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A study on optical properties of MnO doped borobismuthate glasses

Pavan Kumar Pothuganti
Department of Physics,
JNTUA-College of Engineering, Ananthapuramu, Andhra Pradesh, India- 515 002
pavan.p.kumar@gmail.com

Ashok Bhogi
Department of Humanities and Sciences (Physics),
VNR Vignana Jyothi Institute of Engineering and Technology, Hyderabad, Telangana, India-500 090

Muralidhara Reddy Kalimi
Department of EIE,
R.G.M. College of Engineering & Technology, Nandyal, Andhra Pradesh, India- 518 501

Padamasuvarna Reniguntla
Department of Physics,
JNTUA-College of Engineering, Ananthapuramu, Andhra Pradesh, India- 515 002

ABSTRACT

A series of borobismuthate glasses doped with MnO with 0, 0.2, 0.4, 0.6, 0.8 and 1 mol% were prepared by melt quenching technique. The amorphous nature of samples was confirmed by X-Ray Diffraction (XRD) studies. The parameters density, molar volume, molar refraction and oxygen packing density (OPD) were calculated and it is observed that density decreases and molar volume increases with increase in MnO component due to formation of Non Bridging Oxygens (NBO). Optical absorption studies were done for glass samples and it shows that optical bandgap energy (E_{opt}) and metallization criterion (M) decreases with increase in MnO component indicates that these glasses can behave as amorphous semiconductors. Apart from this the optical parameters such as refractive index (n), absorption coefficient (α), extinction coefficient (K), optical conductivity (σ_{op}), optical polarizability (α_o) and optical basicity (Λ_{th}) have also been evaluated for all samples and studied as a function of wavelength.

Keywords: Oxide glasses, UV-Vis, optical bandgap,absorption coefficient, extinction coefficient, Optical basicity