

Elastic properties of thulium doped zinc borotellurite glass

ABSTRACT

A series of Tm-doped zinc borotellurite glass have been extracted by conventional melt-quenching method. The density was measured and it had been found that the value is increased by the increment of Tm^{3+} ion. The elastic properties of the sample were determined by measuring longitudinal and shear velocities using an ultrasound technique. Then the values inserted into equations that calculate the elastic moduli of the glass samples. These include longitudinal, shear, bulk, Young's modulus and also the Poisson's ratio. The longitudinal and shear velocities show an increment as Tm^{3+} increases from 0.01 to 0.03 mol content. The trend then changes as Tm^{3+} increases from 0.03 to 0.05 mol content. In terms of elastic moduli, it produces a rapid increment with Tm^{3+} until 0.03 mol content. But after that, the increment becomes slow until 0.05 mol of Tm^{3+} . The value of Poisson's ratio decreases with the addition of Tm^{3+} concentration.

Keyword: Borotellurite; Bulk modulus; Elastic properties; Longitudinal modulus; Poisson's ratio; Young's modulus