

SYNTHESIS AND CHARACTERIZATION OF CU/AG ALLOY NANOPARTICLES

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Abstract

Nanoparticles of Cu/Ag alloy were prepared by solvothermal synthesis from different metal precursors. A mixture of metal precursors was dissolved in small amount of oleylamine and injected into mixture of octadecene and oleylamine at 230 °C. Oleylamine acted as a reducing agent and protecting layer on the surface of arising nanoparticles. After 10 minutes reaction mixture was cooled, centrifuged and three times washed with hexane. Obtained nanoparticles were dispersed in hexane. The colloidal solutions of nanoparticles were characterized by dynamic light scattering (DLS), small angle X-ray scattering (SAXS), ultraviolet-visible spectroscopy (UV-VIS). Isolated nanopowders were characterized by transmission and scanning electron microscopy (TEM, SEM) and powder X-ray diffraction (PXRD). Alloy phase transformations were studied by differential scanning calorimetry (DSC). Surface of nanoparticles was characterized by infrared spectroscopy (IR) and mass spectrometry (MS). The results of thermal analysis were compared with the calculated phase diagram.

Keywords: Solvothermal synthesis, nanoparticles, nanoalloy, melting point depression, SAXS, DLS

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