CHAPTER 5 CONCLUSION

5.1 Chemical Composition of Rice Husk Ash by EDXRF

The chemical composition of RHA by weight is given in Table 4.1. It was seen that the major composition of RHA is SiO_2 and low transition oxide contamination (MnO and Fe_2O_3). The P_2O_5 is a glass former, while CaO is intermediate. For K_2O is flux in a glass melting. However P_2O_5, CaO and K_2O are not produce color in glass. It shows that the RHA sample is good enough of silica source for glass production.

5.2 Density and Molar Volume

The density of the glasses increase with increasing of BaO content, due to higher molecular weight of BaO than B_2O_3. The molar volumes of these glasses were increased with increasing of BaO content, indicate that the loose packing were increases due to BaO act as modifier. In this case, the non-bridging oxygens (NBOs) are increased in number in the borate network so molar volumes were increased.

5.3 Refractive Index Measurement

The refractive index of the glasses increase with increasing of BaO content, due to the molar refractivity and the molar electronic polarizability of oxide ions.

5.4 UV-Visible Transmission Spectra

In order to investigate the optical properties of these glasses at various concentrations, the transmittance was measured as a function of wavelength in the range of 300-800 nm as shown in Fig. 4.4. All the glasses showed that the transmittance higher than 60% in the visible region and the cutoff wavelength were not shifts.

5.5 Gamma-Ray Shielding Property

The mass attenuation coefficients of barium-borate-RHA glasses having different BaO concentrations were measured in the energy 662 keV γ-rays using a NaI(Tl) detector. The results show that mass attenuation coefficients increase with the increase in the weight percent of barium. This may be attributed to the higher atomic number of barium as compared to borate which subsequently increases the density of the glass system. The experimental results showed good agreement with the theoretical values, which are calculated from WinXCom program.

Half value layers of glass sample were decreases with increase in concentration of BaO, which is due to increase in mass attenuation coefficient and density on replacing borate by barium. In the light of these results, it has been observed that $xBaO:(80-x)B_2O_3$:20RHA glass system has been found to be better than commercial window glass, ordinary concrete, barite concrete at 70 wt% of BaO concentration, The results of half value layer indicating the potential of utilizing the prepared glasses as radiation shields and with advantage of being transparent to visible light.