【DESCRIPTION】

【Title of the Invention】

SLURRY COMPOSITIONS FOR POLISHING SILICONE WAFER FINALLY AND METHODS FOR POLISHING SILICONE WAFER FINALLY BY USING THE SAME

【Detailed Description of the Invention】

【Purpose of the Invention】

【Technical Field and Background Art】

The present invention relates to a slurry composition used in final polishing of silicon wafers. More specifically, the present invention relates to a slurry composition for final polishing of silicon wafers that can reduce the microroughness or haze (which is a result of diffuse reflection of light by fine particle clusters) of polished wafer surfaces, as well as reduce the number of localized light scattering (LLS) defects having a size larger than 50 nm formed on the surface of silicon wafers.

Chemical mechanical polishing (CMP), which is a final process for the production of silicon wafers, is performed to remove physical surface defects, such as microscratches, and to reduce the surface microroughness of silicon wafers, thus making the surface of the wafers soft. Wafers having

undergone the CMP process have mirror surfaces with few defects. In recent years, regulations to restrict the size of LLS defects detected due to microscratches and other defects formed on the surface of wafers have been increasingly stringent.

LLS defects having a size greater than 80 nm or 65 nm have been restricted. Regulations regarding defects having a size on the order of 50 nm or 30 nm are currently enforced. To comply with such strengthened regulations, there is a need for a slurry composition that is more effective for the removal of defects.

Silicon wafers are used as substrates for semiconductor manufacture. Silicon wafers are produced through a series of processes, such as single crystal growth, slicing, lapping, etching, polishing and cleaning. Polishing is a process for removing surface defects and subsurface damage, including scratches, splits, grain distortion, surface microroughness, surface topographical defects, *etc.*, formed in the previous processes to produce defect-free wafers with mirror surfaces.

Processes for chemical mechanical polishing (CMP) of wafers involve some steps, *i.e.*, a primary polishing step for removing deep surface scratches, which requires a high polishing rate, and a secondary polishing (mirror polishing) step for removing microscratches remaining after the primary polishing step and lowering the surface microroughness of

wafers to the order of a few angstroms (Å) to achieve mirror surfaces of the wafers. That is, the final polishing step must be carried out to lower the surface microroughness of wafers to the order of a few angstroms (Å), reduce the haze, and decrease the amounts of residual fine particles and metal ions to the lowest possible levels (a few ppm).

These polishing steps necessitate the use of a soft or hard urethane polishing pad and a slurry composition other than a polisher and deionized water.

The polishing pad is responsible for mechanical polishing, and the slurry composition assists the mechanical polishing of the polishing pad and plays a role in chemical polishing. A considerable improvement in the performance of polishing pads and slurry compositions is required to produce high-quality large-diameter wafers.

Particularly, in view of the processing characteristics of large-diameter (300 mm) wafers, there is an increasing demand for the development of slurry compositions capable of achieving substantially defect-free surfaces.

Slurry compositions are used to chemically and physically promote the final polishing of CMP processes. General slurry compositions comprise an abrasive, a pH-adjusting agent and deionized water. For better polishing quality, slurry compositions may further comprise an organic or inorganic additive.

Monodisperse silica is mainly used as an abrasive, and an alkali base, such as potassium hydroxide or sodium hydroxide, or a non-metallic inorganic or organic base is generally used as a pH-adjusting agent. In addition to these components, additional functional additives may be used to achieve enhanced polishing effects. For example, an amine as a nonionic surfactant or a polishing accelerator can be additionally used to increase the polishing rate, improve the degree of cleaning of polished surface and enhance the dispersibility of abrasive particles. It is common to select slurry compositions depending on the processing characteristics of CMP processes.

U.S. Patent No. 3,715,842 issued to Trednnick, *et al.* discloses a method for inhibiting aggregation and precipitation of silica to reduce the formation of scratches. According to this method, a slurry composition for final polishing of silicon wafers is prepared by dispersing settled silica particles having a size of 100 nm or less in water, adding ammonia to the dispersion to adjust the pH to 7 or higher, and adding a water-soluble cellulose selected from methylcellulose (MC), methylethylcellulose (MEC), ethylcellulose (EC), hydroxyethylcellulose (HEC) and hydroxypropylcellulose (HPC) in an amount of 0.05 to 2.5% by weight, based on the total weight of the slurry composition.

