

# Spectral studies of $\text{Sm}^{3+}$ and $\text{Dy}^{3+}$ doped lithium cesium mixed alkali borate glasses

D. Thirupathi Naidu, A.V. Kumar, R. P. S. Chakradhar<sup>†</sup> and Y.C. Ratnakaram

Department of Physics, S. V. University Post Graduate Centre, Kavali-524 201, India

<sup>†</sup>Department of Physics, Indian Institute of Science, Bangalore-560012, India

## Abstract

The effect of host glass composition on the optical absorption and fluorescence spectra of  $\text{Sm}^{3+}$  and  $\text{Dy}^{3+}$  has been studied in mixed alkali borate glasses of the type  $67\text{B}_2\text{O}_3 \cdot x\text{Li}_2\text{O} \cdot (32-x)\text{Cs}_2\text{O}$  ( $x=8, 12, 16, 20$  and  $24$ ). The Judd-Ofelt intensity parameters ( $\Omega_2$ ,  $\Omega_4$  and  $\Omega_6$ ) are calculated. The radiative transition probabilities ( $A$ ), radiative lifetimes ( $\tau_R$ ), branching ratios ( $\beta$ ) and integrated absorption cross sections ( $\Sigma$ ) are computed for certain excited states of  $\text{Sm}^{3+}$  and  $\text{Dy}^{3+}$  ions for different  $x$  values in the glass matrix. Stimulated emission cross sections ( $\sigma_p$ ) are obtained for certain emission transitions of two ions in these mixed alkali borate glasses. These parameters are compared for different  $x$  values in the glass matrix. Variation of these parameters with  $x$  in the glass matrix has been studied.

---

\*Corresponding author e-mail : [chakra72@physics.iisc.ernet.in](mailto:chakra72@physics.iisc.ernet.in)