



## EPR and Optical Absorption studies on Vanadium doped Glasses

\*<sup>1</sup>M.Sugathria, <sup>2</sup>K.Jyothib, <sup>3</sup>P.Madhusudana Rao, and <sup>4</sup>B.AppaRaod

<sup>1</sup>Department of Physics,RayalaseemaUniversity,Kurnool, India

<sup>2</sup>Department of Physics,Government college Rajahmundry, India

<sup>3</sup>Department of Physics,JNTUH College of Engineering, Kukatpally, Hyderabad-500085, India

<sup>4</sup>Material Science Department, Osmania University, Hyderabad-500 007, India

**Abstract:**Electron Paramagnetic Resonance (EPR) and Optical Absorption studies on glasses  $20\text{Li}_2\text{O} - 10\text{Na}_2\text{O} - (70-X)\text{B}_2\text{O}_3$  doped with  $\text{X}=\text{V}_2\text{O}_5$  are reported. EPR spectra of  $\text{V}^{4+}$  ions doped in the glass system exhibited peak at  $g = 1.98$ . Spin Hamiltonian parameters  $g_{\parallel}$ ,  $g_{\perp}$ ,  $A_{\parallel}$ ,  $A_{\perp}$ , dipolar hyperfine coupling parameter  $P$ , and Fermi contact interaction parameter  $K$ , have been calculated and found that these parameters are dependent upon alkali ion concentration in the glass system and the  $\text{VO}^{2+}$  ion in an octahedral coordination with a tetragonal compression. When the concentration of  $\text{V}_2\text{O}_5$  is increased from 0.2 to 1.0 mole %, the Values of  $g_{\parallel}$ ,  $P$  decrease; values of  $K$  increase and values of  $g_{\perp}$ ,  $A_{\parallel}$ ,  $A_{\perp}$  are found to be constant. These values show that there is a tetragonal distortion of  $\text{V}^{4+}$  in Borate Glasses. Optical absorption spectra recorded in the range 300 - 900nm at room temperature showed a band at 800 to 850nm which is attributed to  ${}^2\text{B}_2 \rightarrow {}^2\text{B}_1$  and  ${}^2\text{B}_2 \rightarrow {}^2\text{E}$  transitions.

**Keywords:**EPR, Spin Hamiltonian Parameters, Lithium Borate Glass.

M.Sugathria *et al*/International Journal of ChemTech Research, 2017,10(7): 267-273.

\*\*\*\*\*