Ultra Uniform Colloidal Gold Particles as Nanoscale Reference Materials

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The ability to understand and predict the properties of nanomaterials relies on an accurate measurement of physical properties such as size, shape, and number density. One challenge associated with nanoscale measurement techniques is the lack of available reference materials with narrow specification ranges that can be used for instrument calibration. Colloidal gold nanoparticles with exceptionally uniform size and shape distributions have been developed and their utility as a rapid and accurate method of calibrating electron microscope and particle counting instruments is demonstrated. When coated with polymer, the nanoparticles self-assemble into ordered arrays on transmission electron microscopy grids to facilitate the rapid imaging and sizing of hundreds or thousands of regularly spaced nanoparticles. A novel algorithm selects the optimal threshold for image analysis independent of instrument and capture contrast and brightness. In combination with a larger, high contrast gold nanoshell analytical standard, accurate pixels per nm calibrations from captured images at magnifications from 1,000 to 1,000,000 can be rapidly acquired.

Figure 1. Polystyrene Coated 100 nm Ultra Uniform™ Gold nanoparticles

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