U.S. Patent Nos. 4,169,337, 4,462,188 and 4,588,421

issued to Payne, *et al.* disclose slurry compositions for increasing the polishing rate. The slurry compositions are prepared by blending particles having a size of 4 to 100 nm with 2 to 4% by weight of an amine (*e.g.*, aminoethylethanolamine or ethylenediamine) or 2 to 4% by weight of a quaternary ammonium salt (*e.g.*, tetramethylammonium chloride or tetramethylammonia hydroxide (TMAH)).

U.S. Patent No. 5,352,277 issued to Sasaki, *et al.* suggests a slurry which comprises 20 to 50% by weight of colloidal silica having a size of 5 to 500 nm, 100 ppm of a water-soluble polymer, and 20 to 100 ppm of a water-soluble salt consisting of a cation selected from Na, K and NH_4 and an anion selected from Cl, F, NO_3 and ClO_4. The slurry is used to realize a soft surface whose microroughness is below 5 nm.

U.S. Patent Publication No. 2001-0003672 filed by Inoue, *et al.* suggests a secondary or finish polishing composition which comprises silica having an average particle size of 20 to 300 nm as an abrasive and 0.001 to 0.3% by weight of TMAH as a base. This patent publication mentions that the addition of a hydroxyethylcellulose (HEC) having a molecular weight of 1.3×10^6 led to an improvement in the hydrophilicity of wafer surfaces.

U.S. Patent No. 6,354,913 issued to Miyashita, *et al.* suggests a slurry composition for polishing the surface of a

single-crystal silicon or polycrystalline silicon film which comprises a water-soluble cellulose, particularly hydroxyethylcellulose (HEC), ammonia as a pH-adjusting agent, and an amine, particularly triethanolamine, as a polishing accelerator. Importantly, the water-soluble cellulose, which is a major pollution source, is purified by ion exchange treatment to reduce the content of metal impurities.

However, these polishing slurry compositions lie within the general ranges, and particularly do not suggest improved performance in terms of light point defects (LPDs), haze and microroughness other than increased polishing rate.

【Technical Problems To Be Solved】

It is an object of the present invention to provide an optimum slurry composition that uses abrasive particles having an optimum particle diameter to reduce the microroughness or haze (which is a result of diffuse reflection of light by fine particle clusters) of polished wafer surfaces and to reduce the number of LLS defects having a size larger than 50 nm, which is the next standard specification issued in the semiconductor manufacturing industry, thereby improving the yield of processes for polishing silicon wafers.

【Technical Solutions】

According to the present invention, there is provided a slurry composition for final polishing of silicon wafers, the slurry composition comprising deionized water, abrasive particles, a pH-adjusting agent, a water-soluble thickener, an acetylene surfactant, and a heterocyclic amine.

In an embodiment of the present invention, the acetylene surfactant is selected from an acetylene alcohol and an acetylene glycol represented by Formulae 1 and 2, respectively:

$R_1R_2(OH)CC{\equiv}CH$ (1)

wherein R_1 and R_2 are each independently $(OCH_2CH_2)_nOCH_2CH_3$ (in which n is from 0 to 10); and

$R_1R_2(OH)CC{\equiv}CC(OH)R_1R_2$ (2)

wherein R_1 and R_2 are each independently $(OCH_2CH_2)_nOCH_2CH_3$ (in which n is from 0 to 10).

In a further embodiment of the present invention, the acetylene surfactant is an acetylene glycol of Formula 2:

$R_1R_2(OH)CC{\equiv}CC(OH)R_1R_2$ (2)

wherein R_1 and R_2 are each independently $(OCH_2CH_2)_nOCH_2CH_3$ (in which n is from 0 to 10).

In another embodiment of the present invention, the acetylene surfactant is used in an amount of 0.00001 to 0.008% by weight, based on the total weight of the slurry composition

that is diluted before use in the polishing of silicon wafers.

