

DTA AND IR ABSORPTION SPECTRA OF (80-x)TeO₂ – 20ZnO – (x)Er₂O₃ GLASS SYSTEM

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ABSTRACT

Er³⁺-doped tellurite glasses of (80-x)TeO₂-20ZnO-(x)Er₂O₃ system (0.5mol% ≤ x ≤ 2.5mol%) has successfully been made by melt quenching technique. The thermal stability and structure of glass has been investigated by means of DTA and FTIR spectroscopy. The thermal parameters, such as the glass transition temperature (T_g) and crystallization temperature (T_c) were determined. It is found that this system provides a wide and stable glass formation in which the glass stability around 99°C–140°C was obtained and increases with the Er₂O₃ content. The spectral shift in FTIR spectra is related to the change in the coordination of the erbium ions. The changes observed were consistent with the stretching vibration mode of TeO₄ trigonal bipyramids and TeO₃ trigonal pyramids, and bending vibration mode of Te–O–Zn in the linkages. It is also found that the sharp absorption peaks shifted from 650cm⁻¹ to 672cm⁻¹ and consistent with the increases of the Er₂O₃ content. The small absorption peaks around 770cm⁻¹, 1115cm⁻¹ and 3420cm⁻¹ are found in all samples.

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