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A kinetic study of silver nanoparticles formation from paracetamol and silver(I) in aqueous and micellar media

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ABSTRACT

UV–vis spectrophotometric, transmission electron microscopy (TEM) and viscometric techniques were used for the formation, characterization and kinetics of silver sol formation using silver nitrate as source of silver, paracetamol as reducing agent and cetyltrimethylammonium bromide (CTAB) as the stabilizer in absence and presence of poly(vinyl alcohol) (PVA). The sigmoidal curve of absorbance *versus* the reaction time suggests an autocatalytic reaction path. Transmission electron microscopy (TEM) results show that the silver nanoparticles are all spherical, highly dispersed and aggregated in aqueous solution. In the formation of silver nanoparticles, alkaline solution is required. The presence of PVA inhibits the rate of silver nanoparticles formation. Effects of $[Ag^+]$, [paracetamol], [CTAB], [NaOH] and [PVA] on the silver sol formation rate were analyzed.

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