of an alkylene oxide adduct which is present most frequently in the whole

compound (d1).

i represents a repeating number of OR⁵².

Yi represents a proportion (% by mass) of an alkylene oxide adduct, of which an addition molar number of alkylene oxide is i, present in the whole compound (d1).

5 The narrow rate can be controlled by, for example, a method for producing the compound (d1).

 There are no particular restrictions on the method for producing the compound (d1), and a method of performing an addition-polymerization of alkylene oxide to a fatty acid alkyl ester using, for example, a surface-modified composite metal oxide catalyst
10 (see Japanese Unexamined Patent Application, First Publication No. 2000-144179) can be used for easy production thereof.

 As suitable examples of the surface-modified composite metal oxide catalyst, specifically, composite metal oxide catalysts such as magnesium oxide of which surface is modified by a metal hydroxide or the like and to which a metal ion (such as Al³⁺, Ga³⁺,
15 In³⁺, Tl³⁺, Co³⁺, Sc³⁺, La³⁺, and Mn²⁺) is added, a calcined product catalyst of hydrotalcite which is surface-modified with a metal hydroxide and/or a metal alkoxide, or the like is mentioned.

 In addition, in a surface modification using the composite metal oxide catalyst, for a mixing proportion of the composite metal oxide, and the metal hydroxide and/or the
20 metal alkoxide, a proportion of metal hydroxide and/or metal alkoxide is preferably 0.5 to 10 parts by mass and more preferably 1 to 5 parts by mass, with respect to 100 parts by mass of the composite metal oxide.

 As the method for producing the compound (d1), there is also a method of adding an alkylene oxide to a fatty acid alkyl ester by using an alkoxylation catalyst
25 prepared from a mixture of an alkaline earth metal compound and an oxyacid or the like.

The above-mentioned alkoxylation catalysts are disclosed in Japanese Patent No. 04977609, PCT International Publication Nos. WO1993/004030, WO2002/038269, and WO2012/028435, and the like, and examples thereof include alkoxylation catalysts prepared from mixtures of an alkaline earth metal salt of carboxylic acid and/or an
5 alkaline earth metal salt of hydroxycarboxylic acid, and sulfuric acid or the like.

[0063]

Compound (d2):

In Formula (d-2), the hydrocarbon group in R^{54} may be linear or branched, or may contain a cyclic structure.

10 In addition, the hydrocarbon group in R^{54} is preferably an aliphatic hydrocarbon group, and more preferably a linear or branched alkyl group, or a linear or branched alkenyl group.

R^{54} has 10 to 20 carbon atoms, preferably 12 to 18 carbon atoms, and more preferably 12 to 14 carbon atoms. In a case where R^{54} has 10 or higher carbon atoms, a
15 further increased detergent power is exhibited. On the other hand, in a case where R^{54} has 20 or lower carbon atoms, an improved storage stability is exhibited, and, in particular, gelation is easily suppressed.

The compound (d2) may be a mixture of compounds having a single chain length or may be a mixture of compounds having a plurality of chain lengths. R^{54} is
20 originated from an alcohol (R^{54} -OH) of a raw material. Examples of the alcohol include alcohols originated from natural fats and oils such as coconut oil, palm oil, or beef tallow, or synthetic alcohols originated from petroleum.

In Formula (d-2), s represents an average repeating number of EO and is the number of 5 to 20, preferably 12 to 18, and more preferably 12 to 16. In a case where s
25 is within the above range, a detergent power of a liquid detergent, in particular, a

detergent power against sebum stains, is further improved.

t represents an average repeating number of PO and is the number of 0 to 4, preferably 0 to 3, and particularly preferably 0. In a case where t is within the above range, not only gelation of a liquid detergent is easily suppressed, but also a good
5 foam-breaking property is easily obtained during rinsing.

In Formula (d-2), EO and PO may be added in a block form or in a random form. As an addition method in a case where EO and PO are added in a block form, a method of adding an ethylene oxide and then adding a propylene oxide, a method of adding a propylene oxide and then adding an ethylene oxide, a method of adding an ethylene
10 oxide, then adding a propylene oxide, and further adding an ethylene oxide, and the like are mentioned. In particular, from the viewpoint that a better rinsability is exhibited in a case of being cleaned in a fully automated washing machine, the method of adding an ethylene oxide, then adding propylene oxide, and further adding an ethylene oxide (which causes a terminal to become -O-CH₂CH₂O-H) is preferable.

15 In the compound (d2), an addition molar number distribution of the alkylene oxide (ethylene oxide, propylene oxide) is not particularly limited, and can be controlled by a method for producing the compound (d2) or the like. For example, in a case where an alkylene oxide is added to a hydrophobic raw material using a general alkaline catalyst such as sodium hydroxide or potassium hydroxide, there is a tendency that a
20 relatively wide addition molar number distribution is exhibited. In addition, in a case where an alkylene oxide is added to a hydrophobic raw material using a specific alkoxylation catalyst such as magnesium oxide to which a metal ion such as Al³⁺, Ga³⁺, In³⁺, Tl³⁺, Co³⁺, Sc³⁺, La³⁺, and Mn²⁺ as described in Japanese Examined Patent Application, Second Publication No. H06-15038, alkylene oxide, there is a tendency that
25 a relatively narrow addition molar number distribution is exhibited.

[0064]

Specific examples of the compound (d2) include, for example, the following compounds.

· Compounds obtained by adding 12 mol or 15 mol equivalent of EO to an alcohol, such as a trade name "LEOX CL-70" (a mixture of an alcohol having 12 carbon atoms and an alcohol having 14 carbon atoms) manufactured by Lion Corporation or a trade name Safol 23 (a mixture of an alcohol having 12 carbon atoms and an alcohol having 13 carbon atoms) manufactured by Sasol.

· Compounds obtained by adding 9 mol, 12 mol, or 15 mol equivalent of EO to a natural alcohol, such as trade names "CO-1214" and "CO-1270", manufactured by Proctor & Gamble.

· Compounds obtained by adding 9 mol, 12 mol, or 15 mol equivalent of EO to a secondary alcohol having 12 to 14 carbon atoms (trade names "Softanol 90", "Softanol 120", "Softanol 150", manufactured by Nippon Shokubai Co., Ltd.).

