

Study of Nanocrystalline Scintillator for Alpha Particles Detection

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Abstract : We report on the synthesis of cesium-iodide nanoparticles using sol-gel technique. The structural properties of CsI nanoparticles were characterized by X-ray diffraction and Scanning Electron Microscope (SEM) Also, optical properties were followed by optical absorption and UV-vis fluorescence. Intense photoluminescence is also observed, with some spectral tuning possible with ripening time getting a range of emission photon wavelength approximately from 366 to 350 nm. The size effect on CsI luminescence leads to an increase in scintillation light yield, a redshift of the emission bands of the on_center and off_center self_trapped excitons (STEs) and an increase in the contribution of the off_center STEs to the net intrinsic emission yield. The energy transfer from the matrix to CsI nanoparticles is a key characteristic for scintillation detectors. So the scintillation spectra to alpha particles of sample were monitored.

Keywords : nanoparticles, luminescence, sol gel, scintillator

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