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Optical features of novel fluorotellurite glasses based on TeO₂- LiNbO₃- BaF₂-La₂O₃- (Nb₂O₅ or TiO₂)

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Abstract:

New families from fluorotellurite glasses with composition 7.53 TeO₂-7.31 LiNbO₃-4.16 Nb₂O₅- 10 BaF₂-1.0La₂O₃, 72.53 TeO₂-7.31 LiNbO₃- 10 Nb₂O₅- 10 BaF₂-1.0La₂O₃ and 77.53 TeO₂-7.31 LiNbO₃-5 TiO₂-10 BaF₂-1.0La₂O₃ in mol% were prepared. The thermal characterization and optical properties of these glasses were estimated by using differential scanning calorimetric, DSC, and UV-Vis-NIR spectroscopy respectively. The results of thermal analysis indicate that 77.53 TeO₂-7.31 LiNbO₃-5 TiO₂-10 BaF₂-1.0La₂O₃ glasses has high thermal stability and high factor against crystallization. The density and linear refractive index, *n*, of present glasses were measured. Also, the physical parameters such as; oxygen packing density, molar volumes, oxygen molar volume, molar refraction, metallization criterion, molar polarizability, third-order non-linear susceptibility and two photon absorption coefficients were calculated. It was found that, the linear refractive index increases otherwise decrease in the optical energy gap with increase Nb₂O₅ concentration. On the basis on thermal and optical results of these glasses it can be concluded that fluorotellurite glasses tested can be used in optical application.

Keywords: Oxide glasses; DSC, UV- Vis- NIR spectra, refractive index; optical energy gap; third order nonlinearity.

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