CLAIMS

1. A slurry composition for chemical mechanical polishing (CMP), the slurry composition comprising:

abrasive particles;

an oxidizer; ~~and~~

a carbon polishing inhibitor~~,~~; and

a pH-adjusting agent,

wherein the carbon polishing inhibitor comprises an anionic surfactant, an amphoteric surfactant, or both thereof,

wherein the carbon polishing inhibitor comprises an anionic functional group with 6 to 20 carbon atoms, anionic and cationic functional groups with 6 to 20 carbon atoms, or both thereof,

wherein the anionic surfactant comprises at least one selected from the group consisting of ammonium lauryl sulfate, sodium dodecyl sulfate, sodium polyoxyethylene alkyl aryl sulfate, ammonium polyoxyethylene alkyl aryl sulfate, alkyl ether phosphate, sodium lauryl sulfate, sodium laureth sulfate, ammonium laureth sulfate, sodium cocoyl methyl taurate, disodium laureth sulfosuccinate, disodium lauryl sulfosuccinate, disodium cocoyl glutamate, sodium cocoyl glutamate, sodium cocoyl glycinate, sodium lauroyl sarcosinate, sodium cocoyl alaninate, sodium cocoyl isethionate, sodium lauroyl methyl isethionate, sodium laureth carboxylate, and sodium C14-16 olefin sulfonate,

the amphoteric surfactant comprises at least one selected from the group consisting of cocamidopropyl betaine, lauramidopropyl betaine, alkyl betaine, amido betaine, sulfobetaine, hydroxysulfobetaine, amidosulfobetaine, phosphobetaine, imidazolinium betaine, alkyl amido betaine, alkyl amide propyl betaine, alkyl dimethyl amine betaine, alkyl dimethyl betaine, apricotamidopropyl betaine, coco amido betaine, coco betaine, ~~cocoamidopropyl betaine,~~ coco dimethyl betaine, lauryl betaine, lauryl amido propyl betaine, wheat germamidopropyl betaine,

isostearamidopropyl betaine, myristamidopropyl betaine, palmitamidopropyl betaine, undecylenamidopropyl betaine, 2-alkyl-N-carboxymethyl-N-hydroxyethyl imidazolinium betaine, lauramidopropyl hydroxysultaine, lauryl hydroxysultaine, cocamidopropyl hydroxysultaine, sodium lauroamphoacetate, and sodium cocoamphoacetate,

wherein a polishing target film comprises a carbon film, and

wherein the carbon film has a polishing amount of less than 20 Å/min,

wherein the pH-adjusting agent comprises at least one selected from the group consisting of benzylamine, monoethanolamine, diethanolamine, triethanolamine, trimethanolamine, dimethylbenzylamine, ethoxybenzylamine, monoisopropanolamine, aminoethylethanolamine, N,N-diethylethanolamine, diethylenetriamine (DETA), triethylenetetramine (TETA), tetraethylenepentamine (TEPA), pentaethylenehexamine (PEHA), bis(hexanmethylene)triamine, N-(3-aminopropyl)ethylenediamine (Am3), N,N´-bis(3-aminopropyl)ethylenediamine (Am4), N,N´,N´-tris(3-aminopropyl)ethylenediamine (Am5), N-3-aminopropyl-1,3-diaminopropane, N,N´-bis(3 -aminopropyl)-1,3-diaminopropane, N,N,N´-tris(3-aminopropyl)-1,3-diaminopropane, bis-(3-aminopropyl)amine, dipropylenetriamine, and tripropylenetetramine.

2. The slurry composition of claim 1, wherein

the abrasive particles comprise at least one selected from the group consisting of a metal oxide, an organic or inorganic matter-coated metal oxide, and the metal oxide in a colloidal state, and

the metal oxide comprises at least one selected from the group consisting of silica, ceria, zirconia, alumina, titania, barium titania, germania, mangania, and magnesia.

3. The slurry composition of claim 1, wherein the abrasive particles include primary particles having a particle size of 10 nm to 200 nm and secondary particles having a

particle size of 30 nm to 300 nm.

4. The slurry composition of claim 1, wherein the abrasive particles are present in an amount of 0.1 wt% to 10 wt% in the slurry composition.

5. The slurry composition of claim 1, wherein the oxidizer comprises at least one selected from the group consisting of hydrogen peroxide, urea hydrogen peroxide, urea, percarbonate, periodic acid, periodate, perchloric acid, perchlorate, perbromic acid, perbromate, perboric acid, perborate, permanganic acid, permanganate, persulfate, bromate, chlorate, chlorite, chromate, iodate, iodic acid, ammonium persulfate, benzoyl peroxide, calcium peroxide, barium peroxide, sodium peroxide, and carbamide peroxide.

6. The slurry composition of claim 1, wherein the oxidizer is present in an amount of 0.05 wt% to 5 wt% in the slurry composition.

7. The slurry composition of claim 1, wherein the carbon polishing inhibitor is present in an amount of 0.0001 wt% to 1 wt% in the slurry composition.

8. The slurry composition of claim 1, further comprising:

at least one selected from the group consisting of a metal polishing improver, a metal polishing inhibitor, a nitride film polishing improver, a nitride film polishing inhibitor, a poly film polishing improver, and a poly film polishing inhibitor.

9. The slurry composition of claim 1, wherein the slurry composition has a contact angle range of 10° to 70°.

10. The slurry composition of claim 1, wherein the slurry composition has a pH range of 2.0 to 6.0.

11. The slurry composition of claim 1, wherein the polishing target film further comprises at least one selected from the group consisting of a nitride film, an insulation film, a metal film, and a polysilicon film.