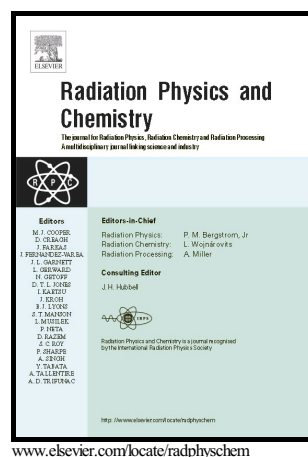


M.I. Sayyed, G. Lakshminarayana, I.V. Kityk,
M.A. Mahdi



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Evaluation of shielding parameters for heavy metal fluoride based tellurite-rich glasses for gamma ray shielding applications

M.I. Sayyed^{a,*}, G. Lakshminarayana^{b,*}, I.V. Kityk^c, M.A. Mahdi^b

^a*Department of Physics, Faculty of Science, University of Tabuk, Tabuk, Saudi Arabia*

^b*Wireless and Photonic Networks Research Centre, Faculty of Engineering, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*

^c*Faculty of Electrical Engineering, Czestochowa University of Technology, Armii Krajowej 17, PL-42-201, Czestochowa, Poland*

Abstract

In this work, we have evaluated the γ -ray shielding parameters such as mass attenuation coefficient (μ/ρ), effective atomic number (Z_{eff}), half value layer (HVL), mean free path (MFP) and exposure buildup factors (EBF) for heavy metal fluoride (PbF_2) based tellurite-rich glasses. In addition, neutron total macroscopic cross sections (Σ_R) for these glasses were also calculated. The maximum value for μ/ρ , Z_{eff} and Σ_R was found for heavy metal (Bi_2O_3) oxide introduced glass. The results of the selected glasses have been compared, in terms of MFP with different glass systems. The shielding effectiveness of the selected glasses is found comparable or better than of common ones, which indicates that these glasses with suitable oxides could be developed for gamma ray shielding applications.

Keywords: Optical materials; Tellurite glasses; Mass attenuation coefficient; Effective atomic number; Half-value layer (HVL); Exposure buildup factors (EBF)

*Corresponding authors– E-mail: mabualssayed@ut.edu.sa (M.I. Sayyed);

glnphysics@gmail.com (G. Lakshminarayana)

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