

3^+ ions in lead borate glasses.

Abstract Submitted
for the PSF20 Meeting of
The American Physical Society

Influence of metal and semiconducting nanoparticles on the optical properties of Dy P K BABU, SAISUDHA MALLUR, Western Illinois University — The effect of glass composition and the influence of Ag, CdSe and ZnSe nanoparticles on the optical absorption and fluorescence of Dy-doped lead borate glasses are studied. Optical absorption and fluorescence spectra of Dy³⁺ ions show significant changes with glass composition, and the presence of semiconducting nanoparticles. We analyzed the hypersensitive transition, intensity parameters, radiative transition probability, stimulated emission cross section (σ_p), and the area ratio of the yellow to blue peak of Dy³⁺ ions. Fluorescence spectra of the glass containing CdSe nanoparticles show a well pronounced, characteristic broad emission. Deconvolution of these broad peaks yields average particle sizes that agree with the transmission electron microscope images. σ_p shows significant increase for the glass containing CdSe nanoparticle of size 8-18 nm. Incorporating CdSe nanoparticles into lead borate glasses can produce significant electronic alterations to the local environment of Dy³⁺ ions to produce favorable enhancements to its optical properties.

P K Babu
Western Illinois University

Date submitted: 30 Oct 2020

Electronic form version 1.4