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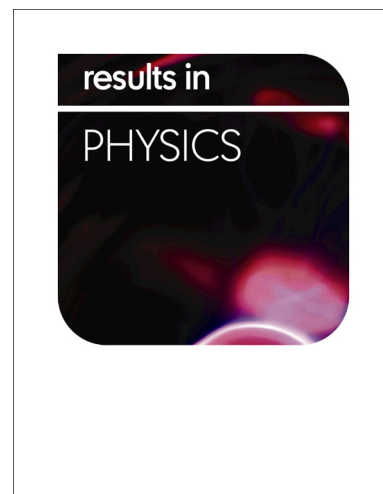
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Comprehensive study on estimation of gamma-ray exposure buildup factors for smart polymers as a potent application in nuclear industries

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Abstract

In the present study, the exposure buildup factors (EBF) have been investigated using geometric progression (G-P) fitting method for different types of smart polymers (DMSO, PDMS, PES, PMA, PVDC, and PVDF) in the energy range of 0.015 -15 MeV. From the calculations, the values of the EBF were depended on the incident photon energy, penetration depth as well as chemical composition of the polymers. In the intermediate energy region, the EBF values were reached at maximum point while in low and high energy regions, the EBF values were decreased at minimum point. The obtained results of the selected polymers have been compared in terms of EBF with Al₂O₃ and other common polymers such as PAN, Teflon and SR. The shielding effectiveness of the selected polymers is found to be comparable to the common polymers. The results of this work should be useful in radiation shielding applications such as in industry, medical and nuclear engineering.

Keywords: smart polymers; equivalent atomic numbers; exposure buildup factors; G-P fitting; shielding properties.

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