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Investigation of the possibility of production and purification of the therapeutic radionuclide 195mPt by bombarding the 193Ir target with neutrons

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The advantage of using the Auger electron emitter 195mPt (T1/2 4.02 days) in medical radiotherapeutic applications are two-food. First there is high yield of low energy beta/gamma radiation, where each decay leads to more than 30 secondary electrons. Second, there is no radioactive contamination after the decay. Effective ways for optimization of the Pt isomer yield at low impurity content must be investigated.
Here we report investigation of the possibility of production of isomer 195mPt by double neutron capture by the 193Ir target nucleus with consequent population of 195mPt through β– decay. This approach allows isolation of carrier-free Pt isotopes from the irradiated target using radiochemical methods.
We developed a rapid and efficient method for dissolution of Ir metal based on anodic dissolution in aqueous solutions. In addition we developed a chemical separation procedure for the selective separation of 195mPt from solution (dissolved Ir target) using extraction chromatography. We performed a test experiment on Ir activation with neutrons at microtron MT-25 (FLNR, Dubna), and provided theoretical estimates for the 195mPt yield [1]. A future full-scale model experiment at the IBR-2 reactor in Dubna will clarify the practical efficiency of the method.
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[1] S.A. Karamian, N.V. Aksenov, Yu.V. Albin, A.G. Belov, G.A. Bozhikov, S.N. Dmitriev, G.A. Starodub. Methods for production of 195mPt isomer. Bulletin of the Russian Academy of Sciences: Physics. 2014, in press; JINR Preprint P15-2013-84; Dubna, 2013.

Primary author: Dr AKSENOV, Nikolay (Joint Institute for Nuclear Research)

Co-authors: Mr MADUMAROV, Alexander (Joint Institute for Nuclear Research); Mr STARODUB, Gennadii (Joint Institute for Nuclear Research); Dr BOZHIKOV, Gospodin (Joint Institute for Nuclear Research); Ms SOKOLOVA, Lydia (Joint Institute for Nuclear Research); Dr KARAMYAN, Sarkis (Joint Institute for Nuclear Research)

Presenter: Dr AKSENOV, Nikolay (Joint Institute for Nuclear Research)

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