[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,

and energy dispersive X-ray spectroscopy, EDX (the last two using a scanning electron microscope with an energy dispersive X-ray microanalyser Vega 3 SEM, Tescon) techniques. The results proved, basically, that Obsidian is a natural glass and composed mainly of silica (82.4%). The TL glow curve revealed a dosimetric peak at the temperature of 220 °C, and the TSEE emission curve showed a peak at about 300 °C. The results obtained in the reproducibility of response test were: 2.9% (TL), 3.0% (TSEE) and 3.1% (OSL). The lower detection limits were: 48.1 Gy (TL), 18.1 Gy (TSEE) and 79.3 Gy (OSL). The dose-response curves showed, in the case of TL, a supralinearity behavior between only 500 Gy and 2 kGy with a following saturation of the response. For the TSEE response, a sublinearity was seen with a following saturation of the response. For the OSL technique, linearity could be observed in the interval from 500 Gy to 2 kGy and then a tendency to saturation.

Estimative of conversion coefficients for absorbed and effective doses in pediatric CT examinations in two different PET/CT scanners

1. Ana P. Perini, Instituto de Física, Universidade Federal de Uberlândia (INFIS/UFU), Uberlândia, MG, Brazil;
2. William S. Santos, Instituto de Física, Universidade Federal (INFIS/UFU), Uberlândia, MG, Brazil;
3. Lucio P. Neves, Instituto de Física, Universidade Federal de Uberlândia (INFIS/UFU), Uberlândia, MG, Brazil;
4. Walmir Belinato, Departamento de Ensino, Instituto Federal de Educação, Ciência e Tecnologia da Bahia (IFBA), Vitória da Conquista, BA, Brazil;
5. Linda V. E. Caldas, Instituto de Pesquisas Energéticas e Nucleares, Comissão Nacional de Energia Nuclear (IPEN/CNEN), São Paulo, SP, Brazil

Presenter: Linda V. E. Caldas
Instituto de Pesquisas Energéticas e Nucleares, Comissão Nacional de Energia Nuclear (IPEN/CNEN) São Paulo, SP, Brazil, lcaldas@ipen.br

The use of computed tomography (CT) in pediatric patients has grown substantially in recent years. As a result, there is an increase to maintain the radiation doses as low as possible, in order to avoid long-term effects, as cancer. In this work, the radiation doses on radiosensitive organs of pediatric patients undergoing head, chest and abdomen CT examinations, utilizing Monte Carlo simulations, were evaluated. In this sense, a new set of pediatric virtual anthropomorphic phantoms with Monte Carlo simulation was employed to determine the conversion coefficients for absorbed and effective doses. Two CT equipment were simulated, taking into account the main characteristics of those commercially available. The F6 tally (MeV/g) was employed to compute the absorbed organ doses. The obtained results were converted to conversion coefficients for all radiosensitive organs, considering all applied beams. The highest conversion coefficients for effective dose were for the newborn virtual anthropomorphic phantom. Therefore, this work provides a useful tool regarding the risks involving ionizing