CLAIMS

1. A polishing slurry composition comprising:

nanoceria abrasive particles;

a water-soluble compound comprising an intramolecular hydrophilic group;

an amphoteric compound comprising an amphoteric amino acid having a PI value of 5.5 to 6.5; and

a surface modifier comprising a monocarboxylic acid,

wherein the primary particle size b of the nanoceria abrasive particles is 30 nanometers (nm) or less,

the water-soluble compound comprises a polymer, a copolymer, or both, wherein each of the polymer and the copolymer comprises at least one monomer selected from a group consisting of alkylene glycol, oxyalkylene alkyl ether, oxyalkylene alkenyl ether, oxyalkylene alkyl aryl ether, and oxyalkylene alkyl ether carboxylic acid,

a molecular weight of the water-soluble compound is less than 3000,

wherein a result value S of Equation 1 below is in a range of 0.9 to 1.1:

[Equation 1]

$$S = \frac{A * (b)^{-1/3}}{B * (a)^{-1/3}}$$

(in Equation 1,

a: a primary particle size of a reference ceria abrasive particle

b: a primary particle size of the nanoceria abrasive particles

A: a polishing rate of a target film of a polishing slurry composition comprising ceria abrasive particles with the primary particle size a

B: a polishing rate of a target film of a polishing slurry composition comprising ceria abrasive particles with the primary particle size b)

2. The polishing slurry composition of claim 1, wherein the nanoceria abrasive particles are included in an amount of 0.0001% by weight (wt%) to 5 wt% in the polishing slurry composition.

3. The polishing slurry composition of claim 1, wherein the water-soluble compound is included in an amount of 0.001 wt% to 1 wt% in the polishing slurry composition.

4. The polishing slurry composition of claim 1, wherein the water-soluble compound further comprises a polymer, a copolymer, or both, wherein each of the polymer and the copolymer comprises at least one monomer selected from a group consisting of alkyl acrylate; alkyl (meth)acrylate; (meth)acrylate containing an aliphatic ring or an aromatic ring; and acrylate containing an aliphatic ring or an aromatic ring.

5. The polishing slurry composition of claim 1, wherein
the amphoteric compound has a molecular weight of 1000 or less.

6. The polishing slurry composition of claim 1, wherein the amphoteric amino acid comprises at least one selected from a group consisting of lysine, methionine, cysteine, tyrosine, glycine, glutamic acid, alanine, serine, asparagine, phenylalanine, threonine, valine, leucine, isoleucine, proline, histidine, lysine, arginine, aspartic acid, tryptophan, glutamine, cysteine, betaine, cocomidopropylbetaine, lauryl betaine, stearyl betaine, laurylpropyl betaine, cocodimethyl carboxymethyl betaine, lauryldimethyl carboxymethyl betaine, lauryldimethyl alpha-carboxyethyl betaine, cetyl dimethyl carboxymethyl betaine, aminocarboxylate, imidazolium betaine, 2-alkyl-N-carboxymethyl-N-hydroxyethylimidazolium betaine, lauryldimethylamine oxide, and lecithin.

7. The polishing slurry composition of claim 1, wherein the amphoteric compound is included in an amount of 0.001 wt% to 1 wt% in the polishing slurry composition.

8. The polishing slurry composition of claim 1, wherein the monocarboxylic acid comprises at least one selected from a group consisting of formic acid, acetic acid, propionic acid, butyric acid, valeric acid, hexanoic acid, heptanoic acid, caprylic acid, nonanoic acid, decanoic acid, undecylenic acid, lauric acid, tridecylic acid, myristic acid, pentadecanoic acid, palmitic acid, phenylacetic acid, 2-phenylpropionic acid, triphenylacetic acid, mandelic acid,

hydrocinnamic acid, o-, p-, m-tolylacetic acid, 4-hydroxyvphenyl acetic acid, benzoic acid, toluic acid, dimethylbenzoic acid, dichlorophenylacetic acid, naphthoic acid (1-naphthoic acid, 2-naphthoic acid, etc.), and salicylic acid.

9. The polishing slurry composition of claim 1, wherein the surface modifier is included in an amount of 0.001 wt% to 0.1 wt% in the polishing slurry composition.

10. The polishing slurry composition of claim 1, further comprising a pH adjuster,

wherein the pH adjuster comprises an acidic material, a basic material, or both,

wherein the acidic material comprises at least one selected from a group consisting of hydrochloric acid, sulfuric acid, nitric acid, phosphoric acid, perchloric acid, bromic acid, perchloric acid, hydrofluoric acid, iodic acid, nitrous acid, persulfuric acid, sulfurous acid, hyposulfurous acid, boronic acid, iodic acid, phosphoric acid, phosphorous acid, hypophosphorous acid, superphosphoric acid, chlorous acid, hypochlorous acid, perchloric acid, bromous acid, hypobromous acid, perbromic acid, hypoiodous acid, periodic acid, hydrogen fluoride, boron trifluoride, tetrafluoroboric acid, phosphorus hydrofluoric acid, and salts thereof, and

wherein the basic material comprises at least one selected from a group consisting of ammonium methyl propanol (AMP), tetramethylammonium hydroxide (TMAH), ammonium hydroxide, ammonia, potassium hydroxide, sodium hydroxide, magnesium hydroxide, rubidium hydroxide, cesium hydroxide, sodium bicarbonate, sodium carbonate, imidazole, and salts thereof.