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Khan, Z., Al-Nowaiser, F.M.

Effect of poly(Vinyl alcohol) on the size, shape, and rate of silver nanoparticles formation
(2011) *Journal of Dispersion Science and Technology*, 32 (11), pp. 1655-1660.

Department of Chemistry, Faculty of Science, King Abdul Aziz University, Jeddah, Saudi Arabia

Abstract

The kinetics of cetyltrimethylammonium bromide (CTAB) stabilized silver nanoparticles have been studied spectrophotometrically at 425 nm (λ max of silver sol) in the absence and presence of water soluble polymer (poly(vinyl alcohol); PVA). Transmission electron microscopy (TEM), ultraviolet-visible spectroscopy, and viscosity measurements were used to determine the size, shape, and the size distribution of the silver nanoparticles. The reaction follows the same behavior with respect to CTAB, [tri-sodium citrate], and [Ag⁺] in both the media indicating the silver nanoparticles were formed through the same reaction path. The sigmoid nature of the kinetic curves suggests an autocatalytic path in the growth of nanoparticles. The reaction rate is increased by increasing CTAB. The presence of PVA inhibits nucleation and retards the rate of particle growth, absorbance and size of the particles. Polymer-surfactant interactions were analyzed based on the viscosity of the reaction mixture. © Taylor & Francis Group, LLC.

Author Keywords

Ctab; Particle growth; Pva; Silver; Tri-sodium citrate

Document Type: Article

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