CLAIMS

1. A silica-based composite fine particle dispersion, child particles primarily composed of crystalline ceria being formed on surfaces of mother particles primarily composed of amorphous silica, the silica-based composite fine particle dispersion comprising silica-based composite fine particles having an average particle size of 50 to 350 nm and having characteristic features of [1] to [6]:

[1] the silica-based composite fine particles have a mass ratio between silica and ceria of 100:11 to 316;

[2] a ceria crystal phase is only detected when the silica-based composite fine particles are subjected to X-ray diffractometry;

[3] a crystallite size in the crystalline ceria, as measured by subjecting the silica-based composite fine particles to X-ray diffractometry, is 10 to 25 nm;

[4] in the silica-based composite fine particles, a percentage of a number of particles having a ratio between a shorter diameter and a longer diameter, as measured by an image analysis method, of not more than 0.8 is not more than 35%; and

[5] each of the silica-based composite fine particles has a silica coating formed partly on surfaces of the child particles, and

[6]a ratio of a percentage of a number of Si atoms to a percentage of a number of Ce atoms (Si atom% / Ce atom%) as measured by EDS measurement is not less than 0.9, the EDS measurement being performed by selectively applying electron beams to a portion of the silica coating of the silica-based composite fine particles that can be observed using a transmission electron microscope,

wherein when cation colloidal titration is performed, a streaming potential curve in which a ratio (ΔPCD/V) between an amount of streaming potential change (ΔPCD) and an amount of

cation colloidal titrant added at a knick (V) as expressed by formula (1) is in a range of -110.0 to -15.0 is obtained:

$\Delta PCD / V = (I - C) / V$ ··· formula (1)

C: streaming potential (mV) at the knick

I: streaming potential (mV) at a starting point of the streaming potential curve; and

V: amount of the cation colloidal titrant added at the knick (mL).

2. The silica-based composite fine particle dispersion according to claim 1 having a characteristic feature of [7]:

[7] silicon atoms enter into solid solution in the crystalline ceria as a main component of the child particles.

3. The silica-based composite fine particle dispersion according to claim 2, wherein as for cerium atoms and silicon atoms included in the child particles, a relationship of $R_1 < R_2$ (where R_1 is a distance between adjacent cerium and silicon atoms, and R_2 is a distance between adjacent cerium atoms) is satisfied.

4. The silica-based composite fine particle dispersion according to claim 1, wherein impurities are contained in the silica-based composite fine particles in amounts shown in (a) and (b):

(a) Na, Ag, Al, Ca, Cr, Cu, Fe, K, Mg, Ni, Ti, Zn, and Zr are contained in amounts of not more than 100 ppm, respectively; and

(b) U, Th, Cl, NO_3, SO_4, and F are contained in amounts of not more than 5 ppm, respectively.

5. The silica-based composite fine particle dispersion

according to claim 1, wherein a streaming potential before titration is a negative potential at a pH value ranging from 3 to 8.

6. A polishing abrasive grain dispersion comprising the silica-based composite fine particle dispersion according to claim 1.

7. A polishing abrasive grain dispersion for flattening a semiconductor substrate having a silica film formed thereon, comprising the silica-based composite fine particle dispersion according to claim 1.

8. A polishing abrasive grain dispersion comprising the silica-based composite fine particles according to claim 1 and having an ionic strength of not less than 0.007.

9. The polishing abrasive grain dispersion according to claim 8 comprising one or two ionic strength adjusters selected from the group consisting of ammonium nitrate and ammonium acetate.

10. A polishing abrasive grain dispersion comprising the silica-based composite fine particles according to claim 1and further comprising an acidic compound having an acid dissociation constant (pKa) of not less than 1.5.

11. The polishing abrasive grain dispersion according to claim 10, wherein the acidic compound is contained in an amount of 0.0002 to 0.1 mass%.

12. The polishing abrasive grain dispersion according to claim 10, wherein the acidic compound is acetic acid.

13. A polishing abrasive grain dispersion for flattening a semiconductor substrate having a silica film formed thereon, comprising the silica-based composite fine particles according to claim 1 and having an ionic strength of not less than 0.007.

14. A polishing abrasive grain dispersion for flattening a semiconductor substrate having a silica film formed thereon, comprising the silica-based composite fine particles according to claim 1 and further comprising an acidic compound having an acid dissociation constant (pKa) of not less than 1.5.

15. A polishing abrasive grain dispersion for flattening a semiconductor substrate having a silica film formed thereon, wherein the polishing abrasive grain dispersion has a pH of 3 to 8, comprising the silica-based composite fine particles according to claim 1 and having an ionic strength of not less than 0.007.

16. A polishing abrasive grain dispersion for flattening a semiconductor substrate having a silica film formed thereon, wherein the polishing abrasive grain dispersion has a pH of 3 to 8, comprising the silica-based composite fine particles according to claim 1 and further comprising an acidic compound having an acid dissociation constant (pKa) of not less than 1.5.