

Preparation and optical properties of colloidal silver nanoparticles at a high Ag^+ concentration

Md. Habib Ullah, Kim Il, Chang-Sik Ha

We have prepared colloidal silver nanoparticles by reducing a high molar concentration of AgNO_3 (up to 0.735 M) with glycerol in the presence of m-phenylenediamine. These silver nanoparticles had anisotropic shapes, including truncated rectangles, truncated triangles, and spheroid-type particles. The UV–Vis spectra of these nanoparticle systems display two distinct plasmon modes and a shoulder that correspond to the in-plane dipole, in-plane quadruple, and out-of-plane dipole resonances, respectively. The size and coating thickness of the nanoparticles are controllable while retaining their size distribution. We have used scanning electron microscopy (SEM), X-ray diffraction (XRD), transmission electron microscopy (TEM) and, UV–Vis spectroscopy to characterize the silver products obtained.