

**AN ESR AND OPTICAL STUDY OF VANADIUM DOPED $K_2O - CdO - B_2O_3 - SiO_2$
(KCdBSi) GLASSES**

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ABSTRACT

Glasses of the $20K_2O - 5CdO - 60B_2O_3 - 15SiO_2$ and $(20-x) K_2O - 5CdO - 60B_2O_3 - 15SiO_2 - xV_2O_5$ (where $x=0.1$ to 0.5 mol %) KCdBSi systems were prepared by melt quenching technique. Optical and structural properties of undoped glass, and glasses doped with VO^{2+} ions were examined. Their structural properties were determined with XRD, Fourier Transform Infrared (FTIR) and Electron Paramagnetic Resonance spectra (ESR) and Optical absorption spectra. Optical band gaps of glass samples were determined for direct and indirect transitions from the absorption spectra. Through the fundamental Ultra Violet absorption edges of the glasses, the Optical band gap energies and Urbach energies were evaluated. The ESR spectra of all the glass samples exhibit resonance signals characteristic of VO^{2+} ions. The values of Spin-Hamiltonian parameters indicated that the VO^{2+} ion in KCdBSi glasses were present in octahedral sites with tetrahedral compression and belong to C_{4v} symmetry. Spin Hamiltonian parameters 'g' and 'A' were calculated from their Ultra Violet edges.

KEYWORDS: Borosilicate, Vanadium, Optical Absorption, Electron Spin Resonance (ESR)