Claims

[Claim 1]

A method for polishing silicon wafers, wherein

while a polishing liquid in which a water-soluble polymer is added to an alkaline aqueous solution with no free abrasive grains is supplied to an abrasive cloth made of polyester or polyurethane with no fixed abrasive grains, of a surface and a rear surface of the silicon wafer, at least the surface which is a surface to be polished is rough-polished by relatively rotating the silicon wafer and the abrasive cloth, and

after the rough polishing, final polishing is applied at least on the rough-polished surface of the silicon wafer .

[Claim 2]

A method for polishing silicon wafers, wherein,

of a surface and a rear surface of the silicon wafer, at least the surface which is a surface to be polished is rough-polished by relatively rotating the silicon wafer and an abrasive cloth, and after the rough polishing, final polishing is applied at least on the rough-polished surface of the silicon wafer,

the method, wherein

the rough polishing is split into a first-step polishing which is carried out while a first-step polishing liquid in

which a water-soluble polymer is added to an alkaline aqueous solution with no free abrasive grains is supplied to the abrasive cloth and a second-step polishing which is carried out while a second-step polishing liquid in which a water-soluble polymer is added to an alkaline aqueous solution with no free abrasive grains is supplied to the abrasive cloth after the first-step polishing, and

the concentration of the water soluble polymer in the second-step polishing liquid is made higher than the concentration of the water soluble polymer in the first-step polishing liquid.

[Claim 3]

The method for polishing silicon wafers according to claim 1 or claim 2, wherein the water-soluble polymer is one type or several types of non-ionic system polymers and monomers, or one type or several types of anionic system polymers and monomers.

[Claim 4]

The method for polishing silicon wafers according to claim 3, wherein the water-soluble polymer is hydroxyethyl cellulose.

[Claim 5]

The method for polishing silicon wafers according to claim 4, wherein the concentration of the hydroxyethyl cellulose in

the polishing liquid is 0.1 ppm to 1000 ppm.

[Claim 6]

The method for polishing silicon wafers according to claim 1 or claim 2, wherein the alkaline aqueous solution is adjusted to pH 8 to pH 13, and

the alkaline aqueous solution is the alkaline aqueous solution to which any one of basic ammonium salt, basic potassic salt, and basic sodium salt is added as an alkaline agent, or an alkaline carbonate aqueous solution, or an alkaline aqueous solution to which amine is added.

[Claim 7]

The method for polishing silicon wafers according to claim 1 or claim 2, wherein the rough polishing simultaneously polishes the surface and the rear surface of the silicon wafer with a double-side polishing device which includes a carrier plate in which a silicon wafer is housed, and an upper surface plate in which the abrasive cloth is pasted on a lower surface and a lower surface plate in which the abrasive cloth is pasted on an upper surface, which holds the carrier plate from above and below therebetween.

[Claim 8]

The method for polishing silicon wafers according to claim 8, wherein polishing is carried out such that a thickness of

the silicon wafer after the rough polishing is made thicker than a thickness of the carrier plate.

[Claim 9]

The method for polishing silicon wafers according to claim 1 or claim 2, wherein a polishing liquid which contains free abrasive grains is used to carry out polishing before the rough polishing, thereby removing a native oxide film present on the surface of the silicon wafer.

[Claim 10]

The method for polishing silicon wafers according to claim 1 or claim 2, wherein the concentration of the water-soluble polymer is adjusted to control ROA of the silicon wafer.

[Claim 11]

The method for polishing silicon wafers according to claim 10, wherein

the water-soluble polymer is hydroxyethyl cellulose, and

the concentration of the hydroxyethyl cellulose is adjusted to be 0.1 ppm to 1000 ppm, by which ROA of the silicon wafer is controlled to be -110 to +390 nm in 1 mm notation.

[Claim 12]

The method for polishing silicon wafers according to claim 10 or claim 11, wherein,

in the rough polishing, roll-up is allowed to occur in

an outer circumferential portion of the silicon wafer, and

in the final polishing, roll-off is allowed to occur in the outer circumferential portion of the silicon wafer, thereby offsetting the roll-up.

[Claim 13]

The method for polishing silicon wafers according to claim 6, wherein the alkaline aqueous solution is an alkaline aqueous solution to which amine is added as an alkaline agent.