The Study of Electron Beam Irradiation on Eu_2O_3 Doped Pbf_2 - Teo_2 - B_2O_3 Glasses

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Abstract — **We report here the combined structural, optical and thermal studies carried out for the prepared Eu2O3 doped PbF2- TeO2-B2O3 glass [built using melting molding technique] samples before and after being subjected to electron beam of energy 7.5 MeV [Dose: 150 kGy], containing 0-2.5 mol% of Eu2O3. The increase in densities of the samples both before and after irradiation has been understood, mainly due to the UV-VIS-NIR data, energy band gap (Eg) values and the characteristic temperatures obtained from Differential Scanning Calorimetry (DSC) study. The decrement in the values of energy band gap and the shifting of the absorption cut-off wavelength of UV-VISNIR spectra towards red edge, proved the formation of color centers in the glass network after irradiation. The changes in the physical appearance of the glasses from light yellow to deep yellowish color after irradiation were studied through color measurement. The change in Hunter L values after irradiation, through color measurement was a proof for the color centers or absorption centers created in the glass sites. Glass transformation temperatures [glass transition (Tg), onset of crystallization (Tx), crystallization (Tc) and melting temperature (Tm)] through Differential Scanning Calorimetry (DSC), were analyzed to study the thermal effects on amorphized borate glasses and check its reaction on stability and vitreous network of the glass samples both before and after electron beam irradiation.**

Index Terms — **Electron beam, Eu2O3 doped, DSC, glass transition, Hunter L**

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