Contribution ID: **100** Type: **Poster**

Electrochemical dissolution of the neutron irradiated 193Ir metal powder

Thursday, 15 May 2014 17:30 (1h 15m)

Due to its nuclear characteristics, the Auger electron emitter isomer 195mPt (T1/2 = 4.02 d) is a promising radionuclide for radioimmunotherapy. We performed a test experiment to produce the isomer195mPt by double neutron capture by the193Ir target nucleus with consequent population of 195mPt through β– decay, and provided theoretical estimates for the 195mPt yield [1]. One of the advantages of the proposed approach is the possibility to isolate 195mPt from irradiated Ir target (in the form of metal powder) using radiochemical methods. It is known that iridium is a very hard, refractory, difficult to dissolve transition metal of the platinum group. Currently used methods of dissolving iridium do not meet the requirements for isolation of theragnostic radionuclides. We utilized anodic corrosion using alternating currents and solutions of hydrochloric and nitric acids that are used as electrolytes to study dissolution of Ir metal. We determined optimum conditions for electro dissolution of irradiated 193Ir metal powder. In this work we also described and discussed details of the procedure.
The work was supported by Russian Foundation for Fundamental Research (project code 14-03-00745 A) and JINR grants No. 13-501-01 and 04-5-1076.

[1] S.A.Karamian ,Aksenov N.V.,Albin Yu.V.,Belov A.G.,Bozhikov G.A.,Dmitriev S.N.,Starodub G.A. Methods for production of 195mPt isomer. Bulletin of the Russian Academy of Sciences: Physics. 2014,in press; JINR Preprint P15-2013-84; Dubna, 2013.

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Session Classification: Poster Session - Production and Application of Radionuclides

Track Classification: Production and Application of Radionuclides