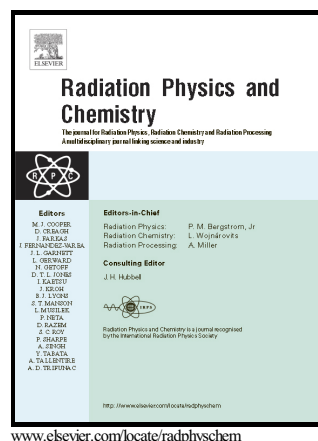


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Preparation and Characterization of a Novel Ionizing Electromagnetic Radiation Shielding
Material; Hematite Filled Polyester Based Composites

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Abstract

Isophthalic polyester (PES) based and natural mineral (hematite) filled composites were prepared and characterized for ionizing electromagnetic radiation shielding applications. Density evaluation and microscopic studies of the composites were carried out. Shielding performances of the composites were investigated for three different IEMR energy regions as low, intermediate and high. The mass attenuation coefficient of the prepared composites reached 98% of the elemental lead. In addition, the studied composites were superior to lead by virtue of their non-toxic nature.

Key words: Ionizing electromagnetic radiation, radiation shielding, composite shielding, polymer composite, hematite

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1.Introduction

Gamma and X rays are ionizing electromagnetic radiation (IEMR) types and they have high enough energy to ionize atoms of the interacting matter. Penetrating ability of IEMR is high in material since it is massless and uncharged. Thus, appropriate shielding materials must be used to protect humans and the environment from the harmful effects of IEMR. Shielding materials reduce the exposure dose by interacting with the radiation itself and reducing its intensity. At the present time, high density materials such as lead bricks, high density concrete and such other metal based shielding materials as tungsten, copper, bismuth and steel are used as shielding materials. Lead is the most widely used shielding material because of its high

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