CLAIMS

1. A bubble-containing hydraulic composition for civil engineering-construction materials comprising:

froth obtained by foaming a liquid composition comprising:

a foaming agent composition for civil engineering-construction materials comprising an anionic surfactant (A), a surfactant aid (B) and a water-insoluble or slightly water-soluble nonionic surfactant (C), wherein

the water-insoluble or slightly water-soluble nonionic surfactant (C) has a solubility in 100 g of water at 25 °C of 0.1 g or less, and

the water-insoluble or slightly water-soluble nonionic surfactant (C) is one or more nonionic surfactants selected from: polypropylene glycol monoalkyl ethers having one alkyl group with 8 or more and 22 or less carbons and having an average number of moles of added oxypropylene of 1 or more and 10 or less; and glyceryl ethers having an alkyl group or alkenyl group with 5 or more and 22 or less carbons; and

water; and

a hydraulic composition.

2. The bubble-containing hydraulic composition for civil engineering-construction materials according to claim 1, wherein in the foaming agent composition for civil engineering-construction materials, the anionic surfactant (A) is an anionic surfactant having an alkyl group or alkenyl group with 8 or more and 22 or less carbons.

3. The bubble-containing hydraulic composition for civil engineering-construction materials according to claim 1 or 2, wherein in the foaming agent composition for civil engineering-construction materials, the anionic surfactant (A) is one or more selected from alkyl or alkenyl sulfonic acids having an alkyl group or alkenyl group with 8 or more and 22 or less carbons, alkyl or alkenyl sulfates having an alkyl group or alkenyl group with 8 or more and 22 or less carbons, olefin sulfonic acids whose olefin has 8 or more and 22 or less carbons, polyoxyalkylene alkyl or alkenyl ether sulfates having an alkyl group or alkenyl group with 8 or more and 22 or less carbons, polyoxyalkylene alkyl or alkenyl ether carboxylic acids having an alkyl group or alkenyl group with 8 or more and 22 or less carbons, and salts thereof.

4. The bubble-containing hydraulic composition for civil engineering-construction materials according to any one of claims 1 to 3, wherein in the foaming agent composition for civil engineering-construction materials, the surfactant aid (B) is a hydrocarbon derivative with 8 or more and 22 or less carbons.

5. The bubble-containing hydraulic composition for civil engineering-construction materials according to any one of claims 1 to 4, wherein in the foaming agent composition for civil engineering-construction materials, the surfactant aid (B) is one or more compounds selected from monohydric alcohols with 8 or more and 22 or less carbons, and fatty acids with 8 or more and 22 or less carbons.

6. The bubble-containing hydraulic composition for civil engineering-construction materials according to any one of claims 1 to 5, wherein in the foaming agent composition for

civil engineering-construction materials, the surfactant aid (B) is a monohydric alcohol with 8 or more and 22 or less carbons.

7. The bubble-containing hydraulic composition for civil engineering-construction materials according to any one of claims 1 to 6, wherein in the foaming agent composition for civil engineering-construction materials, the water-insoluble or slightly water-soluble nonionic surfactant (C) is a glyceryl ether having an alkyl group or alkenyl group with 5 or more and 22 or less carbons.

8. The bubble-containing hydraulic composition for civil engineering-construction materials according to any one of claims 1 to 7, wherein in the foaming agent composition for civil engineering-construction materials, the anionic surfactant (A) is contained in an amount of 60% by mass or more and 95% by mass or less provided that the total of (A), (B) and (C) is 100% by mass.

9. The bubble-containing hydraulic composition for civil engineering-construction materials according to any one of claims 1 to 8, wherein in the foaming agent composition for civil engineering-construction materials, the surfactant aid (B) is contained in an amount of 2.5% by mass or more and 20% by mass or less provided that the total of (A), (B) and (C) is 100% by mass.

10. The bubble-containing hydraulic composition for civil engineering-construction materials according to any one of claims 1 to 9, wherein in the foaming agent composition for civil engineering-construction materials, the water-insoluble or slightly water-soluble nonionic surfactant (C) is

contained in an amount of 2.5% by mass or more and 20% by mass or less provided that the total of (A), (B) and (C) is 100% by mass.

