Applied Quantum Materials Inc.

Silica Nanoparticles

Non-porous silica nanoparticles

Description

Unagglomerated and nearly mono-dispersed, silicon dioxide nanoparticles (SiO_2 NPs), with a hydroxyl terminated surface are readily dispersible in a wide variety of solvents including water and ethanol. These particles have promising and diverse applications ranging from biology to energy sectors. SiO_2 NPs can be made in various sizes from 20 to 300 nm and used as is or their surfaces can be modified and conjugated with a variety of different alkyl, amine, ester or functional groups or polymers.

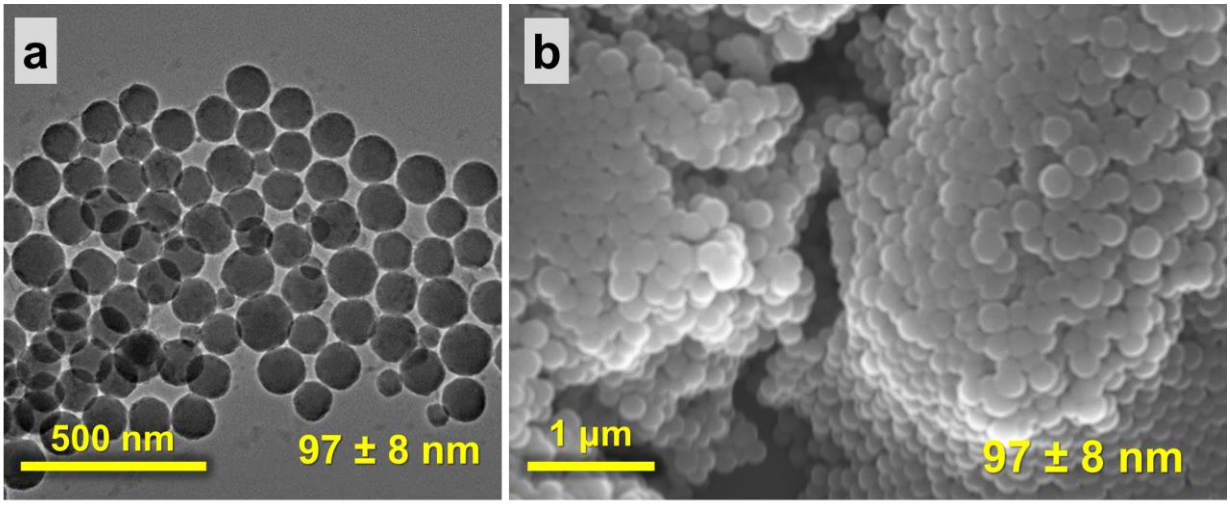

Figure 1. a) Bright-field Transmission Electron Microscope (TEM) image and b) Secondary Electron Scanning Electron Microscope (SEM) image of non-porous 100 nm SiO_2 nanoparticles.

Properties

Related Categories	SiO_2 Nanoparticles
Forms	White powder
Particle size	20 to 100 nm
Density	2.65 g/cm^3
Surface chemistry	Base, hydrophilic, hydrophobic, oleophilic, oleophobic
Availability of different solvents	Dispersible in polar organic solvents: ethanol, methanol, etc.
Production scalability	Fully scalable to kg/batch

