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Cyclotron production and radiochemical isolation of ^{117m}Sn

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In the recent years there has been significant interest in the production of certain isomers, especially the ones with potential applications in the field of nuclear medicine. ^{117m}Sn has been considered as an emerging radio therapeutic isotope, which is particularly promising due to its favorable nuclear decay properties: $T_{1/2} = 13.60\text{d}$, 100% IT decay mode and main gamma emission of 159 keV (86%).

There are number of potentially available ways for the production of ^{117m}Sn . In the current study the cyclotron method for ^{117m}Sn production by α -particles induced reaction on ^{116}Cd has been investigated. The target consisting of enriched ^{116}Cd (98%) in oxide form was irradiated at U-200 under the following conditions: beam current 5,5 μA and energy of the accelerated α -particles 35 MeV. The cross section of reaction $^{116}\text{Cd}(^4\text{He},^3\text{n})$ has been taken in consideration in order to optimize the irradiation conditions. For ^{117m}Sn separation from the target material $\text{La}(\text{OH})_3$ and LaF_3 precipitations were used. In order to achieve deep purification and concentration, ion exchange chromatography was applied using a micro column loaded with Dowex 1x8 resin in F- form. The radiochemical recovery of ^{117m}Sn through the separation procedure was above 90%, with high specific activity of the final product.

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