In another embodiment of the present invention, the acetylene surfactant is used in an amount of 0.00003 to 0.003% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

In another embodiment of the present invention, the heterocyclic amine is selected from the group consisting of piperidine, 1-ethylpiperidine, 1-(2-aminoethyl)piperidine, piperazine, 1-ethylpiperazine, 1-aminoethylpiperazine, 1-hydroxyethylpiperazine, 2-pyrrolidinone, and mixtures thereof.

In another embodiment of the present invention, the heterocyclic amine is used in an amount of 0.0001 to 0.5% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

In another embodiment of the present invention, the heterocyclic amine is used in an amount of 0.001 to 0.3% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

In another embodiment of the present invention, the abrasive particles are colloidal silica particles.

In another embodiment of the present invention, the abrasive particles have an average primary particle diameter of 10 to 70 nm.

In another embodiment of the present invention, the abrasive particles have an average primary particle diameter

of 20 to 30 nm.

In another embodiment of the present invention, the abrasive particles are used in an amount of 0.01 to 10% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

In another embodiment of the present invention, the abrasive particles are used in an amount of 0.05 to 7% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

In another embodiment of the present invention, the slurry composition has a pH of 9.5 to 11.

In another embodiment of the present invention, the pH-adjusting agent is ammonia.

In another embodiment of the present invention, the water-soluble thickener is a polymer having a hydrophilic group.

In another embodiment of the present invention, the water-soluble thickener is selected from the group consisting of polyvinyl alcohol, polyvinylpolypyrrolidone, polyoxyethylene, hydroxyethylcellulose, hydroxypropylcellulose, and mixtures thereof.

In another embodiment of the present invention, the cellulose compounds have a weight average molecular weight of 300,000 to 8,000,000.

In another embodiment of the present invention, the

water-soluble thickener is used in an amount of 0.001 to 0.5% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

In yet another embodiment of the present invention, the slurry composition has a viscosity of 0.1 to 50 cP.

According to the present invention, there is provided a method for final polishing of silicon wafers using the slurry composition.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will now be described in greater detail.

The present invention is directed to a slurry composition for final polishing of silicon wafers, the slurry composition comprising deionized water, abrasive particles, a pH-adjusting agent, a water-soluble thickener, an acetylene surfactant, and a heterocyclic amine.

Any abrasive particles may be used in the present invention if they can be produced by a fuming or sol-gel process. Examples of suitable abrasive particles include silica (SiO_2), alumina (Al_2O_3), ceria (CeO_2), zirconia (ZrO_2), and titania (TiO_2). Silica particles are more preferred and colloidal silica particles are most preferred. The abrasive particles preferably have an average primary particle diameter

of 10 to 70 nm and more preferably 20 to 30 nm in order to reduce mechanical polishing effects and achieve improved surface state. If the average primary particle diameter of the abrasive particles is less than 10 nm, sufficient mechanical polishing effects are not attained, causing a problem in terms of polishing rate, and there is the possibility that the abrasive particles may aggregate and be deposited due to polishing remnants, such as siloxane compounds, during polishing. Meanwhile, if the average primary particle diameter of the abrasive particles exceeds 70 nm, there is the risk that subsurface damage may occur, resulting in an increase in haze value.

The abrasive particles are preferably used in an amount of 0.01 to 10% by weight and more preferably 0.05 to 7% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

The pH-adjusting agent is used to adjust the pH of the slurry composition. The pH-adjusting agent serves to improve the storage stability of the abrasive particles and impart an oxidizing power to the surface of silicon wafers. When silica particles are used as the abrasive particles, the pH of the slurry composition is preferably adjusted to a range of 9.5 to 11. Various kinds of organic and inorganic bases can be used to adjust the pH of the slurry composition. The amount of an organic or inorganic base used to adjust the pH of the slurry

composition to a desired pH range may be varied according to the characteristics of the base. Ammonia, a weak base, is most preferably used as the organic/inorganic base.

The water-soluble thickener is used to enhance the dispersion stability of the abrasive particles during polishing and to induce the wettability of wafer surfaces. As the water-soluble thickener, a polymer having a hydrophilic group is preferably used. Examples of suitable water-soluble thickeners include polyvinyl alcohol, polyvinylpolypyrrolidone, polyoxyethylene, hydroxyethylcellulose, hydroxypropylcellulose, and mixtures thereof. The cellulose compounds have a weight average molecular weight of 300,000 to 8,000,000.

