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 (Tg) 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