

## Vibrational, Thermal, and Physical Characterizations of Some Zinc Niobo Tellurite Glasses Doped with Rare Earth (Eu, Dy)\*

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In this communication, we report physical and thermal properties along with Raman spectroscopic investigations on Zinc Niobo Tellurite glass systems doped with  $\text{Eu}_2\text{O}_3$  and  $\text{Dy}_2\text{O}_3$  at the expense of  $\text{TeO}_2$ . The glasses have been synthesized by the melt quenching technique. Physical parameters like density, molar volume, packing density were estimated. The density of the un-doped glasses increases with increasing mol% of the modifier ( $\text{ZnO}$ ) whereas the glass transition temperature ( $T_g$ ) decreases. We have observed an increase in the density of the base glass systems which are doped with rare earth (RE) dopants. The packing density of the un-doped glasses remains almost constant with increasing modifier content suggesting that there is not much change in the local environment. Raman spectra were recorded at room temperature and assigned to  $\text{TeO}_4$  and  $\text{TeO}_3$  structural units in these glasses. The peak shift, full width at half maximum (FWHM) of the de-convoluted Raman peaks were analyzed to get information about the local environment. It is observed that these compositions of tellurite glasses are good host materials for rare earth ions as they offer voids in the network. Further, it was observed that the rare earth ion doping has not affected the local environment of the glasses;  $\text{Dy}^{3+}$  ions have a slightly higher tendency to polarize  $\text{Te}-\text{O}$  bonds than the  $\text{Eu}^{3+}$  ions.

**Keywords:** Niobium-based tellurite glasses, XRD, DSC, FTIR.

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