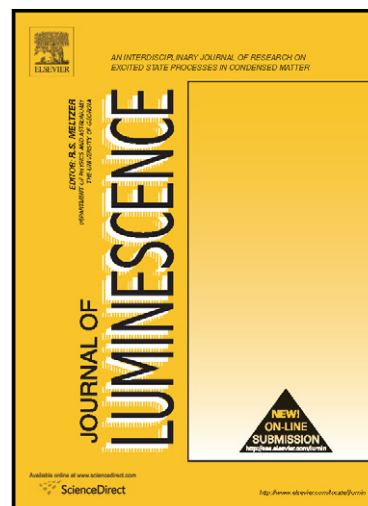


Author's Accepted Manuscript

Spectroscopic and Visible Luminescence Properties of Rare Earth Ions in Lead Fluoroborate Glasses

G. Anjaiah, SK. Nayab Rasool, P. Kistaiah



www.elsevier.com/locate/jlumin

PII: S0022-2313(14)00639-5
DOI: <http://dx.doi.org/10.1016/j.jlumin.2014.10.068>
Reference: LUMIN12998

To appear in: *Journal of Luminescence*

Received date: 18 March 2014
Revised date: 23 October 2014
Accepted date: 30 October 2014

Cite this article as: G. Anjaiah, SK. Nayab Rasool, P. Kistaiah, Spectroscopic and Visible Luminescence Properties of Rare Earth Ions in Lead Fluoroborate Glasses, *Journal of Luminescence*, <http://dx.doi.org/10.1016/j.jlumin.2014.10.068>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Spectroscopic and Visible Luminescence Properties of Rare Earth Ions in Lead Fluoroborate Glasses

G. Anjaiah¹, SK. Nayab Rasool² and P. Kistaiah^{1*}

¹*Department of Physics, Osmania University, Hyderabad- 500007, India*

²*Department of Physics, Sri Venkateswara University, Tirupati-517502, India*

Abstract

The lanthanide doped lead lithium calcium zinc fluoroborate glasses (LLCZFB: Ln) of composition $20\text{PbF}_2+10\text{Li}_2\text{O}+5\text{CaO}+5\text{ZnO}+59\text{B}_2\text{O}_3+1\text{Ln}_2\text{O}_3$ (where Ln = Sm, Eu and Dy in mol %) were prepared by conventional melt quench technique. The amorphous nature of these glasses was confirmed by X-ray diffraction studies. The glass transition temperatures (T_g) were studied by DSC analysis. The glass structure and spectroscopic properties were investigated using optical absorption, vibrational and fluorescence spectra. The FT-IR spectra and Raman spectra reveal the presence of BO_3 , BO_4 and non-bridging oxygen's. The Judd-Ofelt intensity parameters Ω_λ ($\lambda=2, 4, 6$) were determined from the spectral intensities of absorption bands. These parameters were used to calculate the radiative parameters such as radiative transition probability (A_R), radiative life time (τ_R) and branching ratio (β_R) for various excited luminescent states of rare earth ions. The visible emission spectra for different rare earth ions were recorded by exciting the samples at different wavelengths and the decay rates for the different rare earth ions were measured. Using the emission spectra, full width half maxima (FWHM), stimulated emission cross section (σ^E_p) were evaluated. The nature of decay profiles of $^4\text{F}_{9/2}$, $^4\text{G}_{5/2}$ and $^5\text{D}_0$ states of Dy, Sm and Eu ions respectively are analyzed. Comparison of luminescence features of these glasses and also with those reported for different glass hosts indicates that the LLCZFB: Dy glass has strong luminescence in the visible region.

Keywords: Fluoroborate glass, FTIR spectroscopy, Micro Raman spectroscopy, Optical absorption, Photoluminescence, Rare earth ion.

*Author for correspondence –Email: pkistaiah@yahoo.com

Download English Version:

<https://daneshyari.com/en/article/5399615>

Download Persian Version:

<https://daneshyari.com/article/5399615>

[Daneshyari.com](https://daneshyari.com)