The water-soluble thickener is used in an amount of 0.001 to 0.5% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers. This content limitation is to adjust the viscosity of the slurry composition to a range of 0.1 to 50 cP. When the viscosity of the slurry composition exceeds 50 cP, the polishing rate of the slurry composition is decreased and the foamability of the slurry composition is increased, resulting in poor workability.

The acetylene surfactant and the heterocyclic amine are simultaneously used to reduce the number of defects having a size larger than 50 nm formed on the surface of wafers.

The acetylene surfactant can be selected from an acetylene alcohol and an acetylene glycol represented by Formulae 1 and 2, respectively:

$$R_1R_2(OH)CC{\equiv}CH \qquad (1)$$

wherein R_1 and R_2 are each independently $(OCH_2CH_2)_nOCH_2CH_3$ (in which n is from 0 to 10); and

$$R_1R_2(OH)CC{\equiv}CC(OH)R_1R_2 \qquad (2)$$

wherein R_1 and R_2 are each independently $(OCH_2CH_2)_nOCH_2CH_3$ (in which n is from 0 to 10).

An acetylene surfactant of Formula 1 or 2 in which n is greater than 10 has low solubility and may cause increased foamability of the slurry composition. It is anticipated that the acetylene surfactant will provide the following two effects. Firstly, the use of the acetylene surfactant enhances the defoamability of the slurry composition, which has good foamability and poor defoamability to improve the workability of the slurry composition. Secondly, the acetylene surfactant serves to uniformly spread the slurry over lipophilic wafer surfaces due to its inherent hydrophilicity. That is, the acetylene surfactant makes greatly improves the hydrophilicity of lipophilic wafer surfaces and urethane polishing pads, and as a result, the number of LLS defects having a size larger than 50 nm is reduced.

The acetylene surfactant is preferably used in an amount

of 0.00001 to 0.008% by weight and more preferably 0.0003 to 0.003% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers. When the acetylene surfactant is used in an amount of less than 0.00001% by weight, an improvement in the defoamability of the slurry composition cannot be expected. Meanwhile, when the acetylene surfactant is used in an amount of more than 0.008% by weight, there is the possibility that the number of LLS defects will increase.

The heterocyclic amine is preferably used to control the polishing rate of the slurry composition. The heterocyclic amine is preferably selected from the group consisting of piperidine, 1-ethylpiperidine, 1-(2-aminoethyl)piperidine, piperazine, 1-ethylpiperazine, 1-aminoethylpiperazine, 1-hydroxyethylpiperazine, 2-pyrrolidinone, and mixtures thereof.

The heterocyclic amine is preferably used in an amount of 0.0001 to 0.5% by weight and more preferably 0.001 to 0.3% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers. If the heterocyclic amine is used in an amount greater than 0.5% by weight and smaller than 0.0001% by weight, the polishing rate of the slurry composition is considerably increased, resulting in an increase in the number of defects, such as haze.

The slurry composition of the present invention can be

homogeneously mixed by various techniques before use in the final polishing of silicon wafers. In addition, defect-free wafers with mirror surfaces can be produced using the slurry composition of the present invention.

Hereinafter, the present invention will be explained in more detail with reference to the following examples. However, these examples are not intended to limit the present invention.

EXAMPLES

[Example 1]

Colloidal silica particles having a primary particle diameter of 20 nm were diluted in deionized water up to 5% by weight of the silica particles, and then 0.5% by weight of ammonia was added thereto to adjust the pH value to 10.8. 0.5% by weight of hydroxypropylcellulose having a weight average molecular weight of 400,000 was used as a water-soluble thickener. As indicated in Table 1, to the mixture were added 0.002% by weight of the acetylene glycol and 0.2% by weight of piperazine as a heterocyclic amine to prepare a slurry composition.

