



Contribution ID: 399

Type: Oral Presentation

## Influence of SrO Concentration on Radiation Shielding Efficiency of Boro-Tellurate Glasses at High Photon Energies

*Tuesday 8 July 2025 15:00 (20 minutes)*

In this study, the effect of radiation ionization on various glass compositions— $40\text{SrO}-30\text{B}_2\text{O}_3-10\text{TeO}_2-20\text{Bi}_2\text{O}_3$ ,  $35\text{SrO}-30\text{B}_2\text{O}_3-10\text{TeO}_2-25\text{Bi}_2\text{O}_3$ ,  $30\text{SrO}-30\text{B}_2\text{O}_3-10\text{TeO}_2-30\text{Bi}_2\text{O}_3$ ,  $25\text{SrO}-30\text{B}_2\text{O}_3-10\text{TeO}_2-35\text{Bi}_2\text{O}_3$ , and  $20\text{SrO}-30\text{B}_2\text{O}_3-10\text{TeO}_2-40\text{Bi}_2\text{O}_3$ —was investigated using Phy-X/PSD and XCOM simulation software, and validated with GEANT4 simulations. In the high-energy range of 1 MeV to 15 MeV, the mass attenuation coefficient (MAC), linear attenuation coefficient (LAC), and effective atomic number ( $Z_{\text{eff}}$ ) were calculated for each glass sample. The results indicate that increasing the  $\text{Bi}_2\text{O}_3$  concentration enhances the radiation shielding capability of the glasses. Additionally, parameters such as half-value layer (HVL), tenth-value layer (TVL), and mean free path (MFP) were analyzed. The findings show that glasses with higher  $\text{Bi}_2\text{O}_3$  content attenuate more photons at smaller thicknesses. Notably, the  $20\text{SrO}-30\text{B}_2\text{O}_3-10\text{TeO}_2-40\text{Bi}_2\text{O}_3$  composition demonstrated superior radiation shielding performance compared to other materials previously studied.

### Apply for student award at which level:

MSc

### Consent on use of personal information: Abstract Submission

Yes, I ACCEPT

**Primary author:** MTHALANE, Sifiso

**Co-authors:** Mr BHENGU, Busani (university of Zululand); Dr MDLETSHI, Linda (University of Zululand); NTSHANGASE, Sifiso Senzo (University of Zululand)

**Presenter:** MTHALANE, Sifiso

**Session Classification:** Physics of Condensed Matter and Materials 2

**Track Classification:** Track A - Physics of Condensed Matter and Materials