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Photoluminescence spectra of thin films containing CdSe/ZnS quantum dots irradiated by 532-nm laser radiation and gamma-rays[1]
SURESH SHARMA, JAY MURPHREE, TONMOY CHAKRABORTY, AJANI ROSS, CECIL SHIVE, University of Texas at Arlington — We have investigated temporal behavior of the photoluminescence (PL) spectra of thin films containing CdSe/ZnS quantum dots irradiated by 532 nm laser radiation and gamma-rays. Under $\sim$ 100 W/cm^2 laser radiation, the PL intensity (I_{PL}) increases with irradiation time upto about 500s and thereafter declines linearly. The wavelength of the PL emission (λ_{peak}) exhibits a blue-shift with exposure time. Upon simultaneous irradiation by 100 W/cm^2 532-nm laser, as well as 0.57 and 1.06 MeV gamma-rays, the temporal behaviors of both I_{PL} and λ_{peak} are significantly different; I_{PL} increases to a saturation level, and the magnitude of the blue-shift in λ_{peak} is reduced. We also present data on the effects of the density of the quantum dots on the temporal behavior of the PL spectra, as well as additional data on samples synthesized with CdSe/ZnS quantum dots embedded in conducting polymer films. We discuss possible mechanisms underlying our observations.

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