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Silica Nanoparticle Synthesis and Characterization with Dynamic Light Scattering Method: Solution Stability

Dynamic light scattering (DLS) offers a quick and convenient nondestructive means of particle size and zeta potential determination. However, reliability and repeatability of readings is oftentimes dependent on the type of DLS instrument, analytical procedures and solution conditions (and aging) [1]. Changes in sizes of particles, e.g. by agglomeration or adsorption, in suspension in particular, can and do result in changes in particle diffusion and velocity and hence, light intensity. Scattering angle and solution viscosity are also known to influence particle size readings by DLS [3]. Alternative techniques like atomic force microscopy (AFM) can yield values significantly different from those obtained by DLS [2]. Here we measure particle size by DLS and study with statistical analysis how solution ageing and solution conditions impact particle size. Results are compared to transmission electron microscope (TEM) analysis.

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