

Synthesis of Silver Nanoparticles by Polyol Process

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Size of silver nanoparticles (NPs) provides important control over many of the physical and chemical properties of nanoscale materials, including luminescence, conductivity, and catalytic activity. To synthesize the silver NPs, various methods have been developed, such as chemical reduction, radiation in reverse micelles, microemulsions, and thermal decomposition in organic solvents. However, the synthesis of silver NPs with prominent physico-chemical properties like size, size distribution, and chemical composition still remains a major challenge. Herein, we report a simple polyol process for synthesis of silver NPs by reducing the silver nitrate with KOH in ethylene glycol. The polyol process has been characterized by X-ray diffractometer (XRD) and by time-dependent transmission electron microscopy (TEM), allowing for the observation of crystalline nature and size or size distribution. In the synthesis, spherical silver NPs (~10 nm) with narrow size distribution were obtained. The reaction times played important roles in reducing the size distribution of the silver NPs.