Characterization Data

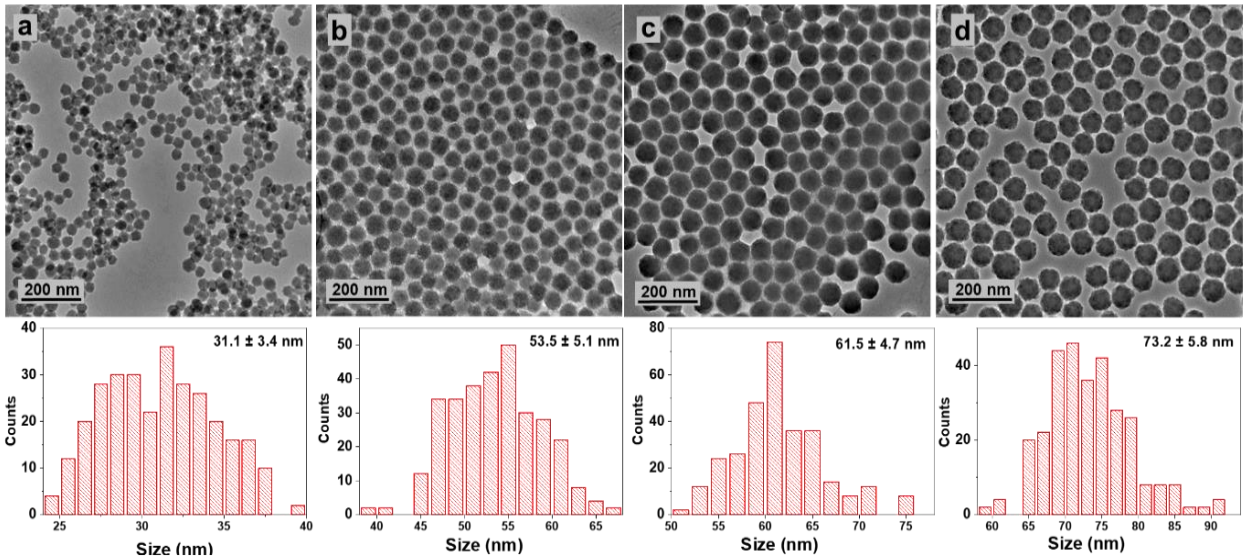

Figure 2. BF-TEM images of different sizes of synthesized SiO_2-NPs. The bottom row shows the particle size distribution (PSD) histogram for each size.

According to the PSD histograms, synthesized 30, 50, 60 and 75 nm sized SiO_2 NPs show less than 10% polydispersity.

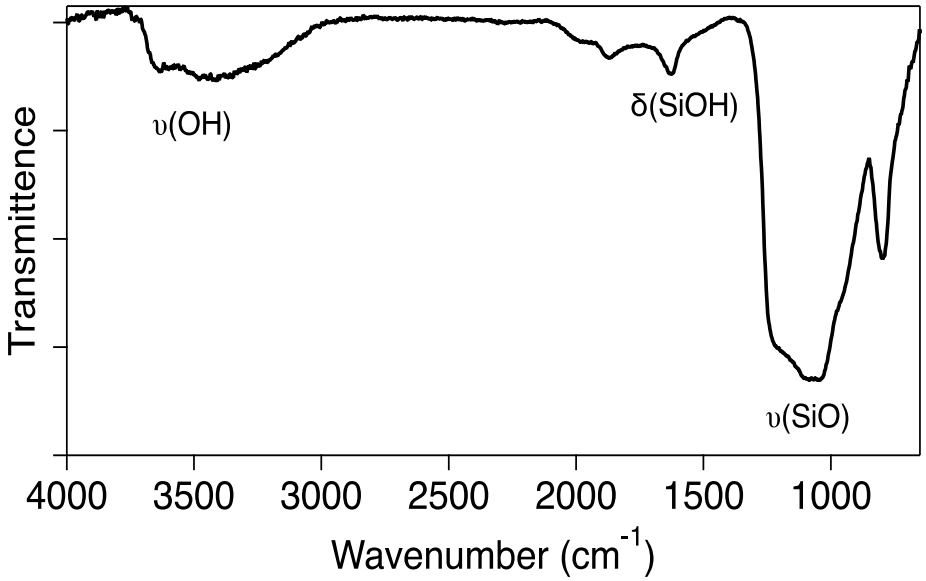

Figure 3. FT-IR spectrum of non-porous 100 nm SiO_2 nanoparticles.

