COMPARATIVE STUDY OF THE TL RESPONSE OF LiF:Mg,Ti AND CaSO4:Dy IN THE CLINICAL ELECTRON BEAMS DOSIMETRY APPLIED TO TOTAL SKIN IRRADIATION – TSI TREATMENTS

[1-]Shirlane Barbosa de Almeida, Letícia Lucente Campos (Radiation Metrology Center - Instituto de Pesquisas Energéticas e Nucleares – IPEN/CNEN).
[2-]Roberto Kenji Sakuraba, Ana Carolina Pires de Rezende (Radiotherapy department of the Hospital Israelita Albert Einstein).

Presenter: Letícia Lucente Campos (Radiation Metrology Center - Instituto de Pesquisas Energéticas e Nucleares – IPEN/CNEN)., lcrodri@ipen.br

Dose verification in the patient has become an important part of quality radiotherapy programs in the departments. The thermoluminescent dosimeters have become essential for the determination of the dose applied to the patient; these detectors present a great accuracy and precision in the measurements, thus enabling the detection of various types of errors in the dosing process. High energy electron beams (> 5 MeV) have wide use in the medical field mainly in the treatment of various types of cancer, or in the irradiation of all skin - TSI. TSI dosimetry is difficult because of the complexity of the treatment in assessing dose uniformity and measuring the absorbed dose at shallow depths throughout the cutaneous surface area, resulting in wide variation in the dose distribution. TLDs have proven to be very useful for the distribution and verification of the dose prescribed for the patient, since the dose may differ from place to place due to the geometry of the patient's body, overlapping of structures and asymmetries of the radiation field. In this work the results obtained from the comparative study and the performance of the LiF:Mg,Ti and CaSO4:Dy detectors used in the clinical electron beams dosimetry applied to total irradiation of the skin treatment are presented. Other factors were analyzed in this study such as the homogeneity of the field and the dose at the calibration point (ZRef), where the detectors were located in the regions anterior, posterior, right anterior oblique, right posterior oblique and right side.

Characterization of Lithium Diborate, Sodium Diborate and Commercial Glass Exposed to Gamma Radiation via Linearity Analyses

[1]Lucas N. de Oliveira, Instituto Federal de Educação, Ciência e Tecnologia de Goiás-IFG, 74055-110, Goiânia-GO, Brazil
[2]Eriberto O. do Nascimento, Instituto Federal de Educação, Ciência e Tecnologia de Goiás-IFG, 74055-110, Goiânia-GO, Brazil
[3]Patrícia L. Antonio, Instituto de Pesquisas Energéticas e Nucleares, Comissão Nacional de Energia Nuclear-IPEN/CNEN-SP, 05508-000, São Paulo-SP, Brazil
[4]Marcello R.B. Andreeta, Universidade Federal de São Carlos-UFSCar, 13565-905, São Carlos-SP, Brazil

[5]Linda V.E. Caldas, Instituto de Pesquisas Energéticas e Nucleares, Comissão Nacional de Energia Nuclear-IPEN/CNEN-SP, 05508-000, São Paulo-SP, Brazil

Presenter: Patrícia L. Antonio,
Instituto de Pesquisas Energéticas e Nucleares, Comissão Nacional de Energia Nuclear, IPEN/CNEN-SP, patrilan@ipen.br

The linearity characteristic in radiation dosimetry presents a growing interest in medical physics. In this work, the lithium diborate, sodium diborate and commercial glass were irradiated with doses from 10 Gy to 10 kGy using a 60Co Gamma-Cell system 220, and then they were evaluated with the UV-Vis technique. The linearity analyses were applied through four methodologies, which the objetive to find linear regions in their response. The results show that all four analyses indicate linear regions for the studied radiation detectors. The samples with higher linearity range, in descending order, were lithium diborate, sodium diborate and commercial glass. In conclusion, the materials may be promising in dosimetry for intermediate and high doses of radiation.

Evaluation of the thermally and optically stimulated response of as Italian Silicate irradiated in 60Co beams

Patrícia L. Antonio [1],
Raquel A.P. Oliveira [2],
Helen J. Khoury [3],
Linda V.E. Caldas [1]
[1]Instituto de Pesquisas Energéticas e Nucleares, Comissão Nacional de Energia Nuclear, IPEN/CNEN-SP
[2]Instituto de Pesquisa em Ciência dos Materiais, IPCM, Universidade Federal do Vale do São Francisco, UNIVASF
[3]Departamento de Energia Nuclear, DEN, Universidade Federal de Pernambuco, UFPE

Presenter: Patrícia L. Antonio,
Instituto de Pesquisas Energéticas e Nucleares, Comissão Nacional de Energia Nuclear, IPEN/CNEN-SP, patrilan@ipen.br

In this work, pellets were manufactured in a proportion of 2:1 of powdered samples of Obsidian black:Teflon (dimensions of 6.0 mm in diameter and 0.8 mm in thickness). The pellets were irradiated using a Gamma-Cell 220 System, model 200, Atomic Energy of Canada LTD (60Co). The TL and OSL responses were analyzed using the reader system composed by the TL/OSL meter Risø, model TL/OSL-DA-20, and the TSEE response was obtained using a homemade reader system developed at the Calibration Laboratory, at IPEN. After the TL, OSL and TSEE measurements, the pellets were thermally treated at 400 °C during 1 h, for reutilization. The physical and chemical characterization of powdered Obsidian was also investigated using the X-ray diffraction, XRD (using a diffractometer Equinox 1000, Inel), scanning electron microscope, SEM,