

**PHYSICAL PROPERTIES AND STRUCTURAL STUDIES  
OF ZnO-PbO-B<sub>2</sub>O<sub>3</sub> GLASSES**

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## ABSTRACT

### PHYSICAL PROPERTIES AND STRUCTURAL STUDIES OF ZnO-PbO-B<sub>2</sub>O<sub>3</sub> GLASSES

Glass samples of compositions  $80\text{B}_2\text{O}_3 \cdot x\text{ZnO} \cdot (20-x)\text{PbO}$  with  $x = 2, 4, 6, 8$  and  $10$  mol% have been prepared by using melt-quenched techniques. Their physical and structural study had been carried out by mean of their density, molar volume, X-ray diffraction as well as FTIR spectroscopy. From the results, the densities are found to decrease from  $4.20 \text{ g/cm}^3$  to  $3.78 \text{ g/cm}^3$  with an increase in the ZnO content. Meanwhile, the molar volume is found increases from  $21.73 \text{ cm}^3/\text{mol}$  to  $22.16 \text{ cm}^3/\text{mol}$  as the ZnO content increased from 2 mol% to 4 mol%. However an addition of ZnO from 4 mol% to 10 mol%, the molar volume start to decreases from  $22.16 \text{ cm}^3/\text{mol}$  to  $21.14 \text{ cm}^3/\text{mol}$ . Amorphous nature of the glass was confirmed by XRD patterns as they show no sharp peaks as observed. The structural changes with respect to mol% of ZnO content have been studied by FTIR spectroscopy. From the results, there are seven peaks that corresponding to stretching and bending vibrational spectra of borate-based glass functional group.