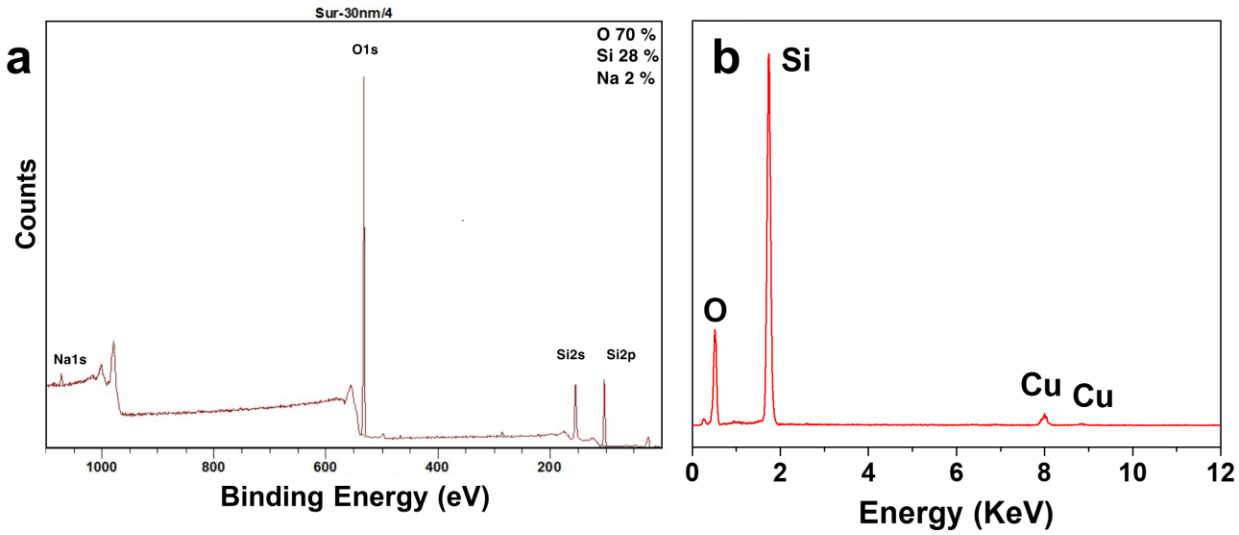

Figure 4. a) X-ray Photoelectron (XP) spectrum and **b)** Energy-dispersive X-ray (EDX) spectrum of non-porous 100 nm SiO_2 nanoparticles. Both spectra show Si and O as expected with no other impurities (Cu in EDX spectrum is from the TEM grid).

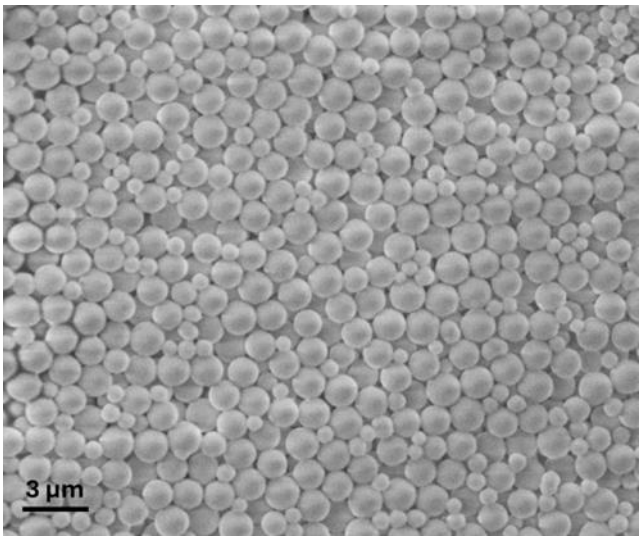

Figure 5. Silica Microparticles

Contact us for purchasing/customization options. AQM can tailor the surface chemistry to provide SiO_2 materials suitable for specific applications.