[0065]

As the component (D), in particular, from the viewpoints of a detergent power against sebum stains and of hardly gelling in a high concentration region, at least one selected from the group consisting of the compound (d1) component and the compound (d2) component is preferable. Among these, it is more preferable to use a combination of the compound (d1) and the compound (d2), or the compound (d1).

As the compound (d1), among those as described above, polyoxyethylene fatty acid alkyl esters in which R^{52} is an ethylene group is preferable, among which polyoxyethylene fatty acid methyl esters in which R^{53} is a methyl group (which hereinafter may be referred to as "MEE") are particularly preferable. Due to a small gelling region thereof even at a high concentration, gelling hardly occurs during blending

at a large amount.

In addition, the liquid detergent contains a polyoxyethylene fatty acid alkyl ester, so that a good solubility in water is exhibited and a high detergent power is easily obtained. In addition, even in a case of containing a high concentration of a surfactant, a remarkable increase in viscosity (gelling) hardly occurs, which makes it possible to obtain a concentrated liquid detergent having a good flowability. The reason for this is considered as follows.

The polyoxyethylene fatty acid alkyl ester, especially MEE, is a nonionic surfactant which has a weak intermolecular orientation in an aqueous solution system and in which micelles are unstable. Thus, it is presumed that gelling or the like of the polyoxyethylene fatty acid alkyl ester hardly occurs at a high concentration, which can cause one type thereof alone to be blended at a large amount in the liquid detergent. In addition, it is presumed that a solubility in water is improved. Furthermore, it is considered that the polyoxyethylene fatty acid alkyl ester contributes to a good flowability at a high concentration. Therefore, in a case where the polyoxyethylene fatty acid alkyl ester is put into water in a tank of a washing machine, a concentration of the polyoxyethylene fatty acid alkyl ester in a cleaning liquid becomes quickly uniform, which allows the polyoxyethylene fatty acid alkyl ester to be brought into contact with an object to be washed at a predetermined concentration from the beginning of washing. For this reason, it is considered that a high detergent power is obtained.

Furthermore, as the compound (d2), among those as described above, a primary alcohol ethoxylate obtained by adding an ethylene oxide to a primary alcohol is particularly preferable.

[0066]

A content of the component (D) is preferably 10% to 50% by mass, more

preferably 10% to 40% by mass, and even more preferably 15% to 30% by mass, with respect to a total mass of the detergent composition. In a case where the content of the component (D) is equal to or higher than 10% by mass, a sufficient detergent power is obtained, whereas in a case where the content of the component (D) is equal to or lower than 50% by mass, it is possible to suppress thickening and to better maintain a storage stability of the liquid detergent.

[0067]

[Cationic surfactant]

Examples of the cationic surfactant include cationic surfactants of an alkyltrimethyl ammonium salt, a dialkyldimethyl ammonium salt, an alkylbenzyldimethyl ammonium salt, and an alkyl pyridinium salt, and the like.

In addition, long-chain aliphatic amidoalkyl tertiary amines such as caprylic acid dimethylaminopropylamide, capric acid dimethylaminopropylamide, lauric acid dimethylaminopropylamide, myristic acid dimethylaminopropylamide, palmitic acid dimethylaminopropylamide, stearic acid dimethylaminopropylamide, behenic acid dimethylaminopropylamide, and oleic acid dimethylaminopropylamide, and salts thereof; palmitic acid diethanolaminopropylamide, stearic acid diethanolaminopropylamide, and the like are mentioned.

[0068]

[Amphoteric surfactant]

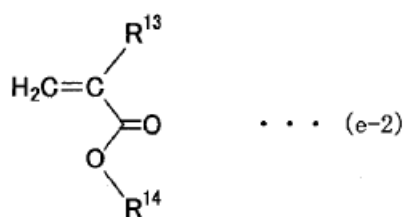
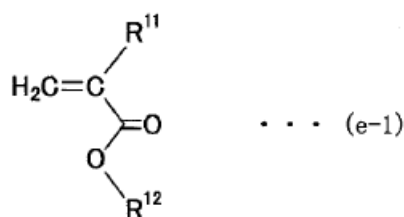
Examples of the amphoteric surfactant include amphoteric surfactants of alkylbetaine-type, alkylamide betaine-type, imidazoline-type, alkylaminosulfone-type, alkylaminocarboxylic acid-type, alkylamidocarboxylic acid-type, amidoamino acid-type, and phosphoric acid-type.

[0069]

[Polymer other than components (A) and (B)]

As the polymer other than the components (A) and (B), a polymer (hereinafter also referred to as the component (E)) containing at least one repeating unit selected from the group consisting of a repeating unit derived from a monomer represented by General
 5 Formula (e-1) and a repeating unit derived from a monomer represented by General Formula (e-2) is mentioned. The component (E) acts as a structuring agent. The liquid detergent contains the component (E), which allows the detergent composition to be structured. Therefore, for example, in a case where the liquid detergent contains insoluble particles, the insoluble particles can be uniformly dispersed in the liquid
 10 detergent and such a state can be maintained. In addition, a storage stability and a recontamination-preventing property of the liquid detergent are also increased.

[0070]



[In Formula (e-1), R¹¹ is a hydrogen atom or a methyl group, and R¹² is a
 15 hydrogen atom. In Formula (e-2), R¹³ is a hydrogen atom or a methyl group, and R¹⁴ is an alkyl group having 1 to 40 carbon atoms.]

[0071]

A repeating unit derived from a monomer represented by General Formula (e-1) is a repeating unit originated from the monomer represented by General Formula (e-1) in a case of polymerizing a monomer component containing the monomer represented by General Formula (e-1).

5 Examples of the monomer represented by General Formula (e-1) include acrylic acid and methacrylic acid.

For these monomers represented by General Formula (e-1), any one type may be used alone, or two or more types may be used in combination.

10 In Formula (e-2), R^{13} is a hydrogen atom or a methyl group, with a hydrogen atom being preferable.

In Formula (e-2), the alkyl group in R^{14} may be linear or branched, or may contain a cyclic structure.

The alkyl group in R^{14} has 1 to 40 carbon atoms, preferably has 1 to 20 carbon atoms, and more preferably has 1 to 10 carbon atoms.

15 A repeating unit derived from a monomer represented by General Formula (e-2) is a repeating unit originated from the monomer represented by General Formula (e-2) in a case of polymerizing a monomer component containing the monomer represented by General Formula (e-2).

