STUDY ON PHYSICAL AND STRUCTURAL PROPERTIES OF YTTRIUM DOPED BARIUM BORATE GLASS

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ABSTRACT

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Six different glass samples have been prepared in this project by melt-quenching technique with composition (75-x) H_3BO_3-25$BaCO_3$-xY_2O_3 (where x=0.0, 0.2, 0.4, 0.6, 0.8 and 1.0 mol%). By varying the proportion of H_3BO_3 and $BaCO_3$, the effect of Y_2O_3 to the barium borate glass can be investigated in term of physical properties such as density, molar volume and oxygen packing density. The structural properties were measured by X-Ray Diffraction (XRD) technique and Fourier Transform Infrared (FTIR) spectroscopy. Based on the result, it shows that the density and oxygen packing density increases while the molar volume decreases as the percent of Y_2O_3 increases. The amorphous nature of this glass was proved from the XRD spectra. On the FTIR spectra result showed the present of B-O-B bending vibrations, Y-O molecule which originates from Y_2O_3, bending vibrations of various borate arrangement B-O-B, asymmetric vibrations of BO_4, B-O stretching vibrations of tetrahedral [BO_4], modes of boron-oxygen triangular unit and B-O stretching vibrations of [BO_3].

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