

A novel ^{111}In production by irradiation of Sb target with high energy protons (600 MeV) for further Perturbed Angular Correlation measurements

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In present work, 3-step separation scheme using ion-exchange chromatography of ^{111}In purification is performed. 1 g of Sb target was irradiated with 600 MeV protons at 1 μA current for 3 hours at the Phasotron facility (DNLP JINR). The activity of desired radionuclide at EOB equaled 53 MBq/ μAh . The separation factor at each step was estimated to be 10^3 . Along with ^{111}In purification, $^{119\text{m}}\text{Te}/^{117\text{m}}\text{Sn}$ separation is presented. ^{111}In ($T_{1/2} = 2.8$ d) is one of the most used radionuclides in diagnostics, also one of the most suitable isotopes for $\gamma\gamma$ -Perturbed Angular Correlation (PAC) measurements due to its parameters: $t_{1/2} = 85$ ns, $I = +5/2$, $Q = +0.68$, $\mu = -0.7656$, cascade 171-245 keV [1]. $\gamma\gamma$ -PAC is a unique method in investigation of the local environment of the probe in liquids especially with a chelator in the system [2]. Moreover, required concentration of the probe is up to $10^{(-12)}$ mol/l which makes this technique very useful for measuring the precursors of the radiopharmaceuticals being used in Nuclear Medicine [3].

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