Reference
[1] N.D. Priest, The distribution and behaviour of heavy metals in the skeleton and body: Studies with bone-seeking radionuclides. In Trace Metals and Fluoride in Bones and Teeth, pp83-139. CRC. Press, London, 1990.

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DETERMINAÇÃO DE FATORES DE RETROESPALHAMENTO UTILIZANDO RAIO-X DIAGNÓSTICO PARA PADRÕES IEC E ISO

ÊUDICE CORREIA VILELA, MARIA DO SOCORRO NOGUEIRA, ALBERTO TEODÓSIO
Centro Regional de Ciências Nucleares

Quando se consideram as novas grandezas recomendadas pelos órgãos internacionais para atribuição de doses, verifica-se a necessidade de determinação dos fatores de retroespalhamento decorrentes da utilização de simuladores na determinação dessas grandezas. O presente trabalho apresenta a medida experimental destes fatores obtidos para qualidades de raio-X diagnóstico seguindo os padrões IEC (International Electrotechnical Commission) para feixes primários e atenuados por alumínio e ISO (International Standartization Organization) para espectros estreitos. As medidas de dose em profundidade foram feita utilizando-se dosímetros termoluminescentes do tipo LiF -100H e foram irradiados em um simulador de PMMA (polimetilmetacrilato) de dimensões 30 x 30 x 15 cm3 . Os valores obtidos pelos dois padrões foram comparados entre si e se apresentaram em perfeito acordo com dados teóricos obtidos na literatura existente sobre este assunto e gerados a partir de cálculos de Monte Carlo.

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Radiation Damage of CsI (Tl): Blocking of the Energy Transfer Processes From Vk Centers and Electrons to the Activator of Tl

M. M. HAMADA, F. E. COSTA
Instituto de Pesquisas Energéticas e Nucleares - IPEN-CNEN/SP
S. SHIMIZU, S. KUBOTA
Rikkyo University , Nishi Ikebukuro 2, Tokyo, 171 Japan

The interest in radiation resistance of scintillators for application in scintillator-based particle detectors has been renewed, due to the new generation of particle accelerators, SSC. LHC and RHIC. It is expected that some parts of new experimental setups will have to work in a severe radiation environment. Among the devices most strongly affected by high radiation environment are eletromagnetic (EM) calorimeter since they absorb the entire energy of the incoming particles. It is now realistic to expect that some components of EM-calorimeters will have to endure annual dose at least 1 Mrad or more. The CsI(Tl) detectors are extremely well suited for this purpose.

In this work CsI(Tl) crystals were irradiated with gamma rays at different doses, ranging from 0.01 to 500 kGy, using a ^{60}Co irradiator at 5.8 kGy/h. After the irradiation, the scintillation pulse height and decay curves were measured, systematically, under electrons and alpha particles excitations. As a complementary experiment. transmittance spectra were measured before and after each irradiation. Decreases in the transmittance and pulse height values were enhanced as the radiation dose increased. A decrease of $10-30\%$ in transmittance was observed for the crystals irradiated over 1 kGy compared with those of non-irradiated crystals. The decrease in scintillation pulse height is attributed to the blocking of the energy transfer processes of Vk centers and electrons by the traps and lattice disorders, which were produced in irradiated crystals. The effect of this blocking of the energy transfer processes is clearly observed as a difference in decay curves for the crystals before and after irradiation. It was also observed that the damage for irradiation is not permanent and it obeys a bi-exponential function.