Patent Literature 18: JP 2014-9189 A

Summary

[0017a]

In one aspect of the present disclosure, there is provided a copolymer comprising:

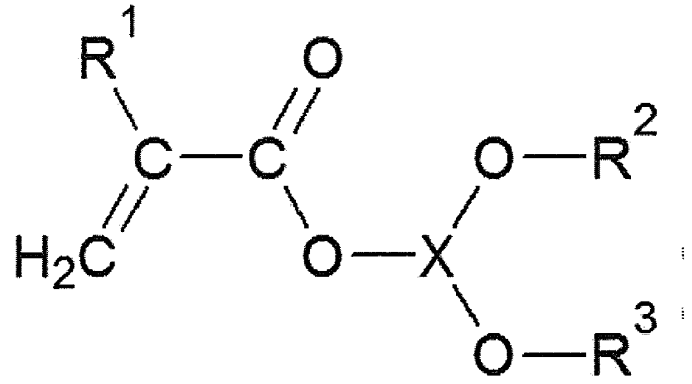
one kind or two or more kinds of constitutional units (a) derived from a hydrophobic monomer represented by the following general formula (1); and

one kind or two or more kinds of constitutional units (b) derived from a hydrophilic monomer represented by the following general formula (2) as essential constitutional units,

wherein a weight average molecular weight of the copolymer is from 20,000 to 110,000:

General Formula (1)

[Chemical Formula 1]

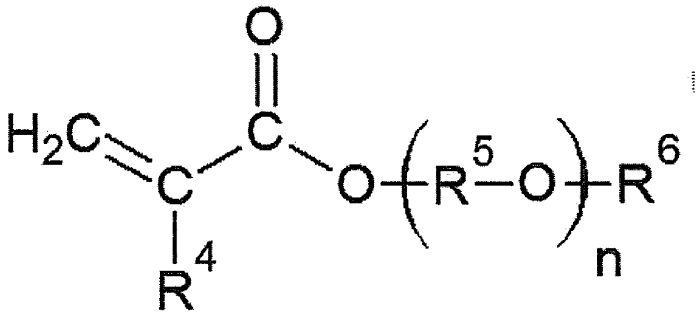


(1)

(in the general formula (1), R1 represents a hydrogen atom or an alkyl group having from 1 to 3 carbon atoms and R2 and R3 may be the same as or different from each other and represent an acyl group which has from 6 to 22 carbon atoms and a branch but does not contain a ring structure. X represents a group obtained by eliminating an OH group from a trihydric alcohol.), and

General Formula (2)

[Chemical Formula 2]



(2)

(in the general formula (2), R4 represents a hydrogen atom or an alkyl group having from 1 to 3 carbon atoms, R5 represents

an alkylene group which has from 2 to 4 carbon atoms and may have a hydroxyl group, and R6 represents a hydrogen atom, an aromatic hydrocarbon group having from 6 to 10 carbon atoms, an aliphatic hydrocarbon group having from 1 to 14 carbon atoms, or an acyl group having from 1 to 12 carbon atoms. n represents an integer from 6 to 40.).

[0017b]

In another aspect of the present disclosure, there is provided an external preparation for skin comprising the copolymer as described herein.

[0017c]

In yet another aspect of the present disclosure, there is provided an emulsified composition comprising;

a water-soluble copolymer which is the copolymer as described herein;

wherein the emulsified composition does not substantially contain an emulsifying agent other than the water-soluble copolymer.

[0017d]

In a further aspect of the present disclosure, there is provided an emulsifying agent containing a water-soluble copolymer which is the copolymer as described herein.

[0017e]

In another aspect of the present disclosure, there is provided a method of producing an emulsified composition, comprising;

a step of conducting emulsification by using the emulsifying agent as described herein;

wherein an emulsifying agent other than the emulsifying agent is substantially not used.

[0017f]

In yet another aspect of the present disclosure, there is provided a skin cleanser comprising;

a water-soluble copolymer which is the copolymer as described herein.

[0017g]

In a further aspect of the present disclosure, there is provided an oil-in-water type sunscreen cosmetic comprising components (A) to (D);

(A) A water-soluble copolymer which is the copolymer as described herein

(B) A polyglycerin fatty acid ester obtained by ester condensation of one molecule of polyglycerin having a polymerization degree of 10 with from two to five molecules of a fatty acid having 16 or more carbon atoms

(C) An ionic surfactant

(D) An ultraviolet scattering agent and/or an ultraviolet absorber.

[0017h]

In another aspect of the present disclosure, there is provided a composition comprising;

an amphipathic copolymer which is the copolymer as described herein, a water-soluble polymer and/or any salt thereof, and water,

wherein the composition forms a coating film having a sea-island structure in which island particles containing the amphipathic copolymer are dispersed in an aqueous gel formed by the water-soluble polymer and/or any salt thereof by evaporation of the water.

