Project title: "Thin films with embedded nanoparticles for dosimetry of ionizing radiation"

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Project Number: 1.1.1.2/VIAA/1/16/167

Implementation period: May 1, 2018 – April 30, 2021 (36 months)

Funding: 133,805.88 EUR including ERDF funding 113,734.99 EUR (85 %), state budget funding 13,380.58 EUR (10 %), and Riga Technical University funding 6,690.31 EUR (5 %).

Project summary:
Malignant tumors are the second leading cause of premature death in EU Member States. One of the main methods of cancer treatment is radiation therapy in which the malignant tumor is irradiated with ionizing radiation. Radiation can break chemical bonds of a cancer cell DNA, resulting in death of tumor cells. In order to increase the efficiency of radiotherapy, it is important to investigate the effect of radiation on DNA molecule that has a diameter of 2 nm. Consequently, it is important to control both the area where the radiation is delivered and the value of radiation dose absorbed in a biological nanoobject. Currently, the existing radiation dosimeters and methods do not provide measurements in nano-sized objects.

The aim of the project is to develop a method of dosimetry that allows to measure dose of ionizing radiation absorbed in a nanolayer with a thickness of up to 10 nm. Radiation-sensitive nanoparticles dispersed in a thin film will be used as active elements of the dosimeter.

Planned main results: 1) publications indexed in SCOPUS; 2) radiation dosimetry method; 3) patent application for dosimetry method.

Keywords: nanoparticles, radiation dosimetry, medical physics, photoelectron emission, ionizing radiation, radiation therapy