

Synthesis of Alkali Metal Doped Tungsten Bronze Nanoparticles by Using Oleylamine as Surfactant and Solvent

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We provide the synthesis of quaternary tungsten bronzes doped with sodium and cesium via a low-cost sol-gel process employing surfactants. The nanocrystal of $Cs_xNa_yWO_3$ was prepared using the sol-gel process with oleylamine as surfactant and solvent. Through transmission electron microscopy (TEM), we confirmed that synthesized tungsten bronze nanoparticles capped with oleylamine have a diameter in the range of 10–30 nm. The carbon chain of surfactant made tungsten bronze nanoparticles well-dispersed in non-polar solvent (toluene), showing about 97% shielding property of near-infrared (780–2100 nm) light as well as about 64% transparency of visible (380–780 nm) light. The property of tungsten bronze nanocrystals was highly suitable for solar control filters in automobiles and architectures by applying windows of incoming near-infrared light.