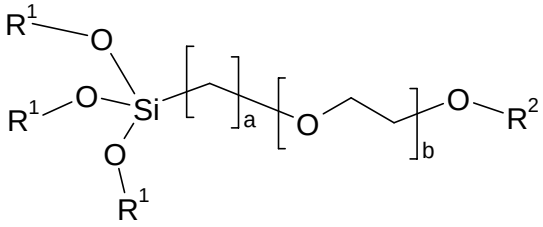
Claims

1. Composition comprising water and modified silica particles comprising an alkoxy organosilane on the surface,
wherein the composition is acidic and the alkoxy organosilane is of the following formula (I)



(I)

wherein R^1 and R^2 are at each occurrence independently of each other selected from the group consisting of methyl, ethyl and propyl; a is an integer of at least 1 and at most 5; and b is an integer of at least 1 and at most 20; wherein preferably R^1 and R^2 are all methyl, a is 3, and b is 11.

2. Modified silica particles according to claim 1, wherein the silica particles are colloidal silica particles.

3. Modified silica particles according to claim 1 or claim 2, wherein the silica particles are water glass-based.

4. Modified silica particles according to any one or more of the preceding claims, wherein the alkoxy organosilane is a hydrophilic alkoxy organosilane.

5. Modified silica particles according to any one or more of the preceding claims, wherein the alkoxy silane is a poly(alkoxy) organosilane.

6. Modified silica particles according to any one or more of the preceding claims, wherein the silica particles are doped with an alkali metal aluminate.

7. Composition according to any one of the preceding claims, wherein the composition has a pH of at least 1.0 and of at most 5.0, preferably of at least 2.0 and of at most 4.0.

8. Composition according to claim 7, further comprising any one or more of the group consisting of biocide, pH-adjusting agent, pH-buffering agent, oxidizer, chelating agent, corrosion inhibitor, and surfactant.

9. Method for producing the composition of any one or more of claims 1 to 8, said method comprising the steps of
   (a) providing an aqueous dispersion of silica particles;
   (b) providing an alkoxy organosilane;
   (c) in case said aqueous dispersion not yet being acidic, subsequently rendering the aqueous dispersion of silica particles acidic; and
   (d) then bringing the silica particles and the alkoxy organosilane into contact with each other, thereby obtaining the composition comprising the modified silica particles.

10. Method for producing the modified silica particles according to claim 9, wherein following step (a) and before step (c) the silica particles are doped with an aluminate.

11. Method for chemical mechanical polishing comprising the steps of
   (A) providing a substrate comprising
      (i) at least one layer comprising, preferably essentially consisting of, silicon oxide; and
      (ii) at least one layer comprising, preferably essentially consisting of, one or more metal or metal alloy;
   (B) providing the composition of any one of claims 1 to 8;
   (C) providing a chemical mechanical polishing pad with a polishing surface;
   (D) bringing the polishing surface of the chemical mechanical polishing pad and the composition provided in step (B) into contact with the substrate; and
   (E) polishing the substrate such that at least a part of the substrate is removed.

12. Method according to claim 11, wherein

(i) the silicon oxide is selected from the group consisting of borophosphosilicate glass (BPSG), plasma-enhanced tetraethyl ortho silicate (PETEOS), thermal oxide, undoped silicate glass, high density plasma (HDP) oxide, and silane oxide; and/or

(ii) the one or more metal or metal alloy is selected from the group consisting of tungsten, tantalum, copper, titanium, titanium nitride, aluminum silicon, and any combination of any of these, and preferably is tungsten.

13. Method according to claim 11 or claim 12, wherein the substrate is selected from the group consisting of flat panel displays, integrated circuits (ICs), memory or rigid disks, metals, interlayer dielectric devices (ILDs), semiconductors, micro-electro-mechanical systems, ferroelectrics, and magnetic heads.