

**EFFECT OF PbO ADDITION ON PHYSICAL, STRUCTURAL AND  
OPTICAL PROPERTIES OF PbO-Na<sub>2</sub>O- B<sub>2</sub>O<sub>3</sub>**

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## ABSTRACT

### EFFECT OF PbO ADDITION ON PHYSICAL, STRUCTURAL AND OPTICAL PROPERTIES OF PbO-Na<sub>2</sub>O-B<sub>2</sub>O<sub>3</sub>

Five different glass samples have been prepared in this project by melt-quenching technique with composition  $x\text{PbO} - (20-x)\text{Na}_2\text{O} - 80\text{B}_2\text{O}_3$ , where  $x= 2, 4, 6, 8$  and  $10$  (mol %). By varying the proportion of PbO and Na<sub>2</sub>O, the effect of PbO to the lead borate glass can be investigated in terms of its density, molar volume, and hardness, structural by X-Ray Diffraction (XRD) technique and Fourier Transform Infrared (FTIR) spectroscopy; and Ultraviolet visible (UV-vis) also been employed to study the optical properties of these glasses. Based on the result of density and molar volume, it shows that there are oppositely relations between these two properties. With the addition of PbO, there are mixed alkali effects that happen in the glass sample that shown by the increasing trend of the density and vice versa for the molar volume. Partial replacement of B<sub>2</sub>O<sub>3</sub> by PbO causes the hardness of the sample to be in increasing trend. The amorphous state of this glass was proved from the XRD spectra. On the other hand, FTIR spectra showed the presence of BO<sub>3</sub>, BO<sub>4</sub>, B-O linkage and OH functional group on the glass network. Additional of PbO also causes distinct changes in the specific region of wavelength of UV-vis absorption spectra which show the increase of optical absorption.