Influence of erbium doping on dielectric properties of zinc borotellurite glass system

ABSTRACT

Glasses of the system {[(TeO2)70 (B2O3)30]70 (ZnO)30}100-y (Er2O3)y containing different concentration of Er2O3 (ranging from 0 to 5 mol %) was prepared from melt-quenching technique. The structural changes were studied by XRD analysis and FTIR analysis. The XRD pattern shows the glasses are amorphous. The higher concentration of Er2O3, the more unit of TeO3 would transform to TeO4 and formation of B-O vibrational groups. The density and molar volume was obtained attribute to non-bridging oxygen (NBO) and are found the density and molar volume of the glass system are increasing. The densities range from 3630 kg/m3 to 3960 kg/m3. The dielectric constant Ůô and dielectric loss factor Ůôô which were characterized in the frequency range 10-2 ï 106 Hz over temperature range 50°C ï 200 °C, show a larger value at lower frequency and higher temperature (above 110°C). The results of dielectric response measurement show that interfacial polarization at low frequency, and orientation polarization at intermediate and high frequency.

Keyword: Activation energy; Dielectric properties; Non-bridging oxygen; Polarization; Rare earth