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A-TYPE CARBONATED APATITE/EPR DOSIMETRY WITH HIGH ENERGY PHOTONS

Liana M. de Oliveira[a], Laura N. Rodrigues[b], Lucia H. Bardella[c]

[a]Instituto de Radioproteção e Dosimetria-IRD/CNEN,
Laboratório Nacional de Metrologia das Radiações Ionizantes-LNMRI
Av. Salvador Allende s/n, Recreio, Rio de Janeiro, Brasil.
CEP 22780-160, FAX 55-21-34118163
E-mail: liana@ird.gov
[b]Instituto de Pesquisas Energéticas e Nucleares-IPEN/CNEN,
Departamento de Metrologia
Av. Lineu Prestes 2.242, Cidade Universitária
CEP 05508-900, São Paulo, Brasil.
[c]Instituto Nacional do Câncer-INCA, Física Médica
Praça Cruz vermelha, 23 - Centro
CEP 20230-130, Rio de Janeiro, Brasil.

Electron paramagnetic resonance (EPR) spectroscopy has been widely applied to the ionizing radiation dosimetry in accidents, food irradiation and sterilization of medical material, archaeological dating and radiation therapy. Alanine and hydroxyapatite from enamel and bone have played an important role in these fields. Properties of the radiation-induced radicals in hydroxyapatite of calcified tissues have allowed successful application for dose evaluation in accidents and epidemiological dose reconstruction, archaeological dating and food irradiation with bones. The performance of biological apatites for EPR dosimetry and the need of alternative materials raised interest for studying dosimetric properties of synthetic apatites. This investigation led to a controlled synthesis process of an A-type carbonated apatite with high potential for EPR dosimetry in the therapy dose range. In previous report Oliveira at al. [1] presented results about the EPR signal dependence as a function of photon energy from X-rays beams to ^{60}Co gamma rays with the A-type apatite and tooth enamel. In this work the energy dependence of the A-type apatite EPR response is studied with 6, 15 and 18 MV photons produced by clinical accelerators and compared with EPR signal intensity induced by ^{60}Co source reference quality. Samples are irradiated in terms of absorbed-dose-to-water of 2 Gy with different dose rates used in the therapy range.

[1] de Oliveira, L. M., de Jesus, E. F., Rossi, A. R., Lopes, R. T., Rodrigues, L. N. and Barbosa, R. A., 1999. Energy Dependence of EPR Signal in Synthetic and Biological Hydroxyapatite Irradiated with Photons. Radiat. Prot. Dos. 84 (1-4), 511-514.

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