Green Synthesis of Silver Nanoparticles by Pulsed Laser Irradiation: Effect of Hydrophilicity of Surfactants

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Synthesis of homogeneous spherical silver nanoparticles (Ag NPs) was conducted successfully by photochemical reduction of silver ions (Ag^{+}) (10^{-4} M) using near ultraviolet (UV) pulse laser (355 nm) irradiation in an aqueous solution of surfactants sodium dodecyl sulphate (SDS) and cetyltrimethylammonium bromide (CTAB). Higher concentration of SDS and CTAB facilitated dispersion of reduced silver salt. Size of NPs was 72 and 163 nm in SDS and CTAB, respectively. Precursor silver acetate salt was irradiated for 30 min. Effect of surfactants concentration, irradiation time, and hydrophilicity of surfactant were investigated to find out the optimum surfactant concentration and time required to irradiate salt for completion of reduction.

Keywords

Laser irradiation, Pulsed laser, Silver nanoparticles, Photo-reduction