



Applied Physics, Inc.

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Nano Particle Technology

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Silica Nanoparticles in DI H₂O, Functionalized Silica, Hydrophobic Silica

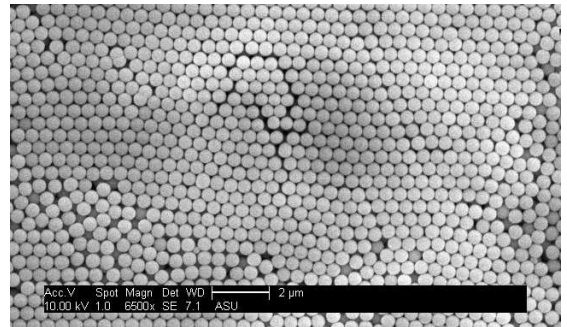


We provide silica nanoparticles with 99.997% purity and size distributions of $\leq 2\%$ in the size range of 32 nanometers to 2,000 nanometers in 15ml bottled volume, 10% SiO₂ concentration mixed in DI Water with no surfactant. We also provide bulk dry powder with the highest purity of silica particles available at 99.997% with narrow peak size distribution of $\leq 3\%$. Bulk, dry silica particles are provided as commercial monosilica, functionalized silica and hydrophobic silica for use as filler in polymers, in CMP polish and lens polish; available in 1 – 100 Kg increments from 200nm to 2um at specific sizes in this size range. Typical 2-4 week lead time for bulk dry silica powder. Larger sizes are available upon request

Applications include uses in liquid chromatography, optical lens polishing, CMP (chemical mechanical planarization) slurries and consumables, CMP polishing pads, solar cell manufacturing and mesoporous silica nanoparticles (MSN). Adding powdered, colloidal nano-silica (NS) provides significant improvement to the mechanical properties during the production of Portland cement and provides much more compressive strength to concrete and mortar.

Benefits

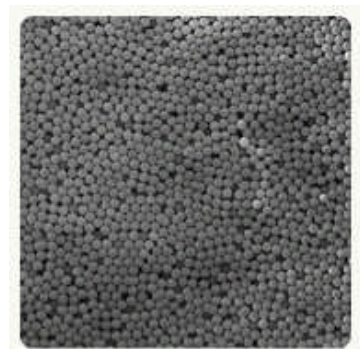
- High Size Repeatability from Batch to Batch
- Sizes $\leq 1.5\mu\text{m}$ with typical 8% CV at Peak Size
- Sizes $\geq 1.5\mu\text{m}$ with typical 11% CV at Peak Size
- 32m to 2 μm Nano-Particle Size
- Ultra-High Silica Purity of 99.997%
- Commercial Monosilica and Functionalized Silica
- Polymer Filler
- SiO₂ Particles for instrument size calibration, 15ml, 10% concentration, no Surfactant



0.5um Silica Nanoparticles

Applications

- High Pressure, Liquid Chromatography
- Nano-Particles and Composites
- Optical Lens, Precision Polishing
- Pharmaceutical Drug Delivery
- Mesoporous Silica Nano-particles (MSN)
- CMP Slurries, Chemical Mechanical Polishing
- Silicon Wafer Polishing
- Thin Film, Solar Cell Manufacturing
- Portland Cement Manufacturing



2.0um Silica Nanoparticles



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2.0 µm Silica Sample Particle Size Response

Brookhaven Instruments Corp.
90Plus Particle Sizing Software, Version 5.23
Sample ID 111121XA1A2A3A4B5B6B7 (Combined)
Operator ID LS
Notes:

Date: Feb 26, 2016
Time: 11:24:17
Batch 0

2.0 µm Nominal Silica Sample

Measurement Parameters:

Temperature	= 25.0 deg. C	Runs Completed	= 3
Liquid	= Water	Run Duration	= 00:00:30
Viscosity	= 0.890 cP	Total Elapsed Time	= 00:01:30
Ref. Index Fluid	= 1.330	Average Count Rate	= 474.4 kcps
Angle	= 90.00	Ref. Index Real	= 1.430
Wavelength	= 657.0 nm	Ref. Index Imag	= 0.000
Baseline	= Auto (Slope Analysis)	Dust Filter	= Off

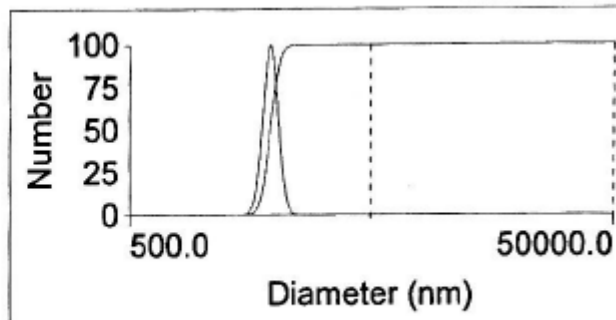
111121XA1A2A3A4B5B6B7 (Combined)

Effective Diameter: 1988.1 nm

Polydispersity: 0.005

Baseline Index: 8.7

Elapsed Time: 00:01:30



Lognormal Distribution

Run	Eff. Diam. (nm)	Half Width (nm)	Polydispersity	Baseline Index
1	2011.5	142.2	0.005	9.7
2	1956.6	138.3	0.005	2.2
3	1978.9	566.8	0.082	7.0
Mean	1982.3	282.4	0.031	6.3
Std. Error	15.9	142.2	0.026	2.2
Combined	1988.1	140.6	0.005	8.7