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## Particles and photon attenuating behavior of lead free $\text{Eu}^{3+}$ doped barium phosphate glass system

*Sunday, 19 May 2024 16:00 (2 hours)*

The study investigates the radiation attenuation performance of five ternary glass systems with varying chemical compositions:  $50\text{P}_2\text{O}_5-(50-x)\text{BaO}-x\text{Eu}_2\text{O}_3$ , where  $x = 0, 1, 2, 4,$  and  $6$  mol%. It utilizes theoretical and Monte Carlo methods to determine shielding parameters such as attenuation coefficients, mean free path, value layers, electron densities, conductivity and neutron removal cross-sections across an energy range from 1 keV to 100 GeV. In addition to these analyses, the study explores kinetic energy stopping potentials and projected ranges of ions ( $\text{H}^+$ ,  $\text{He}^+$ , and  $\text{C}^+$ ) through the Stopping and Range of Ions in Matter database. Furthermore, research evaluates the dose rate attenuation behaviour and trajectories of photons bombarded from  $^{137}\text{Cs}$  and  $^{60}\text{Co}$  sources using Particle and Heavy Ion Transport code System. Obtained results show that sample:  $50\text{P}_2\text{O}_5-44\text{BaO}-6\text{Eu}_2\text{O}_3$  with higher  $\text{Eu}^{3+}$ -doped glass has a potential for radiation shielding application among selected samples and is comparable with previously recommended, tested polymer and glass samples.

### Footnotes

### Funding Agency

### Paper preparation format

LaTeX

### Region represented

Asia

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