ABSTRACT

The borosilicate glass is the most common industrial solution host barrier used for the immobilization of low-level wastes for its excellent chemical durability and for its resistance to heat. The borosilicate glass samples were prepared in a muffle furnace at temperature 1300°C, glass samples were then annealed in a furnace at 400°C.

In this study, the durability of borosilicate glass was tested in many leaching solutions such as acidic HCl, alkali solution such as NaOH and ground water. The results show that borosilicate glass of the composition prepared from 37.5% slag – 37.5% cement dust – 25% B₂O₃ is the most durable glass in acidic solution and the borosilicate glass of the composition 37.5% Cullet – 37.5% cement dust – 25% B₂O₃ is the most corroded glass in acidic solution. The durability is also studied after subjecting the glass samples to different irradiation doses of γ-ray or by using different heat treatment temperature ranges. Also the corrosion of glasses after being heat treated at the temperature ranges at (500-750°C) were evaluated. The durability of the glasses after heat treatment shows that all glass samples become more durable.