Contribution ID: **42** Type: **Poster**

Optically stimulated luminescence and thermoluminescence dosimetry for nuclear forensics

The aim of retrospective dosimetry is the determination of absorbed dose after a certain „radiological event" (e.g. accidents or terrorist attacks), when no dosimeters were used. These measurements are usually performed by applying thermoluminescence (TL) or optically stimulated luminescence (OSL) dosimetry methods. Retrospective dosimetry is an auxiliary science of Nuclear Forensics, capable from rapid accident dose reconstruction after a possible terrorist event, to tracking of gamma-emitting radiological materials. For decades, retrospective dosimetry has been used for dose estimation of bricks and other radiation-sensitive building materials and household objects. In recent years, TL and OSL measurements of components from electronic devices (mobile phones, pagers, portable computers, music and video playback devices, cameras, digital watches, cars) have been tested. Their surface-mounted components such as resistors, surface-mounted capacitors and diodes, inductors, integrated circuits, smart chip cards including subscriber identification module (SIM) cards, glasses and displays produce material-specific TL and OSL responses, from which the dose absorbed by the given component can be estimated.
OSL dosimetry research was launched at the Nuclear Security Department from 2021 and based on the Belgian Nuclear Research Centre's (SCK•CEN) sample preparation, OSL data evaluation and OSL protocol.
The idea of this paper was to test possibilities of Monte Carlo simulations for the application in the retrospective dosimetry. The obtained experimental data were used to test the simulation code written in Geant4.
If the obtained simulation results are in good agreement with experimental data, than the similar code with some adjustments may be used in future investigations to test the possibilities of using other materials as a retrospective dosimeters. In that case, simulation results will be a part of initial research as a confirmation that experimental work is sustainable.

keywords: retrospective dosimetry, thermoluminescence, optically stimulated luminescence, nuclear forensics

Authors: KOVÁCS, András; Dr KELEMEN, András (Nuclear Security Department, Centre for Energy Research); Ms SÓS, Vivien (Nuclear Security Department, Centre for Energy Research); Dr VÖLGYESI, Péter (Nuclear Security Department, Centre for Energy Research); Mr TRAVAR, Miloš (University of Novi Sad, Faculty of Sciences); Mr VRANIČAR, Andrej (University of Novi Sad, Faculty of Sciences); Prof. TODOROVIĆ, Nataša (University of Novi Sad, Faculty of Sciences); NIKOLOV, Jovana (University of Novi Sad, Faculty of Sciences)

Presenters: KOVÁCS, András; Ms SÓS, Vivien (Nuclear Security Department, Centre for Energy Research); NIKOLOV, Jovana (University of Novi Sad, Faculty of Sciences)

Session Classification: Poster Session 3

Track Classification: 1. Nuclear Forensics Capability Building: Initiation and Sustainability: 1.2 New Technologies, R&D and Signature Research in Nuclear Forensics