20 Examples of the monomer represented by General Formula (e-2) include acrylic acid esters such as methyl acrylate, ethyl acrylate, n-propyl acrylate, n-butyl acrylate, octyl acrylate, decyl acrylate, dodecyl acrylate, and icosyl acrylate; methacrylic acid esters such as methyl methacrylate, ethyl methacrylate, n-propyl methacrylate, n-butyl methacrylate, decyl methacrylate, dodecyl methacrylate, and icosyl methacrylate.

25 For these monomers represented by General Formula (e-2), any one type may be used alone, or two or more types may be used in combination.

The component (E) may be crosslinked or may not be crosslinked, with a crosslinked one being preferable.

Examples of the crosslinked component (E) include those crosslinked with a crosslinking agent (crosslinked polymers).

5 As the crosslinking agent, allyl ether compounds are suitably mentioned.

As the allyl ether compounds, allyl ethers, allyl ethers of sugar, allyl ethers of sugar alcohol, and the like are mentioned.

Examples of the sugar in the allyl ethers of sugar include sucrose.

10 Examples of the sugar alcohol in the allyl ethers of sugar alcohol include pentaerythritol.

For the component (E), any one type may be used alone, or two or more types may be used in combination.

In addition, the component (E) may have a repeating unit (another repeating unit) other than a repeating unit derived from a monomer represented by General
15 Formula (e-1) and a repeating unit derived from a monomer represented by General Formula (e-2).

As the other repeating unit, a repeating unit derived from another monomer is mentioned.

The other monomer is not particularly limited as long as the other monomer is
20 copolymerizable with the monomer represented by General Formula (e-1) and the monomer represented by General Formula (e-2), and one or more types thereof can be used.

Specific examples of the component (E) include, for example, the following trade names.

25 Examples of commercially available products of a crosslinked-type component

(E) include a trade name "Carbopol Aqua 30" which is a crosslinked copolymer composed of two or more types of monomers selected from alkyl acrylate, alkyl methacrylate, acrylic acid, and methacrylic acid, manufactured by Lubrizol Corporation; "Carbopol Aqua SF-1" which is a crosslinked copolymer composed of two or more types of monomers selected from alkyl acrylate (C1 to C4 and C8), alkyl methacrylate (C1 to C4 and C8), acrylic acid, and methacrylic acid, manufactured by Lubrizol Corporation; a trade name "Carbopol EZ-4" which is a crosslinked copolymer composed of two or more types of monomers selected from alkyl acrylate (C10 to C30), alkyl methacrylate (C10 to C30), and acrylic acid, manufactured by Lubrizol Corporation; and a trade name "ACUSOL 830" which is a crosslinked copolymer composed of alkyl acrylate, and acrylic acid or methacrylic acid, manufactured by DOW.

Examples of commercially available products of a non-crosslinked-type component (E) include a trade name "Novethix HC 200" which is a copolymer composed of two or more types of monomers selected from alkyl acrylate, alkyl methacrylate, acrylic acid, and methacrylic acid, manufactured by Lubrizol Corporation.

For these (E) components, one type may be used alone, or two or more types may be used in combination.

[0072]

A content of the component (E) is preferably 0.1% to 5.0% by mass, and more preferably 0.5% to 2.5% by mass, with respect to a total mass of the detergent composition. In a case where the content of the component (E) is within the above range of numerical values, the liquid detergent can be structured.

[0073]

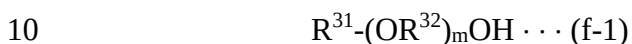
A mass ratio represented by component (A)/component (E) (hereinafter also referred to as A/E ratio) is preferably 0.05 to 1.25, and more preferably 0.1 to 1.25.

By setting the A/E ratio within the above range, the liquid detergent is sufficiently structured and a storage stability thereof is increased.

[0074]

[Organic solvent]

5 The detergent composition of the present invention can contain an organic solvent (hereinafter also referred to as component (F)), and the organic solvent is, for example, a solvent selected from the group consisting of a monohydric alcohol having 2 to 4 carbon atoms, a polyhydric alcohol having 2 to 4 carbon atoms, a glycol ether-based solvent represented by Formula (f-1), and a solvent represented by Formula (f-2).



[In the formula, R^{31} is an alkyl group having 1 to 6 carbon atoms or a phenyl group, R^{32} is an alkylene group having 2 to 4 carbon atoms, and m is an average addition molar number and is 1 to 5.]



15 [In the formula, R^{33} to R^{35} each independently represent a hydrogen atom or an alkyl group having 1 to 3 carbon atoms, and R^{36} represents a hydrogen atom or an acetyl group.]

[0075]

Examples of the monohydric alcohol having 2 to 4 carbon atoms include ethanol,
20 1-propanol, 2-propanol, and 1-butanol.

Examples of the polyhydric alcohol having 2 to 4 carbon atoms include ethylene glycol, propylene glycol, butylene glycol, and glycerin.

Examples of the glycol ether-based solvent represented by Formula (f-1) include ethylene glycol monobutyl ether, ethylene glycol monohexyl ether, ethylene glycol
25 monophenyl ether, propylene glycol monophenyl ether, diethylene glycol monomethyl

ether, and diethylene glycol monobutyl ether.

[0076]

Examples of the solvent represented by Formula (f-2) include

- 3-methoxymethanol, 3-methoxy-3-methylbutanol, 3-methoxy-3-ethylbutanol,
 5 3-methoxy-3-propylbutanol, 3-methoxy-2-methylbutanol, 3-methoxy-2-ethylbutanol,
 3-methoxy-2-propylbutanol, 3-methoxy-1-methylbutanol, 3-methoxy-1-ethylbutanol,
 3-methoxy-1-propylbutanol, 3-methoxybutyl acetate, 3-methoxy-3-methylbutyl acetate,
 3-methoxy-3-ethylbutyl acetate, 3-methoxy-3-propylbutyl acetate,
 3-methoxy-2-methylbutyl acetate, 3-methoxy-2-ethylbutyl acetate,
 10 3-methoxy-2-propylbutyl acetate, 3-methoxy-1-methylbutyl acetate,
 3-methoxy-1-ethylbutyl acetate, and 3-methoxy- 1-propylbutyl acetate.

