



Enhanced blue-light emission on $\text{Cd}_{0.9-x}\text{Zn}_{0.1}\text{Cr}_x\text{S}$ ($0 \leq x \leq 0.05$) quantum dots

I. Devadasa^a, P. Sakthivad^a, S. Muthukumar^a, N. Sudhakar^a

Show more

➦ Add to Mendeley ➦ Share ➦ Cite

<https://doi.org/10.1016/j.ceramint.2018.11.054>

Get rights and content

Abstract

Zn, Cr dual doped CdS quantum dots (QDs) have been synthesized using co-precipitation method at room temperature without any capping agent. The prepared samples were analyzed by x-ray diffraction (XRD), Transmission electron microscopic (TEM) study, Scanning electron microscopic (SEM) study, Energy Dispersive X-ray (EDX) spectra, UV-Visible absorption & transmission spectra, Fourier Transform Infra-Red (FTIR) spectra and Photoluminescence studies (PL). All the samples were exhibited cubic structure and they confirmed that the presence of Cr did not alter the original structure. TEM study and SEM study revealed the structure and morphology of the particles. Crystallite size was reduced for the addition of Cr and it was ranged as ~2 nm. As large number of small particles aggregated on the surface, agglomeration was received on surface morphological study. EDX spectra confirmed the occurrence of doped elements in CdS as per the targeted ratio. In UV-visible absorption study, Cr doping caused blue shift on absorption peaks. UV-visible transmittance peaks intensity was reduced as a function of Cr doping. Optical energy band gap value was slightly increased for the addition of Cr. High intense blue light emission and red shifted red emission were received on PL study for the Cr, Zn dual doped CdS QDs. Since these materials offered better optical and luminescent properties, shall be suitable for the optoelectronic device applications.