

Temperature stability and physical properties of Bi₂O₃-B₂O₃-ZnO-RHA glass system

ABSTRACT

Rice husk ash (RHA) is a product from the burning of the rice husk and it become a significant material for glass preparation due to high amount of amorphous silica that can be produced. From the recent studies, the highest amount of silica is observed at 550°C at 6 hours which is 99.36% by XRF detection. Nevertheless, the amount of silica decreasing proportionally if the temperature profile is higher than 550°C and the time taken is more than 6 hours. Quaternary glasses are prepared using melt-quenching method using the highest amount of silica from RHA combined with Bismuth Oxide (Bi₂O₃), Boron Oxide (B₂O₃), and Zinc Oxide (ZnO). The ratio of quaternary glass that used are 30%SiO₂: 20%B₂O₃: xZnO : (50-x)%Bi₂O₃ (% mole) ; where x= 10,20,30,40. The physical properties and glass transition temperature (T_g) profiles are determined using standard measurement instrument. Moreover, the density measured will enhance the verification of Oxygen Packing Density for prepared quaternary glasses.

Keyword: Glass transition temperature; Oxygen packing density; Quaternary glass; Rice hush ash