

## Development of a new method for obtaining a radiopharmaceutical based on Ra-223 for medical purposes using aluminum oxide (III) as a substance with high sorption properties

*Friday 1 November 2024 15:20 (15 minutes)*

One of the low-abundance isotopes for radionuclide therapy of osseous metastasis in castration-resistant prostate cancer is the isotope Ra-223. The usage of a radionuclide based on Ra-223 is due to a high concentration of radiation on osseous tissue foci.

The purpose of the research is to develop a new and promising method for producing a radiopharmaceutical based on Ra-223 using aluminum oxide (III) as a substance with high sorption properties.

The set of experiments under identical conditions was conducted to investigate efficiency of the target isotope accumulation during irradiation in the field of a neutron generator. Aluminium oxide (III) was used as a substance with high sorption capacity. Expected sorption capacity was provided by using plasma-chemical synthesis. The required minimum neutron flux density for experiments was obtained by four sources of ionizing radiation. A coaxial germanium gamma-ray detector was applied as a non-destructive testing method.

Radium-226 with gross activity about 0,83 Bq and thorium-227 with gross activity about 0,21 Bq, which is a parent nucleus of the decay of radium-223, were identified in low concentration during the gamma-spectrometric analysis. This confirms the necessity to conduct similar experiments with a higher neutron flux density at the operating nuclear reactor located at Tomsk Polytechnic University. Giving shape by pressing or enclosing the enriched powder in a heat-conducting sealed sleeve will allow us to experimentally establish the optimal operating mode of the neutron channel for the synthesis of radium-223.

**Primary author:** KONAREV, Sergei (Student)

**Presenter:** KONAREV, Sergei (Student)

**Session Classification:** Experimental Nuclear Physics

**Track Classification:** Experimental Nuclear Physics