

Elastic properties of TeO₂-B₂O₃-Ag₂O glasses.

ABSTRACT

A series of glasses [(TeO₂)_x (B₂O₃)_{1-x}]_{1-y} [Ag₂O]_y with x = 70 and y = 10, 15, 20, 25 and 30 mol% were synthesised by rapid quenching. Longitudinal and shear ultrasonic velocity were measured at room temperature and at 5 MHz frequency. Elastic properties, Poisson's ratio, microhardness, softening temperature and Debye temperature have been calculated from the measured density and ultrasonic velocity at room temperature. The experimental results indicate that the elastic constants depend upon the composition of the glasses and the role of the Ag₂O inside the glass network is discussed. Estimated parameters based on Makishima–Mackenzie theory and bond compression model were calculated in order to analyse the experimental elastic moduli. Comparison between the experimental elastic moduli data obtained in the study and the calculated theoretically by the mentioned above models has been discussed.

Keyword: Tellurite glass; Elastic moduli; Bond compression model; Makishima–Mackenzie model.