[0017i]

In yet another aspect of the present disclosure, there is provided a coating film having a sea-island structure in which island particles containing an amphipathic copolymer are dispersed in an aqueous gel formed by a water-soluble polymer,

wherein the amphipathic copolymer is the copolymer as described herein.

[0017j]

In a further aspect of the present disclosure, there is provided a method of forming the coating film as described herein, comprising the step of;

applying a composition to the skin,

wherein the composition containing an amphipathic copolymer which is the copolymer as described herein, a water-soluble polymer and/or any salt thereof, and water.

Technical Problem

[0018]

As described above, an oil agent exhibits a favorable feel of use such as elastic feel, but it also has a problem such as stickiness. Under such circumstances, a novel material exhibiting elastic feel like an oil agent has been demanded.

An object of the present invention is to provide a novel copolymer exhibiting elastic feel. In addition, in a preferred aspect of the present invention, it is a first object to provide a copolymer which hardly causes stickiness but exhibits moist feel.

[0019]

In addition, a polymer emulsifying agent as described above has advantages that the polymer emulsifying agent causes less irritation to the skin and is less sticky when being contained at a low concentration, but it is inferior in the emulsifying power to a conventional low-molecular emulsifying agent. Hence, in order to secure the stability of an emulsified state, it is required to blend a high-molecular emulsifying agent in the emulsified composition at a high proportion and thus to increase the viscosity, but there is a problem of stickiness as a result.

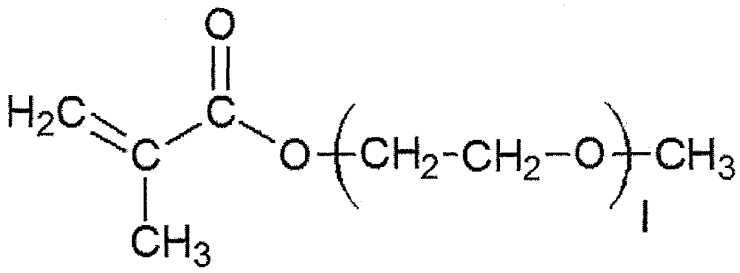
[0020]

In view of such circumstances, it is a second object of the present invention to provide an emulsified composition which exhibits excellent emulsion stability while causing less

irritation to the skin and being less sticky.

[0021]

With a recent increase in consumer needs, particularly foam quality and feel after washing are not



(6)

(l in the general formula (6) represents an integer from 6 to 40.).

9. An external preparation for skin comprising the copolymer according to any one of claims 1 to 8.

10. An emulsified composition comprising;

a water-soluble copolymer which is the copolymer according to any one of claims 1 to 8;

wherein the emulsified composition does not substantially contain an emulsifying agent other than the water-soluble copolymer.

11. The emulsified composition according to claim 10, wherein the content of the water-soluble copolymer is from 0.5% to 30% by mass.

12. The emulsified composition according to claim 10 or 11, wherein the content of an oil phase component is from 0.1% to 70% by mass.

13. The emulsified composition according to any one of claims 10 to 12, wherein the emulsified composition is a cosmetic.

14. An emulsifying agent containing a water-soluble copolymer which is the copolymer according to any one of claims 1 to 8.

15. A method of producing an emulsified composition, comprising;

a step of conducting emulsification by using the emulsifying agent according to claim 14;

wherein an emulsifying agent other than the emulsifying agent is substantially not used.

16. A skin cleanser comprising;

a water-soluble copolymer which is the copolymer according to any one of claims 1 to 8.

17. The skin cleanser according to claim 16, wherein the content of the water-soluble copolymer is from 0.1% to 20% by mass.

18. The skin cleanser according to claim 16 or 17, wherein the skin cleanser is a foaming cleanser.

19. The skin cleanser according to claim 16 or 17, wherein the skin cleanser is a gel skin cleanser.

20. The skin cleanser according to any one of claims 16 to 19, further comprising
a surfactant.

21. The skin cleanser according to 20, comprising fatty acid soap as the surfactant.

22. The skin cleanser according to 21, wherein the ratio of the mass of the water-soluble copolymer contained to the mass of the fatty acid soap contained is from 1 : 500 to 1 : 2.

23. The skin cleanser according to 20, comprising a nonionic surfactant as the surfactant.

24. The skin cleanser according to 23, wherein the ratio of the mass of the water-soluble copolymer contained to the mass of the nonionic surfactant contained is from 1 : 20 to 1 : 0.5.

