CLAIMS

[1] A method for producing a glass hard disk substrate, comprising steps (1) and (2) below:

step (1) of polishing a glass substrate to be polished by use of a polishing liquid composition; and

step (2) of cleaning the substrate obtained in step (1) by use of a detergent composition,

wherein the detergent composition contains an amine including 1 to 10 nitrogen atoms and an inorganic alkali,

a content of the amine is in a range of 5.00 mass% to 70.00 mass% relative to the total mass of components of the detergent composition other than water,

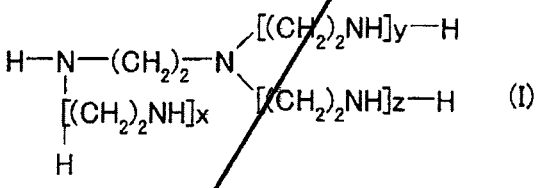
a mass ratio of the amine to an alkali metal ion derived from the inorganic alkali [(content of amine) / (content of alkali metal ion)] is in a range of 0.50 to 12.00,

the glass substrate to be cleaned is a crystallized glass substrate, and

a pH of the detergent during cleaning is in a range of 9.00 to 11.50.

[2] The method for producing a glass hard disk substrate according to claim 1, wherein the detergent composition is a polishing liquid composition including silica particles.

[3] The method for producing a glass hard disk substrate according to claims 1 or 2, wherein the amine is at least one selected from the group consisting of a compound represented by General Formula (I), alkanolamine, and a compound having a piperazine ring:



(I)

[in Formula (I), x, y and z respectively denote integers in a range of 0 to 4, satisfying $1 \leq x+y+z \leq 4$].

[4] The method for producing a glass hard disk substrate according to any one of claims 1 to 3, wherein the amine is at least one selected from the group consisting of: tetraethylenepentamine, pentaethylenehexamine, monoethanolamine,

2-[(2-aminoethyl)amino]ethanol, and 1-(2-hydroxyethyl)piperazine.

[5] The method for producing a glass hard disk substrate according to any one of claims 1 to 4, wherein the detergent composition contains further a nonionic surfactant represented by General Formula (II) below:

R-O-(EO)o(PO)p-H (II)

[in Formula (II), R is a linear or branched alkyl group having 6-16 carbon atoms, o is an average number of added moles of EO, and p is an average number of added moles of PO; o is a number in a range of 0 to 20, and p is a number in a range of 0 to 5].

[6] The method for producing a glass hard disk substrate according to claim 5, wherein a content of the nonionic surfactant is in a range of 1.00 mass% to 5.00 mass% relative to the total mass of the components other than water.

[7] The method for producing a glass hard disk substrate according to any one of claims 1 to 6, wherein the detergent composition further contains at least one solubilizer selected from the group consisting of: organic sulfonic acids such as p-toluenesulfonic acid, dimethylbenzenesulfonic acid, and the like; 2-ethylhexanoic acid; and salts thereof.

[8] The method for producing a glass hard disk substrate according to claim 7, wherein a content of the solubilizer is in a range of 20.00 mass% to 62.00 mass% relative to the total mass of the components other than water.

[9] The method for producing a glass hard disk substrate according to any one of claims 1 to 8, wherein the detergent composition contains further an anionic polymer.

[10] The method for producing a glass hard disk substrate according to claim 9, wherein a content of the anionic polymer is in a range of 2.50 mass% to 7.50 mass% relative to the total mass of the components other than water.

[11] The method for producing a glass hard disk substrate according to any one of claims 1 to 10, wherein the detergent composition contains further a chelating agent.

[12] The method for producing a glass hard disk substrate according to claim 11, wherein a content of the chelating agent is in a range of 3.80 mass% to 10.60 mass% relative to the total mass of the components other than water.

[13] The method for producing a glass hard disk substrate according to any one of claims 1 to 12, comprising diluting a concentrated liquid of the detergent composition

containing water in a range of 60.00 mass% to 95.00 mass%.

