CLAIMS

Claim 1. A polishing liquid for CMP, comprising: abrasive grains containing silica, a liquid medium, an oxidizing agent, an iron ion supplying agent, an organic acid and an anticorrosive agent, wherein

in a particle size distribution on mass basis obtained by a centrifugation method, D50 of the abrasive grains is 150 nm or less, D90 of the abrasive grains is 100 nm or more, and a difference between the D90 and the D50 is 21 nm or more,

a content of the abrasive grains is 1.0% by mass or more based on the total amount of the polishing liquid,

a pH is 4.0 or less, and

the polishing liquid for CMP is used for polishing at least a second portion of a base substrate including a first portion composed of an insulating material and the second portion provided on the first portion and composed of a tungsten material.

Claim 2. The polishing liquid for CMP according to claim 1, wherein a content of the abrasive grains is 5.0% by mass or less based on the total amount of the polishing liquid.

Claim 3. The polishing liquid for CMP according to claim 1 or 2, wherein the D50 is 50 nm or more.

Claim 4. The polishing liquid for CMP according to any one of claims 1 to 3, wherein the D90 is 200 nm or less.

Claim 5. The polishing liquid for CMP according to any one of claims 1 to 4, wherein the oxidizing agent contains hydrogen peroxide.

Claim 6. The polishing liquid for CMP according to any one of claims 1 to 5, wherein the iron ion supplying agent contains at least one selected

from the group consisting of iron nitrate and iron nitrate hydrate.

Claim 7. The polishing liquid for CMP according to claim 6, further comprising an organic acid, wherein

a ratio of a molecular number of the dissociated organic acid with respect to one iron ion atom is 2.0 or more.

Claim 8. The polishing liquid for CMP according to claim 7, wherein the organic acid is a divalent or trivalent organic acid having no carbon-carbon unsaturated bond.

Claim 9. The polishing liquid for CMP according to claim 7 or 8, wherein the organic acid contains at least one selected from the group consisting of malonic acid, succinic acid, adipic acid, glutaric acid, malic acid, and citric acid.

Claim 10. The polishing liquid for CMP according to any one of claims 1 to 9, wherein the anticorrosive agent contains an azole compound having no thiol group and/or carbon-carbon unsaturated bond.

Claim 11. The polishing liquid for CMP according to claim 10, wherein the anticorrosive agent contains a compound represented by Formula (1) below and having no thiol group and/or carbon-carbon unsaturated bond:

H_2N-X-COOH (1)

[in Formula (1), X represents a hydrocarbon group optionally having a substituent and having 1 or more carbon atoms.]

Claim 12. The polishing liquid for CMP according to any one of claims 1 to 11, wherein the anticorrosive agent contains at least one selected from the group consisting of 1,2,4-triazole, 4-amino-1,2,4-triazole, glycine, and 6-aminohexanoic acid.

Claim 13. The polishing liquid for CMP according to any one of claims 1 to 12, wherein a pH is 2.0 or more.

Claim 14. A dispersion ~~being used~~for use in a polishing liquid for CMP according to any one of claims 1 to 13, the dispersion comprising:

abrasive grains containing silica, a liquid medium, an oxidizing agent, an iron ion supplying agent, an organic acid and an anticorrosive agent, wherein

in a particle size distribution on mass basis obtained by a centrifugation method, D50 of the abrasive grains is 150 nm or less, D90 of the abrasive grains is 100 nm or more, and a difference between the D90 and the D50 is 21 nm or more.

Claim 15. A method for producing a polishing liquid for CMP, the method comprising a step of mixing abrasive grains containing silica, a liquid medium, an oxidizing agent, an iron ion supplying agent, an organic acid and an anticorrosive agent to obtain a polishing liquid having a pH of 4.0 or less, wherein

in a particle size distribution on mass basis obtained by a centrifugation method, D50 of the abrasive grains is 150 nm or less, D90 of the abrasive grains is 100 nm or more, and a difference between the D90 and the D50 is 21 nm or more,

in the step, the abrasive grains are mixed so that a content of the abrasive grains becomes 1.0% by mass or more based on the total amount of the polishing liquid, and the polishing liquid for CMP is used for polishing at least a second portion of a base substrate including a first portion composed of an insulating material and the second portion provided on the first portion and composed of a tungsten

material.

Claim 16. A method for polishing a base substrate, the method comprising:

a step of preparing a base substrate including a first portion composed of an insulating material and a second portion provided on the first portion and composed of a tungsten material;

a step of disposing the base substrate on a polishing pad so that a surface of the second portion on a side opposite to the first portion faces

the polishing pad; and

a step of polishing at least the second portion by supplying the polishing liquid according to any one of claims 1 to 13 between the polishing pad and the base substrate and relatively moving the polishing pad and the base substrate.