

## Abstract

In this research, the glass samples from domestic raw materials in composition  $x\text{BaSO}_4 : 15\text{Na}_2\text{O} : 15\text{SiO}_2 : (70-x)\text{B}_2\text{O}_3$ , where  $x = 0, 5, 10, 15$  and  $20$  mol%, respectively have been studied for development as radiation shielding material applications. The mass attenuation coefficient, effective atomic number, effective electron and half value layer have been calculated by theoretical approach using WinXCom program in the energy range of  $1$  keV to  $100$  GeV. The results are shown graphically for total and partial photon interactions. It was observed that the variations of this radiation parameter are due to the variations in domination of different interaction processes in different energy regions. These variations of radiation parameter comprise three processes are photoelectric absorption, Compton scattering and pair production at low, medium and high photon energy, respectively. The half value layer was compared with some standard shielding materials. It was found that half value layer of glass sample at  $20$  mol% has lower value than hematite-serpentine concrete, ordinary concrete and commercial window. The glass sample in this study could be a promising radiation shielding material applications.

Keywords: WinXCom/ Glass/ Barium sulfate/ Partial photon interactions