

CLAIMS

1. A sublimable film formation composition comprising:

a sublimable substance;

a solvent A2 in which a saturation solubility of the sublimable substance is more than 10% by mass; and

a solvent B2 in which a content in the sublimable film formation composition is greater than a content of the solvent A2 and a boiling point is less than a boiling point of the sublimable substance at 1 atm and less than a boiling point of the solvent A2,

wherein the sublimable substance is at least one selected from the group consisting of norbornene, norbornane, camphor, pyrazine, 2,3-dichloropyrazine, 2,6-dichloropyrazine, 2,6-dichloropyridine, tetrahydrodicyclopentadiene, dimethyl oxalate, isoborneol, neopentyl alcohol, neopentyl glycol, and ethylene carbonate,

wherein the solvent A2 is at least one selected from the group consisting of tetrahydrofuran, methanol, ethanol, 1-propanol, 2-propanol, 1-butanol, 2-butanol, 2-methyl-2-butanol, acetone, methyl acetate, ethyl acetate, 1,1-dichloroethane, 1,2-dichloroethane, 1,2-dichloroethylene, cis-1-chloro-3,3,3-trifluoropropene, and trans-1-chloro-3,3,3-trifluoropropene,

wherein the solvent B2 is at least one selected from the group consisting of pentane, 3-methylpentane, hexane, heptane, cyclopentane, cyclohexane, methylcyclohexane, 1,1-dichloroethane, 1,2-dichloroethane, 1,2-dichloroethylene, cis-1-chloro-3,3,3-trifluoropropene,

trans-1-chloro-3,3,3-trifluoropropene, toluene, benzene, xylene, diethyl ether, dipropyl ether, diisopropyl ether, tetrahydrofuran, methanol, ethanol, 1-propanol, 2-propanol, 1-butanol, 2-butanol, acetone, methyl acetate, and ethyl acetate.

2. The sublimable film formation composition according to claim 1, wherein the content of the solvent B2 in the sublimable film formation composition is 50% by mass or more.

3. The sublimable film formation composition according to claim 1 or 2, wherein a difference between the boiling point of the solvent A2 and the boiling point of the solvent B2 is 5°C or more.

4. A sublimable film formation composition comprising:

a sublimable substance; and

a solvent A1 in which a saturation solubility of the sublimable substance is more than 10% by mass and a boiling point is lower by 5°C or more than a boiling point of the sublimable substance at 1 atm,

wherein the sublimable substance is at least one selected from the group consisting of norbornene, norbornane, camphor, pyrazine, 2,3-dichloropyrazine, 2,6-dichloropyrazine, 2,6-dichloropyridine, tetrahydrodicyclopentadiene, dimethyl oxalate, isoborneol, neopentyl alcohol, neopentyl glycol, and ethylene carbonate,

wherein the solvent A1 is at least one selected from the group consisting of tetrahydrofuran, methanol, ethanol, 1-propanol,

2-propanol, 1-butanol, 2-butanol, 2-methyl-2-butanol, acetone, methyl acetate, ethyl acetate, 1,1-dichloroethane, 1,2-dichloroethane, 1,2-dichloroethylene, cis-1-chloro-3,3,3-trifluoropropene, and trans-1-chloro-3,3,3-trifluoropropene.

5. The sublimable film formation composition according to claim 4, further comprising:

a solvent B1 in which a boiling point is less than the boiling point of the solvent A1.

6. The sublimable film formation composition according to claim 5,

wherein the solvent B1 is at least one selected from the group consisting of pentane, 3-methylpentane, hexane, heptane, cyclopentane, cyclohexane, methylcyclohexane, 1,1-dichloroethane, 1,2-dichloroethane, 1,2-dichloroethylene, cis-1-chloro-3,3,3-trifluoropropene, trans-1-chloro-3,3,3-trifluoropropene, toluene, benzene, xylene, diethyl ether, dipropyl ether, diisopropyl ether, tetrahydrofuran, methanol, ethanol, 1-propanol, 2-propanol, 1-butanol, 2-butanol, acetone, methyl acetate, and ethyl acetate.

7. The sublimable film formation composition according to any one of claims 4 to 6,

wherein a content of the solvent A1 in the sublimable film formation composition is 50% by mass or more.

8. The sublimable film formation composition according to any one of claims 1 to 7,

wherein a coagulation heat of the sublimable substance is 200 J/g or less.

9. The sublimable film formation composition according to any one of claims 1 to 8,

wherein a coagulation point of the sublimable substance at 1 atm is 5°C or higher.

10. The sublimable film formation composition according to any one of claims 1 to 9,

wherein the boiling point of the sublimable substance at 1 atm is 300°C or lower.

11. The sublimable film formation composition according to any one of claims 1 to 10,

wherein a content of the sublimable substance is 80% by mass or less in the sublimable film formation composition.

12. The sublimable film formation composition according to any one of claims 1 to 11,

wherein the sublimable film formation composition is used in suppressing pattern collapse of an uneven structure formed on a substrate.

13. The sublimable film formation composition according to claim

12,

wherein the sublimable film formation composition is used for treating a substrate having an uneven structure with a pattern dimension of 30 nm or less.

14. The sublimable film formation composition according to claim 13,

wherein the sublimable film formation composition is used for treating the substrate having an uneven structure with the pattern dimension of 20 nm or less.

15. A method for producing a substrate, the method comprising:

a step of preparing a substrate having an uneven structure on a surface;

a step of supplying a sublimable film formation composition including a sublimable substance to the surface;

a step of causing the sublimable film formation composition to coagulate and forming a sublimable film on the surface; and

a step of removing the sublimable film by sublimating the sublimable substance,

wherein the sublimable film formation composition including the sublimable substance is the sublimable film formation composition according to any one of claims 1 to 11.

16. The method for producing a substrate according to claim 15,

wherein the substrate has the uneven structure with a pattern dimension of 30 nm or less on the surface.

17. The method for producing a substrate according to claim 16,
wherein the substrate has the uneven structure with the pattern
dimension of 20 nm or less on the surface.