Among these, from the viewpoints of flowability as a liquid detergent, mild smell, and availability of a raw material, ethanol, propylene glycol, diethylene glycol monobutyl ether, and 3-methoxy-3-methyl butanol are preferable.

- 15 For these (F) components, one type may be used alone, or two or more types may be used in combination.

[0077]

A content of the component (F) is preferably 3% to 25% by mass with respect to a total mass of the detergent composition.

- 20 In a case where the content of the component (F) is equal to or lower than the above upper limit value, it is easy to impart flowability and liquid stability as a liquid detergent. In a case where the content of the component (F) is equal to or higher than the lower limit value, it is easy to impart flowability and liquid stability as a liquid detergent.

- 25 [0078]

[Viscosity reducing agent and solubilizing agent]

As the viscosity reducing agent and the solubilizing agent, glycols such as triethylene glycol, tetraethylene glycol, polyethylene glycol having an average molecular weight of about 200, polyethylene glycol having an average molecular weight of about
5 400, polyethylene glycol having an average molecular weight of about 1,000, and dipropylene glycol, paratoluenesulfonic acid, benzoate, urea, and the like are mentioned.

In a case where the detergent composition of the present invention contains the viscosity reducing agent and the solubilizing agent, a content of the viscosity reducing agent and the solubilizing agent is preferably 0.01% to 15% by mass with respect to a
10 total mass of the detergent composition.

[0079]

[Metal ion trapping agent (chelating agent)]

As the metal ion trapping agent (chelating agent), malonic acid, succinic acid, malic acid, diglycolic acid, tartaric acid, citric acid, and the like are mentioned.

15 In a case where the detergent composition of the present invention contains the metal ion trapping agent, a content of the metal ion trapping agent is preferably 0.1% to 20% by mass with respect to a total mass of the detergent composition.

[0080]

[Antioxidant]

20 As the antioxidant, butylhydroxytoluene, distyrenated cresol, sodium sulfite, sodium hydrogen sulfite, and the like are mentioned.

In a case where the detergent composition of the present invention contains the antioxidant, a content of the antioxidant is preferably 0.01% to 2% by mass with respect to a total mass of the detergent composition.

25 [0081]

[Preservative]

As the preservative, "Caisson CG" (trade name) manufactured by Dow Chemical Company, "Acticide MBS" (trade name) manufactured by Thor Japan Inc., "NIPACIDE BIT 20" manufactured by Clariant (trade name), and the like are mentioned.

5 [0082]

[Coloring agent]

Examples of the coloring agent include general-purpose colorants and pigments such as Acid Red 138, Polar Red RLS, Acid Yellow 203, Acid Blue 9, Blue No. 1, Blue No. 205, Green No. 3, Red No. 106, Yellow No. 203, and Turquoise P-GR (all trade
10 names).

In a case where the detergent composition of the present invention contains the coloring agent, a content of the coloring agent is preferably 0.00005% to 0.005% by mass with respect to a total mass of the detergent composition.

[0083]

15 [Emulsifying agent]

As the emulsifying agent, for example, a polystyrene emulsion, a polyvinyl acetate emulsion, and the like are mentioned, and, usually, an emulsion having a solid content of usually 30% to 50% by mass is mentioned. Specifically, a polystyrene emulsion (Saibinor RPX-196 PE-3 (trade name), solid content of 40% by mass,
20 manufactured by Saiden Chemical Industry, Co., Ltd.) and the like are mentioned.

In a case where the detergent composition of the present invention contains the emulsifying agent, a content of the emulsifying agent is preferably 0.01% to 0.5% by mass with respect to a total mass of the detergent composition.

[0084]

25 [Fragrance]

Examples of the fragrance include fragrance ingredients described in Japanese Unexamined Patent Application, First Publication No. 2002-146399.

In a case where the detergent composition of the present invention contains the fragrance, a content of the fragrance is preferably 0.01% to 2% by mass with respect to a
5 total mass of the detergent composition.

[0085]

[Insoluble particles]

The insoluble particles are particles which are hardly soluble in components constituting the liquid detergent.

10 As the insoluble particles, capsule particles, beads and pearlescent agents for imparting unique product aesthetic properties, bentonite, carboxymethyl cellulose (CMC), and the like are specifically mentioned.

[0086]

The capsule particles are those in which active ingredients are enclosed by a
15 capsule wall formed of a polymer compound.

The capsule particles can be produced by a known method, and examples of the known method include an interfacial polymerization method and an in-situ polymerization method.

Examples of the polymer compound forming the capsule wall include synthetic
20 polymers such as polyacrylic acid-based polymers, polyvinyl-based polymers, polymethacrylic acid-based polymers, melamine-based polymers, and urethane-based polymers. For these polymer compounds, any one type may be used alone, or two or more types may be used in combination.

Examples of the active ingredient include a fragrance ingredient and a sunscreen
25 ingredient (an ultraviolet absorber, an ultraviolet scattering agent, and the like).

Hereinafter, capsule particles in which fragrance ingredients are enclosed by a capsule wall formed of a polymer compound are also referred to as "capsule fragrance".

Specific examples of the capsule fragrance include, for example, a capsule fragrance A, a capsule fragrance B, and a capsule fragrance C as shown below.

5 [0087]

Capsule fragrance A:

The capsule fragrance A contains the following fragrance ingredients.

Limonene (0.10% by mass), ethyl 2-methylbutyrate (3.50% by mass), Triplal (5.00% by mass), Galbascone (0.20% by mass), spirogalbanone (0.60% by mass),
 10 Cyclaset (9.00% by mass), Cyclabut (0.10% by mass), tricyclodecenyl acetate (19.00% by mass), Beldox (18.00% by mass), Nectaryl (15.00% by mass), tetrahydrolinalool (14.00% by mass), α -ionone (0.50% by mass), β -ionone (14.00% by mass), and dipropylene glycol (1.00% by mass).

[0088]

15 Capsule fragrance B:

The capsule fragrance B contains the following fragrance ingredients.