The slurry composition was diluted 40-fold with deionized water and used for polishing of silicon wafers. The diluted slurry was used to polish a p-type 200-mm flat wafer with a (100) orientation using a polisher (UNIPLA 211) to

which a hard urethane polishing pad was attached. Thirty wafers were polished per slurry sample and the surfaces of the wafers were analyzed using a SURFSCAN SP-1 (KLA-TENCOR).

[Example 2]

A slurry composition was prepared in the same manner as in Example 1, except that ethylpiperazine was used instead of piperazine. The polishing performance of the slurry composition was evaluated by the same procedure as described in Example 1.

[Example 3]

A slurry composition was prepared in the same manner as in Example 1, except that aminoethylpiperazine was used instead of piperazine. The polishing performance of the slurry composition was evaluated by the same procedure as described in Example 1.

[Comparative Example 1]

A slurry composition was prepared in the same manner as in Example 1, except that colloidal silica particles having a primary particle diameter of 50 nm were used instead of those having a primary particle diameter of 20 nm. The polishing performance of the slurry composition was evaluated by the same procedure as described in Example 1.

[Comparative Example 2]

A slurry composition was prepared in the same manner as in Example 1, except that no acetylene surfactant was used and ethanolamine was used instead of piperazine. The polishing performance of the slurry composition was evaluated by the same procedure as described in Example 1.

[Comparative Example 3]

A slurry composition was prepared in the same manner as in Example 1, except that ethanolamine was used instead of piperazine. The polishing performance of the slurry composition was evaluated by the same procedure as described in Example 1.

[Comparative Example 4]

A slurry composition was prepared in the same manner as in Example 1, except that colloidal silica particles having a primary particle diameter of 50 nm were used instead of those having a primary particle diameter of 20 nm and ethanolamine was used instead of piperazine. The polishing performance of the slurry composition was evaluated by the same procedure as described in Example 1.

[Comparative Example 5]

A slurry composition was prepared in the same manner as in Example 1, except that no acetylene surfactant was used. The polishing performance of the slurry composition was evaluated by the same procedure as described in Example 1.

The slurry compositions prepared in Examples 1 to 3 and Comparative Examples 1 to 5 and the polishing performance thereof are shown in Table 1.

TABLE 1

	Components			Polishing performance		
	Silica (Primary particle diameter)	Acetylene surfactant	Amine polishing accelerator	> 50nm LLS (Number)	Haze (ppm)	Rq*2 (Å)
Comparative Example 1	50nm	X	Ethanolamine	70	0.138	2.25
Comparative Example 2	20nm	X	Ethanolamine	60	0.135	2.18
Comparative Example 3	20nm	$R_1R_2(OH)CC{\equiv}CCR_1R_2(OH)$ *1	Ethanolamine	51	0.133	2.20
Comparative Example 4	50nm	$R_1R_2(OH)CC{\equiv}CCR_1R_2(OH)$ *1	Ethanolamine	65	0.140	2.25
Comparative Example 5	20nm	X	Piperazine	55	0.136	2.19
Example 1	20nm	$R_1R_2(OH)CC{\equiv}CCR_1R_2(OH)$ *1	Piperazine	43	0.134	2.19
Example 2	20nm	$R_1R_2(OH)CC{\equiv}CCR_1R_2(OH)$ *1	Ethylpiperazine	38	0.134	2.20
Example 3	20nm	$R_1R_2(OH)CC{\equiv}CCR_1R_2(OH)$ *1	Aminoethylpiperazine	35	0.133	2.18

NOTE

*1: R_1 and R_2 = $(OCH_2CH_2)_4OCH_2CH_3$

*2: Value obtained from 100-μm cut-off scanning by atomic force microscopy (AFM)
This value indicates surface roughness

As can be seen from the results of Table 1, the use of the acetylene surfactant reduced the number of LLS defects and the optimum particle diameter of the silica particles resulted in a reduction in the number of LLS defects, haze and surface roughness. In addition, the combination of the acetylene surfactant and the heterocyclic amine led to a marked reduction in the number of LLS defects.