11. The bubble-containing hydraulic composition for civil engineering-construction materials according to any one of claims 1 to 10, wherein in the foaming agent composition for civil engineering-construction materials, a mass ratio of (B) to (A), (B)/(A), is 0.03 or more and 0.20 or less.

12. The bubble-containing hydraulic composition for civil engineering-construction materials according to any one of claims 1 to 11, wherein the foaming agent composition for civil engineering-construction materials comprises water.

13. A bubble-containing hydraulic composition for civil engineering-construction materials comprising a hydraulic powder, water, an anionic surfactant (A), a surfactant aid (B) and a water-insoluble or slightly water-soluble nonionic surfactant (C), wherein

the water-insoluble or slightly water-soluble nonionic surfactant (C) has a solubility in 100 g of water at 25 °C of 0.1 g or less, and

the water-insoluble or slightly water-soluble nonionic surfactant (C) is one or more nonionic surfactants selected from: polypropylene glycol monoalkyl ethers having one alkyl group with 8 or more and 22 or less carbons and having an average number of moles of added oxypropylene of 1 or more and 10 or less; and glyceryl ethers having an alkyl group or alkenyl group with 5 or more and 22 or less carbons.

14. A method for producing a bubble-containing hydraulic composition for civil engineering-construction materials, the method comprising the following step 1 and step 2:

<step 1>

obtaining froth by foaming a liquid composition comprising:

a foaming agent composition for civil engineering-construction materials comprising an anionic surfactant (A), a surfactant aid (B) and a water-insoluble or slightly water- soluble nonionic surfactant (C), wherein

the water-insoluble or slightly water-soluble nonionic surfactant (C) has a solubility in 100 g of water at 25 °C of 0.1 g or less, and

the water-insoluble or slightly water-soluble nonionic surfactant (C) is one or more nonionic surfactants selected from: polypropylene glycol monoalkyl ethers having one alkyl group with 8 or more and 22 or less carbons and having an average number of moles of added oxypropylene of 1 or more and 10 or less; and glyceryl ethers having an alkyl group or alkenyl group with 5 or more and 22 or less carbons; and

water; and

<step 2>

mixing the froth obtained in step 1 with a hydraulic composition containing a hydraulic powder and water.

15. A method for producing a bubble-containing hydraulic composition for civil engineering-construction materials, wherein a hydraulic powder, water, an anionic surfactant (A), a surfactant aid (B) and a water-insoluble or slightly water-soluble nonionic surfactant (C) are mixed to prepare a hydraulic composition containing bubbles, wherein

the water-insoluble or slightly water-soluble nonionic surfactant (C) has a solubility in 100 g of water at 25 °C of 0.1 g or less, and

the water-insoluble or slightly water-soluble nonionic surfactant (C) is one or more nonionic surfactants selected from: polypropylene glycol monoalkyl ethers having one alkyl group with 8 or more and 22 or less carbons and having an average number of moles of added oxypropylene of 1 or more and 10 or less; and glyceryl ethers having an alkyl group or alkenyl group with 5 or more and 22 or less carbons.

16. A bubble-containing gypsum slurry for civil engineering-construction materials comprising:

froth obtained by foaming a liquid composition comprising:

a foaming agent composition for civil engineering-construction materials comprising an anionic surfactant (A), a surfactant aid (B) and a water-insoluble or slightly water-soluble nonionic surfactant (C), wherein

the water-insoluble or slightly water-soluble nonionic surfactant (C) has a solubility in 100 g of water at 25 °C of 0.1 g or less, and

the water-insoluble or slightly water-soluble nonionic surfactant (C) is one or more nonionic surfactants selected from: polypropylene glycol monoalkyl ethers having one alkyl group with 8 or more and 22 or less carbons and having an average number of moles of added oxypropylene of 1 or more and 10 or less; and glyceryl ethers having an alkyl group or alkenyl group with 5 or more and 22 or less carbons; and

water; and

gypsum.