Triplal (2.40% by mass), Cyclaset (10.00% by mass), tricyclodecenyl propionate (10.00% by mass), isopropylmethyl-2-butyrate (1.70% by mass), manzanate (2.00% by mass), Beldox (14.00% by mass), allyl amyl glycolate (2.00% by mass), allyl cyclohexyl
 20 propionate (5.00% by mass), γ -decalactone (0.50% by mass), γ -undecalactone (7.50% by mass), α -damascone (0.25% by mass), nellol (0.20% by mass), Hedione (5.00% by mass), lilial (12.00% by mass), linalool (23.00% by mass), p-t-butylcyclohexyl acetate (0.20% by mass), vanillin (0.10% by mass), lime oxide (2.40% by mass), and dipropylene glycol (1.75% by mass).

25 [0089]

Capsule fragrance C:

The capsule fragrance C contains the following fragrance ingredients.

Hexyl salicylate (3.71% by mass), ethyl 2-methyl butyrate (3.30% by mass), dihydro eugenol (8.49% by mass), camphor (1.46% by mass), 1,4-cineole (1.28% by mass), Beldox (9.04% by mass), γ -nonalactone (0.84% by mass), γ -decalactone (2.58% by mass), γ -undecalactone (3.70% by mass), allyl caproate (7.47% by mass), hexyl acetate (1.27% by mass), geranyl propionate (6.38% by mass), Prenyl acetate (1.52% by mass), allyl phenoxyacetate (0.60% by mass), dimethylbenzyl carbonyl butyrate (0.95% by mass), Nectaryl (8.54% by mass), geranyl acetate (11.13% by mass), lilial (11.51% by mass), cyclamenaldehyde (3.05% by mass), amyl salicylate (1.39% by mass), Iso E Super (1.08% by mass), γ -methyl ionone (1.34% by mass), ambroxan (0.13% by mass), habanolide (0.37% by mass), anisaldehyde (8.46% by mass), and lime oxide (0.41% by mass).

In a case where the detergent composition of the present invention contains the insoluble particles, a content of the insoluble particles is preferably 0.01% to 20% by mass with respect to a total mass of the detergent composition.

[0090]

[Extracts of natural product or the like]

As the extracts of a natural products or the like, plants such as *Maackia amurensis*, bearberry leaf, *echinacea*, *Scutellaria baicalensis*, *Phellodendron amurense*, *Coptis japonica*, allspice, oregano, *Sophora japonica*, German chamomile, *Lonicera japonica*, *Sophora angustifolia*, *schizonepeta* spike, *Cinnamomum cassia*, laurel, magnolia, burdock, comfrey, *Torilis japonica*, burnet, peony, ginger, *Solidago altissima*, *Sambucus nigra*, sage, mistletoe, *Atractylodes lancea*, thyme, *Ancmarrhena asphodeloides*, clove, Satsuma mandarin, tea tree, barberry, *Hottuynia*, *nandina*,

frankincense, Angelica dahurica, Aglaophenia whiteleggei, Ledebouriella, Psoralea
 corylifolia, hops, rosewood, mountain wape, Serum siamea, Melissa officinalis,
 Belamcanda chinensis, Mosla japonica, eucalyptus, lavender, rose, rosemary, balun,
 Japanese cedar, Abies balsamea, Dictamnus albus, summer cypress, Polygonum aviculare,
 5 Gentiana macrophylla, Liquidambar formosana, Adenophora triphylla, Yamabishi,
 Cayratia japonica, Glycyrrhiza, and Common St. John's wort are mentioned.

In a case where the detergent composition of the present invention contains the
 extract of a natural product or the like, the content of the extract of a natural product or
 the like is preferably 0% to 0.5% by mass with respect to a total mass of the detergent
 10 composition.

[0091]

For these components, one type may be used alone, or two or more types may be
 used in combination.

Furthermore, an agent having an antifoaming effect such as 2-ethylhexyl
 15 2-ethylhexanoate (2-ethylhexyl isooctylate), 2-ethylbutyl 2-ethylhexanoate, and
 2-ethyloctyl 2-ethylhexanoate as described in Japanese Unexamined Patent Application,
 First Publication No. 2017-8139 may be contained. In a case where the detergent
 composition of the present invention contains the agent having such an antifoaming
 effect, a content thereof is preferably 0% to 2.0% by mass with respect to a total mass of
 20 the detergent composition.

A total amount of the components constituting the detergent composition does
 not exceed 100% by mass.

[0092]

The detergent composition of the present invention preferably has, at 25°C, a pH
 25 of 4 to 10, more preferably a pH of 4 to 9, and even more preferably a pH of 4 to 8. In a

case where the pH is within such a range, a storage stability of the detergent composition can be well maintained.

The pH of the detergent composition can be adjusted, if necessary, by adding a pH adjusting agent.

5 The pH adjusting agent is optional to the extent that an effect of the present invention is not impaired, and sulfuric acid, sodium hydroxide, potassium hydroxide, alkanolamine, and the like are preferably used.

 In the present specification, the pH means a value obtained by measuring an object to be measured at 25°C with a pH meter (product name: HM-30G, manufactured
10 by DKK-TOA Corporation).

[0093]

 It is preferable that the detergent composition of the present invention contains the component (A) and the component (B), in which the component (A) is a copolymer of dimethyl diallyl ammonium and acrylamide, and the component (B) is a compound
15 represented by Formula (b-3) or (b-4).

 It is preferable that the detergent composition of the present invention contains the component (A) and the component (B), in which the component (A) is a copolymer of dimethyl diallyl ammonium and acrylamide, and the component (B) is a compound represented by Formula (b-3) or (b-4), and in which a content of the component (A) is
20 0.1% to 5% by mass with respect to a total mass of the detergent composition, and a content of the component (B) is 0.1% to 5% by mass with respect to a total mass of the detergent composition.

[0094]

 It is preferable that the detergent composition of the present invention contains
25 the component (A), the component (B), and the component (C), in which the component

(A) is a copolymer of dimethyl diallyl ammonium and acrylamide, the component (B) is a compound represented by Formula (b-3) or (b-4), and the component (C) is a linear alkylbenzene sulfonate.

It is preferable that the detergent composition of the present invention contains
5 the component (A), the component (B), and the component (C), in which the component (A) is a copolymer of dimethyl diallyl ammonium and acrylamide, the component (B) is a compound represented by Formula (b-3) or (b-4), and the component (C) is a linear alkylbenzene sulfonate, and in which a content of the component (A) is 0.1% to 5% by mass with respect to a total mass of the detergent composition, a content of the
10 component (B) is 0.1% to 5% by mass with respect to a total mass of the detergent composition, and a content of the component (C) is 2% to 20% by mass with respect to a total mass of the detergent composition.