[14] A method for cleaning a glass substrate, comprising a step of bringing a detergent composition into contact with a glass substrate to be cleaned,

wherein the detergent composition contains an amine including 1 to 10 nitrogen atoms and an inorganic alkali,

a content of the amine is in a range of 5.00 mass% to 70.00 mass% relative to the total mass of components of the detergent composition other than water,

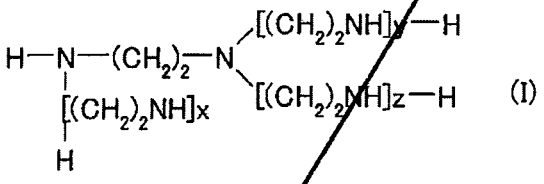
a mass ratio of the amine to an alkali metal ion derived from the inorganic alkali [(content of amine) / (content of alkali metal ion)] is in a range of 0.50 to 12.00,

the glass substrate to be cleaned is a crystallized glass substrate, and

a pH of the detergent composition during cleaning is in a range of 9.00 to 11.50.

[15] The method for cleaning a glass substrate according to claim 14, wherein the glass substrate to be cleaned is a substrate obtained by subjecting a glass substrate to be polished to a polishing with silica particles.

[16] The method for cleaning a glass substrate according to claim 14 or 15, wherein the amine is at least one selected from the group consisting of a compound represented by General Formula (I), alkanolamine, and a compound having a piperazine ring:



(I)

[in Formula (I), x, y and z respectively denote integers in a range of 0 to 4, satisfying $1 \leq x+y+z \leq 4$].

[17] The method for cleaning a glass substrate according to any one of claims 14 to 16, comprising diluting a concentrated liquid of the detergent composition containing water in a range of 60 mass% to 95 mass%.

[18] The method for cleaning a glass substrate according to any one of claims 14 to 17, wherein the glass substrate to be cleaned is a glass substrate for a glass hard disk substrate.

CLAIMS

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step (2) of cleaning the substrate obtained in step (1) by use of a detergent composition,

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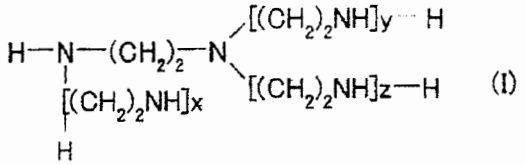
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[2] The method for producing a glass hard disk substrate according to claim 1, wherein the polishing liquid composition is a polishing liquid composition including silica particles.

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[5] The method for producing a glass hard disk substrate according to any one of claims 1 to 4, wherein the detergent composition contains further a nonionic surfactant represented by General Formula (II) below:

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[in Formula (II), R is a linear or branched alkyl group having 6-16 carbon atoms, o is an average number of added moles of EO, and p is an average number of added moles of PO; o is a number in a range of 0 to 20, and p is a number in a range of 0 to 5].

[6] The method for producing a glass hard disk substrate according to claim 5, wherein a content of the nonionic surfactant is in a range of 1.00 mass% to 5.00 mass% relative to the total mass of the components other than water.

[7] The method for producing a glass hard disk substrate according to any one of claims 1 to 6, wherein the detergent composition further contains at least one solubilizer selected from the group consisting of: organic sulfonic acids such as p-toluenesulfonic acid, dimethylbenzenesulfonic acid, and the like; 2-ethylhexanoic acid; and salts thereof.

[8] The method for producing a glass hard disk substrate according to claim 7, wherein a content of the solubilizer is in a range of 20.00 mass% to 62.00 mass% relative to the total mass of the components other than water.

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[12] The method for producing a glass hard disk substrate according to claim 11, wherein a content of the chelating agent is in a range of 3.80 mass% to 10.60 mass% relative to the total mass of the components other than water.

[13] The method for producing a glass hard disk substrate according to any one of claims 1 to 12, comprising diluting a concentrated liquid of the detergent composition

containing water in a range of 60.00 mass% to 95.00 mass%.

[14] A method for cleaning a glass substrate, comprising a step of bringing a detergent composition into contact with a glass substrate to be cleaned,

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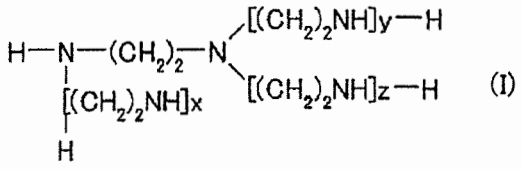
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[16] The method for cleaning a glass substrate according to claim 14 or 15, wherein the amine is at least one selected from the group consisting of a compound represented by General Formula (I), alkanolamine, and a compound having a piperazine ring:



(I)

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[18] The method for cleaning a glass substrate according to any one of claims 14 to 17, wherein the glass substrate to be cleaned is a glass substrate for a glass hard disk substrate.