【Industrial Applicability】

As apparent from the above description, the slurry composition of the present invention can reduce the number of LLS defects having a size larger than 50 nm formed on the surface of silicon wafers, and reduce the haze and surface roughness of silicon wafers.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

【CLAIMS】

【CLAIM 1】

A slurry composition for final polishing of silicon wafers, the slurry composition comprising deionized water, abrasive particles, a pH-adjusting agent, a water-soluble thickener, an acetylene surfactant, and a heterocyclic amine.

【CLAIM 2】

The slurry composition according to claim 1, wherein the acetylene surfactant is selected from an acetylene alcohol and an acetylene glycol represented by Formulae 1 and 2, respectively:

$R_1R_2(OH)CC{\equiv}CH$ (1)

wherein R_1 and R_2 are each independently $(OCH_2CH_2)_nOCH_2CH_3$ (in which n is from 0 to 10); and

$R_1R_2(OH)CC{\equiv}CC(OH)R_1R_2$ (2)

wherein R_1 and R_2 are each independently $(OCH_2CH_2)_nOCH_2CH_3$ (in which n is from 0 to 10).

【CLAIM 3】

The slurry composition according to claim 1, wherein the acetylene surfactant is an acetylene glycol of Formula 2:

$R_1R_2(OH)CC{\equiv}CC(OH)R_1R_2$ (2)

wherein R_1 and R_2 are each independently $(OCH_2CH_2)_nOCH_2CH_3$ (in which n is from 0 to 10).

【CLAIM 4】

The slurry composition according to claim 1, wherein the acetylene surfactant is used in an amount of 0.00001 to 0.008% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

【CLAIM 5】

The slurry composition according to claim 1, wherein the acetylene surfactant is used in an amount of 0.00003 to 0.003% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

【CLAIM 6】

The slurry composition according to claim 1, wherein the heterocyclic amine is selected from the group consisting of piperidine, 1-ethylpiperidine, 1-(2-aminoethyl)piperidine, piperazine, 1-ethylpiperazine, 1-aminoethylpiperazine, 1-hydroxyethylpiperazine, 2-pyrrolidinone, and mixtures thereof.

【CLAIM 7】

The slurry composition according to claim 1, wherein the heterocyclic amine is used in an amount of 0.0001 to 0.5% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

【CLAIM 8】

The slurry composition according to claim 1, wherein the heterocyclic amine is used in an amount of 0.001 to 0.3% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

【CLAIM 9】

The slurry composition according to claim 1, wherein the abrasive particles are colloidal silica particles.

【CLAIM 10】

The slurry composition according to claim 1, wherein the abrasive particles have an average primary particle diameter of 10 to 70 nm.

【CLAIM 11】

The slurry composition according to claim 1, wherein the abrasive particles have an average primary particle diameter

of 20 to 30 nm.

【CLAIM 12】

The slurry composition according to claim 1, wherein the abrasive particles are used in an amount of 0.01 to 10% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

【CLAIM 13】

The slurry composition according to claim 1, wherein the abrasive particles are used in an amount of 0.05 to 7% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

【CLAIM 14】

The slurry composition according to claim 1, wherein the slurry composition has a pH of 9.5 to 11.

【CLAIM 15】

The slurry composition according to claim 1, wherein the pH-adjusting agent is ammonia.

【CLAIM 16】

The slurry composition according to claim 1, wherein the water-soluble thickener is a polymer having a hydrophilic group.

【CLAIM 17】

The slurry composition according to claim 1, wherein the water-soluble thickener is selected from the group consisting of polyvinyl alcohol, polyvinylpolypyrrolidone, polyoxyethylene, hydroxyethylcellulose, hydroxypropylcellulose, and mixtures thereof.

【CLAIM 18】

The slurry composition according to claim 17, wherein the cellulose compounds have a weight average molecular weight of 300,000 to 8,000,000.

【CLAIM 19】

The slurry composition according to claim 1, wherein the water-soluble thickener is used in an amount of 0.001 to 0.5% by weight, based on the total weight of the slurry composition that is diluted before use in the polishing of silicon wafers.

【CLAIM 20】

The slurry composition according to claim 1, wherein the slurry composition has a viscosity of 0.1 to 50 cP.

【CLAIM 21】

A method for final polishing of silicon wafers using the slurry composition according to any one of the claims 1 to 20.