[0095]

It is preferable that the detergent composition of the present invention contains
15 the component (A), the component (B), the component (C), and the component (D), in which the component (A) is a copolymer of dimethyl diallyl ammonium and acrylamide, the component (B) is a compound represented by Formula (b-3) or (b-4), the component (C) is a linear alkylbenzene sulfonate, and the component (D) is a compound represented by Formula (d-1) or (d-2).

20 It is preferable that the detergent composition of the present invention contains the component (A), the component (B), the component (C), and the component (D), in which the component (A) is a copolymer of dimethyl diallyl ammonium and acrylamide, the component (B) is a compound represented by Formula (b-3) or (b-4), the component (C) is a linear alkylbenzene sulfonate, and the component (D) is a compound represented
25 by Formula (d-1) or (d-2), and in which a content of the component (A) is 0.1% to 5% by

mass with respect to a total mass of the detergent composition, a content of the component (B) is 0.1% to 5% by mass with respect to a total mass of the detergent composition, a content of the component (C) is 2% to 20% by mass with respect to a total mass of the detergent composition, and a content of the component (D) is 10% to 50% by mass with respect to a total mass of the detergent composition.

[0096]

It is preferable that the detergent composition of the present invention contains the component (A), the component (B), the component (C), the component (D), and the component (E), in which the component (A) is a copolymer of dimethyl diallyl ammonium and acrylamide, the component (B) is a compound represented by Formula (b-3) or (b-4), the component (C) is a linear alkylbenzene sulfonate, the component (D) is a compound represented by Formula (d-1) or (d-2), the component (E) is a crosslinked copolymer synthesized from two or more types of monomers selected from the group consisting of alkyl acrylate, alkyl methacrylate, acrylic acid, and methacrylic acid.

It is preferable that the detergent composition of the present invention contains the component (A), the component (B), the component (C), the component (D), and the component (E), in which the component (A) is a copolymer of dimethyl diallyl ammonium and acrylamide, the component (B) is a compound represented by Formula (b-3) or (b-4), the component (C) is a linear alkylbenzene sulfonate, the component (D) is a compound represented by Formula (d-1) or (d-2), and the component (E) is a crosslinked copolymer synthesized from two or more types of monomers selected from the group consisting of alkyl acrylate, alkyl methacrylate, acrylic acid, and methacrylic acid, and in which a content of the component (A) is 0.1% to 5% by mass with respect to a total mass of the detergent composition, a content of the component (B) is 0.1% to 5% by mass with respect to a total mass of the detergent composition, a content of the

component (C) is 2% to 20% by mass with respect to a total mass of the detergent composition, a content of the component (D) is 10% to 50% by mass with respect to a total mass of the detergent composition, a content of the component (E) is 0.1% to 5.0% by mass with respect to a total mass of the detergent composition.

5 [0097]

It is preferable that the detergent composition of the present invention contains the component (A), the component (B), the component (C), the component (D), the component (E), and the component (F), in which the component (A) is a copolymer of dimethyl diallyl ammonium and acrylamide, the component (B) is a compound
10 represented by Formula (b-3) or (b-4), the component (C) is a linear alkylbenzene sulfonate, the component (D) is a compound represented by Formula (d-1) or (d-2), the component (E) is a crosslinked copolymer synthesized from two or more types of monomers selected from the group consisting of alkyl acrylate, alkyl methacrylate, acrylic acid, and methacrylic acid, and the component (F) is a monohydric alcohol having
15 2 to 4 carbon atoms or an organic solvent represented by Formula (f-1) or (f-2).

It is preferable that the detergent composition of the present invention contains the component (A), the component (B), the component (C), the component (D), the component (E), and the component (F), in which the component (A) is a copolymer of dimethyl diallyl ammonium and acrylamide, the component (B) is a compound
20 represented by Formula (b-3) or (b-4), the component (C) is a linear alkylbenzene sulfonate, the component (D) is a compound represented by Formula (d-1) or (d-2), the component (E) is a crosslinked copolymer synthesized from two or more types of monomers selected from the group consisting of alkyl acrylate, alkyl methacrylate, acrylic acid, and methacrylic acid, and the component (F) is a monohydric alcohol having
25 2 to 4 carbon atoms or an organic solvent represented by Formula (f-1) or (f-2), and in

which a content of the component (A) is 0.1% to 5% by mass with respect to a total mass of the detergent composition, a content of the component (B) is 0.1% to 5% by mass with respect to a total mass of the detergent composition, a content of the component (C) is 2% to 20% by mass with respect to a total mass of the detergent composition, a content of the component (D) is 10% to 50% by mass with respect to a total mass of the detergent composition, a content of the component (E) is 0.1% to 5.0% by mass with respect to a total mass of the detergent composition, and a content of the component (F) is 3% to 25% by mass with respect to a total mass of the detergent composition.

[0098]

10 The detergent composition of the present invention is produced by methods for producing a detergent which are known in the related art.

In a case where the detergent composition is a liquid, for example, a method in which components (A) to (B) and, if necessary, an optional component are added to water which is a solvent, and the components are mixed is mentioned.

15 In a case where the detergent composition is granular, examples of the method include a dry blending method in which the respective raw materials are mixed in powders, a dry granulation method in which powder raw materials are granulated while being flowed, a stirring granulation method in which powder raw materials are granulated by spraying a liquid binder while being flowed, an extrusion granulation method in which raw materials are kneaded and extruded by an extruder, a pulverization granulation method in which raw materials are kneaded and pulverized, and a spray drying method in which a slurry containing raw materials is spray-dried.

[0099]

25 As a method of using the detergent composition of the present invention, for example, in a case of being used for washing fiber products, a method of putting the

detergent composition together with objects to be cleaned in water at the time of doing the cleaning, a method in which the detergent composition is directly applied to dirt stains or sebum stains, a method in which the detergent composition is dissolved in water in advance and clothing is immersed therein, and the like are mentioned. In addition, it is also preferable to apply the detergent composition to the objects to be cleaned, then allow the objects to stand for an appropriate time, followed by carrying out a usual cleaning using a usual cleaning liquid.

