Abstract

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Structural studies and mechanical properties of some borate glasses doped with different alkali and cobalt oxides

Mixed alkali borate glasses doped with CoO, have been prepared by the melt quenching technique. Elastic properties and FT-IR spectroscopic studies have been employed to study the role of CoO and the mixed alkali effect on the structure of the investigated glass system. Elastic properties and Debye temperature have been investigated using sound wave velocity measurements at 4 MHz at room temperature. The density, molar volume and glass transition temperatures were employed to investigate the structure of these glasses. Infrared spectra of these glasses revealed that the borate network is affected by the increase in the concentration of CoO content and the mixed alkali oxides. These results are interpreted in terms of the change in the topology of these glass structures. The elastic moduli are observed to increase with the increase of CoO content due to the increased average bond connectivity.