17. A bubble-containing gypsum slurry for civil engineering-construction materials comprising gypsum, water, an anionic surfactant (A), a surfactant aid (B) and a water-insoluble or slightly water-soluble nonionic surfactant (C), wherein

the water-insoluble or slightly water-soluble nonionic surfactant (C) has a solubility in 100 g of water at 25 °C of 0.1 g or less, and

the water-insoluble or slightly water-soluble nonionic surfactant (C) is one or more nonionic surfactants selected from: polypropylene glycol monoalkyl ethers having one alkyl group with 8 or more and 22 or less carbons and having an average number of moles of added oxypropylene of 1 or more and 10 or less; and glyceryl ethers having an alkyl group or alkenyl group with 5 or more and 22 or less carbons.

18. A method for producing a bubble-containing gypsum slurry for civil engineering-construction materials, the method comprising the following step 1 and step 2:

<step 1>

obtaining froth by foaming a liquid composition comprising:

a foaming agent composition for civil engineering-construction materials comprising an anionic surfactant (A), a surfactant aid (B) and a water-insoluble or slightly water- soluble nonionic surfactant (C), wherein

the water-insoluble or slightly water-soluble nonionic surfactant (C) has a solubility in 100 g of water at 25 °C of 0.1 g or less, and

the water-insoluble or slightly water-soluble nonionic surfactant (C) is one or more nonionic surfactants selected from: polypropylene glycol monoalkyl ethers having one alkyl group with 8 or

more and 22 or less carbons and having an average number of moles of added oxypropylene of 1 or more and 10 or less; and glyceryl ethers having an alkyl group or alkenyl group with 5 or more and 22 or less carbons; and

water; and

<step 2>

mixing the froth obtained in step 1 with a gypsum slurry containing gypsum and water.

19. A bubble-containing soil composition for civil engineering-construction materials comprising:

froth obtained by foaming a liquid composition comprising:

a foaming agent composition for civil engineering-construction materials comprising an anionic surfactant (A), a surfactant aid (B) and a water-insoluble or slightly water- soluble nonionic surfactant (C), wherein

the water-insoluble or slightly water-soluble nonionic surfactant (C) has a solubility in 100 g of water at 25 °C of 0.1 g or less, and

the water-insoluble or slightly water-soluble nonionic surfactant (C) is one or more nonionic surfactants selected from: polypropylene glycol monoalkyl ethers having one alkyl group with 8 or more and 22 or less carbons and having an average number of moles of added oxypropylene of 1 or more and 10 or less; and glyceryl ethers having an alkyl group or alkenyl group with 5 or more and 22 or less carbons; and

water; and

soil.

20. A bubble-containing soil composition for civil engineering-construction materials comprising soil, water, an anionic surfactant (A), a surfactant aid (B) and a water-insoluble or slightly water-soluble nonionic surfactant (C), wherein

the water-insoluble or slightly water-soluble nonionic surfactant (C) has a solubility in 100 g of water at 25 °C of 0.1 g or less, and

the water-insoluble or slightly water-soluble nonionic surfactant (C) is one or more nonionic surfactants selected from: polypropylene glycol monoalkyl ethers having one alkyl group with 8 or more and 22 or less carbons and having an average number of moles of added oxypropylene of 1 or more and 10 or less; and glyceryl ethers having an alkyl group or alkenyl group with 5 or more and 22 or less carbons.

21. A method for producing a bubble-containing soil composition for civil engineering-construction materials, the method comprising the following step 1 and step 2:

<step 1>

obtaining froth by foaming a liquid composition comprising:

a foaming agent composition for civil engineering-construction materials comprising an anionic surfactant (A), a surfactant aid (B) and a water-insoluble or slightly water-soluble nonionic surfactant (C), wherein

the water-insoluble or slightly water-soluble nonionic surfactant (C) has a solubility in 100 g of water at 25 °C of 0.1 g or less, and

the water-insoluble or slightly water-soluble nonionic surfactant (C) is one or more nonionic surfactants selected from: polypropylene glycol monoalkyl ethers having one alkyl group with 8 or

more and 22 or less carbons and having an average number of moles of added oxypropylene of 1 or more and 10 or less; and glyceryl ethers having an alkyl group or alkenyl group with 5 or more and 22 or less carbons; and

water; and

<step 2>

kneading soil with the froth obtained in step 1.