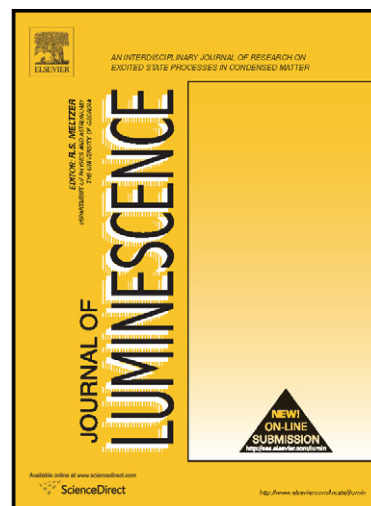


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# Luminescence properties of Pr<sup>3+</sup> doped Li<sub>2</sub>O-MO-B<sub>2</sub>O<sub>3</sub> glasses

J. Anjaiah<sup>a,b,\*</sup>, C. Laxmikanth<sup>a</sup>, N. Veeraiah<sup>c</sup>, P. Kistaiah<sup>d</sup>

<sup>a</sup> Department of Physics, The University of Dodoma, Tanzania, East Africa

<sup>b</sup> Department of Physics, Geethanjali College of Engineering & Technology, Keesara, RR Dist., 501 301, India

<sup>c</sup> Department of Physics, Acharya Nagarjuna University, Nagarjuna Nagar, Guntur, 522 510, AP., India

<sup>d</sup> Department of Physics, Osmania University, Hyderabad, 500007, TS., India

## Abstract

Lithium borate glasses of composition 30Li<sub>2</sub>O-10MO-59B<sub>2</sub>O<sub>3</sub>:1Pr<sub>2</sub>O<sub>3</sub> (MO= ZnO, CaO and CdO) were prepared by conventional melt quenching method. The amorphous nature of these glasses was confirmed by X-ray diffraction. Characterization of these glasses was carried out by differential scanning calorimetry and infrared spectra. Optical absorption and photoluminescence spectra of these glasses were investigated. Judd-Ofelt intensity parameters  $\Omega_{\lambda}$  ( $\lambda=2, 4, 6$ ) are evaluated from the intensities of various absorption bands of optical absorption spectra. From this theory various radiative properties like transition probability  $A$ , branching ratio  $\beta$ , the radiative life time  $\tau_R$ , and the stimulated emission cross-section  $\sigma_p$  for various emission levels of these glasses have been determined and reported. The relationship between the structural modifications and luminescence efficiencies of all the three glasses are explained. After X-ray irradiation on these glasses, the thermoluminescence emission properties were also studied. The thermoluminescence studies indicate that CdO modified glass is giving out maximum thermoluminescence light output among the three glasses studied.

Keywords:

Optical absorption, Photoluminescence,  
Judd-Ofelt parameters, Borate glasses, Praseodymium

Corresponding author at: Department of Physics, The University of Dodoma, Tanzania, East Africa,

Tel: +255 768224886

E-mail: anjaiah.juluru@gmail.com (J. Anjaiah)

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