25. An oil-in-water type sunscreen cosmetic comprising components (A) to (D);

(A) A water-soluble copolymer which is the copolymer according to any one of claims 1 to 8

(B) A polyglycerin fatty acid ester obtained by ester condensation of one molecule of polyglycerin having a polymerization degree of 10 with from two to five molecules of

a fatty acid having 16 or more carbon atoms

(C) An ionic surfactant

(D) An ultraviolet scattering agent and/or an ultraviolet absorber.

26. The sunscreen cosmetic according to 25, wherein the component (C) is an anionic surfactant.

27. The sunscreen cosmetic according to 26, wherein the anionic surfactant is sodium acyl lactate.

28. The sunscreen cosmetic according to any one of 25 to 27, wherein the component (B) is polyglyceryl-10 pentastearate.

29. The sunscreen cosmetic according to any one of 25 to 28, wherein the component (D) is a water dispersible ultraviolet scattering agent.

30. The sunscreen cosmetic according to 29, wherein the water dispersible ultraviolet scattering agent is an ultraviolet scattering agent of which the surface is treated with sodium polyacrylate.

31. A composition comprising;

an amphipathic copolymer which is the copolymer according to any one of claims 1 to 8, a water-soluble polymer and/or any salt thereof, and water,

wherein the composition forms a coating film having a sea-island structure in which island particles containing the amphipathic copolymer are dispersed in an aqueous gel formed by the water-soluble polymer and/or any salt thereof by evaporation of the water.

32. The composition according to 31, wherein the average ratio of major axis to minor axis of the island particles is 0.8 or more and the number particle size distribution of the island particles having an average particle diameter of from 1 to 5 μm is 80% or more.

33. The composition according to 31 or 32, wherein the

water-soluble polymer is one kind or two or more kinds of water-soluble polymers selected from the group consisting of an acrylic acid-based water-soluble polymer, a water-soluble polypeptide, and a water-soluble polysaccharide and/or salts thereof.

34. The composition according to 33, wherein the water-soluble polymer is one kind or two or more kinds of water-soluble polymers selected from the group consisting of sodium polyacrylate, a (acrylates/(C10-30) alkyl acrylate) crosspolymer, sodium polyglutamate, xanthan gum, and Tremella fuciformis polysaccharide.

35. The composition according to 33, further comprising;

a polyol which promotes phase separation between the aqueous gel and the amphipathic copolymer and/or

a polyol which suppresses the phase separation between the aqueous gel and the amphipathic copolymer.

36. The composition according to 35, wherein

the polyol which promotes the phase separation is a polyol which increases the cloud point of the aqueous solution by being mixed with an aqueous solution of a nonionic surfactant having a polyether chain at the hydrophilic moiety, and

the polyol which suppresses the phase separation is a polyol which lowers the cloud point of the aqueous solution by being mixed with an aqueous solution of a nonionic surfactant having a polyether chain at the hydrophilic moiety.

37. The composition according to 36, wherein the polyol which promotes the phase separation is one kind or two or more kinds of polyols selected from the group consisting of 1,3-butylene glycol and polyethylene glycol.

38. The composition according to 36 or 37, wherein the polyol which suppresses the phase separation is one kind or two or more kinds of polyols selected from the group

consisting of glycerin, diglycerin, sorbitol, and maltitol.

39. The composition according to any one of 36 to 38, wherein the mass ratio of the total amount of the polyol which promotes the phase separation and the polyol which suppresses the phase separation to the total amount of the amphipathic copolymer and the water-soluble polymer is from 5 : 1 to 20 : 1.

40. The composition according to any one of 36 to 39, the mass ratio of the polyol which promotes the phase separation to the polyol which suppresses the phase separation is from 3.5 : 1 to 1 : 2.5.

41. The composition according to any one of 31 to 40, the content of the amphipathic copolymer is from 0.1% to 5% by mass.

42. The composition according to any one of 31 to 41, wherein the content of the oil agent is 1% by mass or less.

43. A coating film having a sea-island structure in which island particles containing an amphipathic copolymer are dispersed in an aqueous gel formed by a water-soluble polymer,

wherein the amphipathic copolymer is the copolymer according to any one of claims 1 to 8.

44. The coating film according to claim 43, wherein the average ratio of major axis to minor axis of the island particles is 0.8 or more and the number particle size distribution of the island particles having an average particle diameter of from 1 to 5 μm is 80% or more.

45. A method of forming the coating film according to claim 44, comprising the step of;

applying a composition to the skin,

wherein the composition containing an amphipathic copolymer which is the copolymer according to any one of claims 1 to 8, a water-soluble polymer and/or any salt

thereof, and water.

46. The method according to claim 45, wherein the composition contains

a polyol which promotes the phase separation between the amphipathic copolymer and the aqueous gel and/or

a polyol which suppresses the phase separation between the aqueous gel and the amphipathic copolymer.