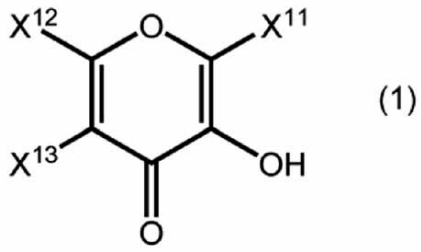
CLAIMS

[Claim 1] A polishing liquid for CMP, comprising:

abrasive grains; an additive; and water, wherein

the abrasive grains include cerium-based particles, and

the additive includes (A) a 4-pyrone-based compound represented by General Formula (1) below, and (B1) a compound of which a 1 mM aqueous solution has a pH of 3.7 or more:



(1)

wherein in the formula, X^{11}, X^{12}, and X^{13} are each independently a hydrogen atom or a monovalent substituent, and

the component (B1) excludes the compound corresponding to the component (A) and includes at least one selected from the group consisting of a basic amino acid, an aromatic amino acid, aminoacetic acid, hydroxypyridine, methylpyridine, acetylpyridine, pyridineethanol, aminopyridine, imidazole, pyrazole, triazole, an ethylenedinitrilotetraethanol, and an ethylenedinitrilotetrapropanol.

[Claim 2] The polishing liquid for CMP according to claim 1, wherein the component (B1) includes a hydroxypyridine.

[Claim 3] The polishing liquid for CMP according to claim 1, wherein the component (B1) includes an ethylenedinitrilotetraethanol.

[Claim 4] The polishing liquid for CMP according to claim 3, wherein a pH of the polishing liquid for CMP is 8.0 or less.

[Claim 5] The polishing liquid for CMP according to claim 1,

wherein the component (B1) includes triethanolamine.

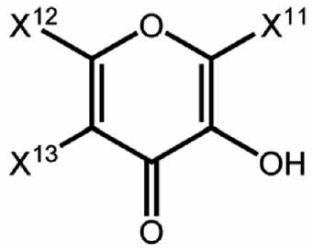
[Claim 6] A polishing liquid for CMP, comprising:

abrasive grains; an additive; and water, wherein

the abrasive grains include cerium-based particles,

an average particle diameter of the abrasive grains is more than 100 nm, and

the additive includes (A) a 4-pyrone-based compound represented by General Formula (1) below, and (B2) a cyclic compound excluding the compound corresponding to the component (A) and having at least one functional group selected from the group consisting of a carboxy group and a carboxylate group:



(1)

wherein in the formula, X^{11}, X^{12}, and X^{13} are each independently a hydrogen atom or a monovalent substituent, and

a pH of the polishing liquid for CMP is 4.8 or less.

[Claim 7] The polishing liquid for CMP according to claim 6, wherein the component (B2) includes at least one selected from the group consisting of an aromatic aminocarboxylic acid, a quinolinecarboxylic acid, a pyridinecarboxylic acid, and salts thereof.

[Claim 8] The polishing liquid for CMP according to claim 6 or 7, wherein the component (B2) includes at least one selected from the group consisting of quinaldic acid and a salt thereof.

[Claim 9] The polishing liquid for CMP according to any one of

claims 6 to 8, wherein the component (B2) includes at least one selected from the group consisting of anthranilic acid and a salt thereof.

[Claim 10] The polishing liquid for CMP according to any one of claims 6 to 9, wherein the component (B2) includes at least one selected from the group consisting of picolinic acid and a salt thereof.

[Claim 11] A polishing liquid for CMP, comprising:

abrasive grains; an additive; and water, wherein

the abrasive grains include cerium-based particles,

the additive includes a compound having two or more nitrogen atoms to which a hydroxyalkyl group is bonded,

the compound having two or more nitrogen atoms to which a hydroxyalkyl group is bonded includes an ethylenedinitrilotetraethanol, and

a pH of the polishing liquid for CMP is less than 9.0.

[Claim 12] The polishing liquid for CMP according to claim 11, wherein a pH of the polishing liquid for CMP is 8.0 or less.

[Claim 13] A polishing liquid set for CMP, comprising:

constituent components of the polishing liquid for CMP according to any one of claims 1 to 12, separately stored as a first liquid and a second liquid, wherein

the first liquid contains the abrasive grains and water, and

the second liquid contains at least one of the additives and water.

[Claim 14] A polishing method comprising a step of polishing a surface to be polished containing silicon oxide by using the polishing liquid for CMP according to any one of claims 1 to 12 or a polishing liquid for CMP obtained by mixing the first liquid and the second liquid

of the polishing liquid set for CMP according to claim 13.