CLAIMS

1. A method of preparing silica nanoparticles having a diameter of 50 nm to 1000 nm and a particle density of 1.96 g/cm^3 or less, and a rate of dissolution in 1N KOH solution of more than 10 nm/min, wherein the rate is measured by mixing 1-5 mg/mL silica nanoparticles in 1N aqueous KOH solution at 25°C and measuring the change in diameter as a function of time by the Dynamic Light Scattering method or measuring the turbidity decay as a function of time using a nephelometric turbidity meter, said method comprising:

(a) reacting an orthosilicate and an alcohol or a mixture of alcohols in an aqueous medium in the presence of a salt of a metal or in the presence of a boron compound, in combination with ammonium hydroxide,

(b) isolating the resulting nanoparticles, and

(c) treating the nanoparticles from (b) with an acid;

wherein the salt of a metal is selected from lithium acetate, sodium acetate, sodium metasilicate, sodium formate, potassium acetate, cesium acetate, magnesium acetate, and calcium acetate.

2. The method of claim 1, wherein the orthosilicate is a tetraalkylorthosilicate.

3. The method of claim 2, wherein the tetraalkylorthosilicate is selected from tetramethylorthosilicate, tetraethylorthosilicate, tetrapropylorthosilicate, tetrabutylorthosilicate, and tetrapentylorthosilicate.

4. The method of any one of claims 1 to 3, wherein the alcohol or mixture of alcohols is selected from methanol, ethanol, propanol, butanol, and mixtures thereof.

5. The method of claim 1, wherein the boron compound is boric acid or an alkyl borate.

6. The method of claim 5, wherein the alkyl borate is trimethyl borate or triethyl borate.

7. The method of any one of claims 1 to 6, wherein (a) is performed by mixing water, alcohol, the orthosilicate, and the salt of the metal or the boron compound.

8. The method of claim 7, comprising mixing 2 to 25 mol/L of water, 8 to 16 mol/L of ethanol, 0 to 2 mol/L of methanol, 0.1 to 2 mol/L of ammonia, 0.1 to 0.4 mol/L of tetraalkylorthosilicate, and 0.001 to 0.01 mol/L of the salt of the metal or boron compound.

9. The method of any one of claims 1 to 6, wherein (a) is performed by adding an orthosilicate into a solution comprising the salt of the metal or the boron compound, water, and alcohol.

10. The method of claim 9, comprising adding 0.1 to 0.4 mol/L of orthosilicate into a solution including 2 to 25 mol/L of water, 8 to 16 mol/L of ethanol, 0 to 2 mol/L of methanol, 0.1 to 2 mol/L of ammonia, and 0.001 to 0.01 mol/L of the salt of the metal or boron compound and mixing the resulting mixture.

11. The method of any one of claims 1 to 10, wherein the mixing is carried out for a period of from 5 minutes to 2 hours.

12. The method of claim 11, wherein the mixing is carried out at a temperature of from 20 °C to 50 °C.

13. The method of any one of claims 1 to 12, wherein the resulting nanoparticles are isolated by centrifugal separation followed by washing with an alcohol.

14. The method of any one of claims 1 to 13, wherein the acid is a mineral acid or organic acid.

15. The method of claim 14, wherein the mineral acid is hydrochloric acid and the organic acid is formic acid.

16. The nanoparticles prepared by the method of any one of claims 1 to 15.