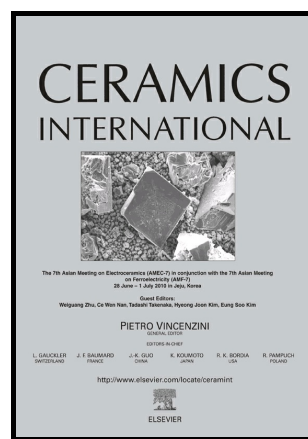


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Effect of Mn^{2+} and Cu^{2+} co-doping on structural and luminescent properties of ZnS nanoparticles

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Abstract

Undoped and transition metal (Cu, Mn, Cu:Mn) doped ZnS nanoparticles are synthesized by chemical co-precipitation method via an aqueous synthesis route. Synthesized samples are characterized by various techniques for their structural and optical properties. Crystallite size obtained from X-Ray Diffraction (XRD) is 1.68, 1.87, 1.50, 1.42 nm for undoped, Cu, Mn, Cu:Mn doped ZnS nanoparticles. The XRD, High Resolution Transmission Electron Microscopy, and Selected Area Electron Diffraction confirm the evolution of stable hexagonal phase of ZnS nanoparticles at low temperature. Energy Dispersive Spectroscopy confirms the doping of nanoparticles. Blue shift in UV absorbance shows the increase in optical bandgap with decrease in particle size. The Photoluminescence studies exhibit blue, yellow and red emission in visible region. Surface functionalization of nanoparticles is confirmed from Fourier Transform Infra Red spectroscopy. The present samples are tunable in wider range of emission and are prospective candidates for biological labels due to their fluorescent properties.

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