Examples of the object to be washed include fiber products such as clothing, fabrics, sheets, curtains, and carpets.

10 Examples

[0100]

Hereinafter, the present invention will be described in more detail by way of examples, but the present invention is not limited to these examples.

[0101]

15 (Raw materials used)

<Component (A)>

· A-1: Dimethyl diallyl ammonium-acrylamide copolymer, trade name "Noverite 300", manufactured by Lubrizol Corporation.

[0102]

20 <Component (B)>

· B-1: Water-soluble polymer, trade name "TexCare SRN-170C", manufactured by Clariant Japan K.K., mass average molecular weight = 2,000 to 3,000, pH (5% by mass aqueous solution at 20°C) = 4, viscosity (20°C) = 300 mPa·s, polymer represented by Formula (b-4).

25 [0103]

<Optional components>

[Component (C)]

- C'-1: Linear alkyl (having 10 to 14 carbon atoms) benzenesulfonic acid, trade name "LIPON LH-200", having an average molecular weight of 322, manufactured by
5 Lion Corporation, which forms, in a system, a salt with monoethanolamine and exists as a linear alkylbenzene sulfonate (C-1) (having an average molecular weight of 383).

[Component (D)]

- D-1: Polyoxyethylene alkyl ether (which is obtained by adding an average of 15 mol equivalent of ethylene oxide to a natural alcohol CO-1270 (trade name,
10 manufactured by Procter & Gamble)).

· D-2: Mixture of $C_{11}H_{23}CO(OCH_2CH_2)_mOCH_3$ and $C_{13}H_{27}CO(OCH_2CH_2)_mOCH_3$ at a mass ratio of 8/2, $m = 15$ on average, narrow rate of 33% by mass, synthetic product.

[Component (E)]

- 15 · (E-1) Crosslinked copolymer synthesized from two or more types of monomers selected from the group consisting of alkyl acrylate, alkyl methacrylate, acrylic acid, and methacrylic acid, trade name "Carbopol Aqua 30", manufactured by Lubrizol Corporation.

[Component (F)]

- 20 · F-1: Ethanol, trade name "Special Alcohol 95% Synthetic", manufactured by Japan Alcohol Trading Co., Ltd.

· F-2: Diethylene glycol monobutyl ether, trade name "Butyl Diglycol", manufactured by Nippon Nyukazai Co., Ltd.

- F-3: 3-Methoxy-3-methylbutanol, trade name "Solfit", manufactured by
25 Kuraray Co., Ltd.

[Common component a]

· Polyethylene glycol: Trade name "PEG# 1000-60L", manufactured by Lion Corporation) . . . 2% by mass.

· Coconut fatty acid: Manufactured by NOF CORPORATION . . . 4% by mass.

5 · Sodium benzoate: Trade name "Sodium Benzoate", manufactured by Toagosei Co., Ltd. . . . 0.5% by mass.

· Citric acid: Trade name "Liquid Citric Acid", manufactured by Ipposha Oil Industries Co., Ltd. . . . 0.5% by mass.

10 · Dibutyl hydroxy toluene: Trade name "SUMILZER BHT-R", manufactured by Sumitomo Chemical Co., Ltd. . . . 0.05% by mass.

· Fragrance: Fragrance ingredient a described in Japanese Unexamined Patent Application, First Publication No. 2009-108248 . . . 0.8% by mass.

· Capsule fragrance: Above-mentioned capsule fragrance A . . . 0.1% by mass.

15 · Green No. 3 (colorant): Trade name "Green No. 3", manufactured by Kishi Kasei Co., LTD. . . . 0.0002% by mass.

[Common component b]

· Polyethylene glycol: Trade name "PEG# 1000-60L", manufactured by Lion Corporation) . . . 2% by mass.

· Coconut fatty acid: Manufactured by NOF CORPORATION . . . 4% by mass.

20 · Sodium benzoate: Trade name "Sodium Benzoate", manufactured by Toagosei Co., Ltd. . . . 0.5% by mass.

· Citric acid: Trade name "Liquid Citric Acid", manufactured by Ipposha Oil Industries Co., Ltd. . . . 0.5% by mass.

· Dibutyl hydroxy toluene: Trade name "SUMILZER BHT-R", manufactured by

Sumitomo Chemical Co., Ltd. . . . 0.05% by mass.

· Fragrance: Fragrance ingredient a described in Japanese Unexamined Patent Application, First Publication No. 2009-108248 . . . 0.8% by mass.

· Capsule fragrance: Above-mentioned capsule fragrance A . . . 0.1% by mass.

5 · Green No. 3 (colorant): Trade name "Green No. 3", manufactured by Kishi Kasei Co., LTD. . . . 0.0002% by mass.

· 2-Ethylhexyl 2-ethylhexanoate: Trade name "2-Ethylhexyl Isooctylate",
manufactured by Lion Specialty Chemicals Co., Ltd. . . . 0.8% by mass

[pH adjusting agent]

10 · Monoethanolamine: Manufactured by Nippon Shokubai Co., Ltd. . . . amount
to make pH 7.

[0104]

<Preparation of detergent composition>

A detergent composition having a composition shown in Table 1 was prepared
15 by the following procedure.

Polyethylene glycol, the component (C), the component (D), the component (F),
coconut fatty acid, a pH adjusting agent (monoethanolamine), and water were placed in a
500 mL beaker, and sufficiently stirred with a magnetic stirrer (manufactured by
MITAMURA KOGYO INC.). Subsequently, the other components, that is, the
20 component (A), the component (E), sodium benzoate, and citric acid water were added
and stirred, and it was confirmed that the mixture had a pH at 25°C of around 7. Then,
the component (B), a pigment, a fragrance (in which dibutylhydroxytoluene had been
dissolved in advance), and a capsule fragrance were added to obtain a detergent
composition.

In Table 1, a blending amount of each component has a unit of “% by mass”.

In the table, in a case where a blending component is indicated as blank, the blending component is not blended.

A content of water "balance" is an amount necessary to make 100% by mass of the detergent composition as a whole.

In addition, in the table, a ratio (A/C ratio) of blending amounts of the component (A) and the component (C) in the detergent composition is also shown.

The obtained detergent composition was evaluated as follows. The results are also shown in Table 1.

