THE PRODUCTION OF ^{211}At ON THE INTERNAL CYCLOTRON BEAM AND ITS SEPARATION FROM THE TARGET FOR NUCLEAR MEDICINE PURPOSES

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^{211}At is α-emitter with half-life 7.214 *h* the physicochemical properties of which are very promissing for its perspective use in targeted cancer therapy. In spite of rather incomplete knowledge of astatine chemistry there have been pursued many experiments with labeling of various organic carriers of ^{211}At in the world laboratories. The search for suitable compound meeting all the criteria posed on an appropriate radiopharmaceutical is very intensive in last several years. Such experiments require the ^{211}At supply in sufficient amount and nuclear purity especially with respect to ^{210}Po content.

We have, therefore, designed an internal beam target for ^{211}At preparation by the most convenient ^{209}Bi(α,2n)^{211}At reaction on cyclotron U-120M at N.P.I. in Řež near Prague. The target was developed in collaboration with accelerator's department within N.P.I. The activities obtained are close to the theoretical values for the thick target yields under given conditions. The beam hits the target in tangential direction at small angles what reduces the necessary thickness of the Bi-layer and enables to employ an evaporation technique for its preparation.

For the ^{211}At removal from the target a quartz apparatus placed inside a ceramic oven was designed. The distillation procedure is reliable, relatively fast and efficient. Astatine is collected on a quartz column filled with glass beads, and then eluted by proper agent in order to gain it in desirable chemical form. The temperature gradient in the oven during the distillation results in excellent separation of ^{210}Po from ^{211}At - the data acquired via α-spectrometry and γ-spectrometry show the ratio between ^{210}Po and ^{211}At activities to be 2×10^{-10} and lower at EOB.