P-181

Synthesis and Microstructure of Au Nanosized Particles by a Reverse Micellle and Sol-gel Processing

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Nanometer-sized Au particles have been synthesized within reverse micelles via metal alkoxide hydrolysis and condensation The size of the particles can be controlled by manipulating the relative rates of the hydrolysis and condensation reaction of organometallic precursors within the microemulsion. Composite particles in the size range of 5 – 20 nm are produced As the molar ratio of water to surfactant is increased above, 10, the size distribution broadens The effects of synthesis parameters, such as the molar ratio of water to surfactant, the molar ratio of water to TEOS and the amount of base catalyst, on the size and distribution of the composite nano sized Au particles are discussed

P-182

Rheological and Electrokinetic Behavior Associated with Concentrated Nanosize Silica Hydrosols

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The influence of solids loading and the electrical double-layer on the rheological behavior of concentrated silica nanosols was investigated In this study, the physicochemical properties of silica suspensions were characterized by viscosity and electrokinetic sonic amplitude measurements, and by theoretical considerations Despite a high electrokinetic potential at pH 8, fumed silica not only exhibits rheological behavior normally indicative of an unstable suspension, but the rheology does not have the expected dependence on ionic strength. The positive correlation between zeta potential and viscosity implicates that classical Derjaguin-Landau-Verwey-Overbeek (DLVO) theory alone is insufficient to predict the rheological behavior of concentrated silica nanosols It was also important to take into account the effects of particle crowding and electrostatic interactions on suspension structure.