

Facile Route to the Synthesis and Characterization of Novel Core-shell and Ag/Ru Allied Nanoparticles

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Abstract

The synthesis of polyvinylpyrrolidone (PVP) and dodecanethiol (DT) seed mediated Ag/Ru allied bimetallic nanoparticles were successfully carried out by the simultaneous reduction of the metal ions in aqueous and non-aqueous solutions with ethylene glycol (EG), diethylene glycol (DEG), glycerol (GLY) and pentaerythritol (PET). The TEM images of the Ag/Ru NPs passivated by DT/DEG; DT/GLY; DT/EG (200 °C, 3h) and PVP/PET (90 °C, 4h) revealed novel well-ordered core-shell structures with particle sizes in the range of 8.2 ± 0.7, 10.0 ± 3.2, 11.4 ± 1.3 and 18.89 ± 6.83 nm respectively. The analysis of the nanocomposites using X-ray photoelectron spectroscopy and X-Ray diffraction suggests dominance of the face-centered cubic structure with 2θ reflections slightly shifted from the silver peaks.