10 [0105]

<Evaluation of fluffy voluminous feeling>

In a fully automated electric washing machine (JW-Z23A manufactured by Haier), 1 piece of fleece clothing (fleece full-zip jacket, 100% polyester, manufactured by UNIQLO), and 3 pieces of commercial cotton towels (100% cotton) were put (amount of cotton towels put was adjusted so that the entire mass of clothes was about 1 kg). Therein, 12.5 mL of the detergent composition was added, and a washing operation was done by sequentially carrying out washing, rinsing, and dehydration. Regarding washing time, rinsing, dehydration, and water volume, no adjustment was made at all, and a standard course setting of the washing machine was used. After completion of cleaning, the above fleece clothing was dried, and then compared with a clothing before cleaning (a new product of the same clothing) to make an evaluation according to the following criteria.

<<Criteria for evaluation>>

1 Point: Very poor finish feeling which is not fluffy (finish with no voluminous feeling at all), as compared with a control cloth.

2 Points: Poor finish feeling which is not fluffy (finish with no voluminous feeling), as compared with a control cloth.

3 Points: Same degree of finish feeling, as compared with a control cloth.

4 Points: Good fluffy finish feeling (finish with voluminous feeling), as
5 compared with a control cloth.

5 Points: Very good fluffy finish feeling (finish with very voluminous feeling),
as compared with a control cloth.

From values obtained by averaging scoring results of 5 panelists, a finish feeling
was evaluated according to the following criteria.

10 <<Criteria for evaluation>>

A: Equal to or higher than 4 points.

B: Equal to or higher than 3.5 points and lower than 4 points.

C: Equal to or higher than 3 points and lower than 3.5 points.

D: Lower than 3 points.

[0107]

From the results shown in Table 1, the detergent compositions of Examples 1 to 11 to which the present invention was applied were capable of imparting a fluffy voluminous tactile feeling.

5 On the other hand, in Comparative Example 1 which does not contain the component (A), it was not possible to impart a fluffy voluminous tactile feeling.

In Comparative Example 2 which does not contain the component (B), it was not possible to impart a fluffy voluminous tactile feeling.

From the above results, it was possible to confirm that the detergent composition
10 to which the present invention is applied is capable of imparting a fluffy voluminous tactile feeling.

Industrial Applicability

[0108]

15 According to the present invention, it is possible to provide a detergent composition capable of imparting a fluffy voluminous tactile feeling.

CLAIMS

1. A detergent composition comprising:

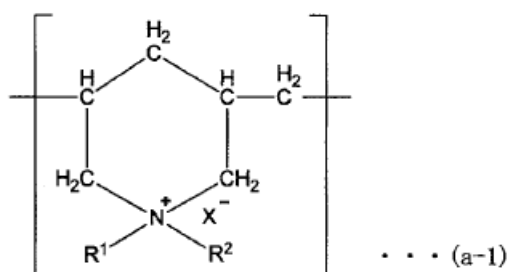
a component (A); and

5 a component (B),

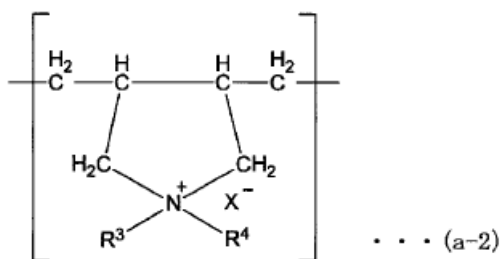
wherein the component (A) is a polymer having at least one repeating unit selected from the group consisting of a repeating unit represented by General Formula (a-1) and a repeating unit represented by General Formula (a-2), and

the component (B) is a water-soluble polymer having a repeating unit (b1)

10 which is at least one member selected from the group consisting of an alkylene terephthalate unit and an alkylene isophthalate unit and a repeating unit (b2) which is at least one member selected from the group consisting of an oxyalkylene unit and a polyoxyalkylene unit,

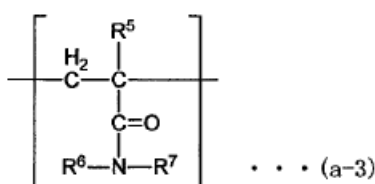


15 in the formula, R^1 and R^2 are each independently an alkyl group having 1 to 3 carbon atoms or a hydroxyalkyl group having 1 to 3 carbon atoms, and X^- is a counter ion, and



in the formula, R^3 and R^4 are each independently an alkyl group having 1 to 3 carbon atoms or a hydroxyalkyl group having 1 to 3 carbon atoms, and X^- is a counter ion.

- 5 2. The detergent composition according to claim 1,
wherein the component (A) further has a repeating unit represented by General Formula (a-3),



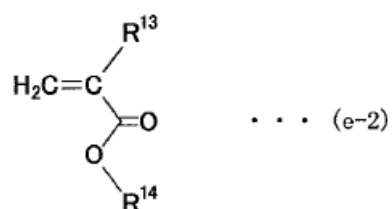
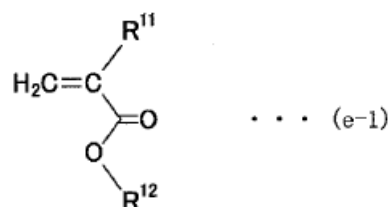
- 10 in the formula, R^5 is a hydrogen atom or an alkyl group having 1 to 3 carbon atoms, and R^6 and R^7 are each independently a hydrogen atom, an alkyl group having 1 to 3 carbon atoms, or a hydroxyalkyl group having 1 to 3 carbon atoms.

- 15 3. The detergent composition according to claim 1 or 2, further comprising:
an anionic surfactant which is at least one member selected from the group
consisting of a sulfonic acid-type anionic surfactant and a sulfate ester-type anionic surfactant.

- 20 4. The detergent composition according to any one of claims 1 to 3, further comprising:
a nonionic surfactant.

5. The detergent composition according to any one of claims 1 to 4, further comprising:

a polymer having at least one repeating unit selected from the group consisting of a repeating unit derived from a monomer represented by General Formula (e-1) and a repeating unit derived from a monomer represented by General Formula (e-2),



- 5 in Formula (e-1), R^{11} is a hydrogen atom or a methyl group, and R^{12} is a hydrogen atom, and in Formula (e-2), R^{13} is a hydrogen atom or a methyl group, and R^{14} is an alkyl group having 1 to 40 carbon atoms.