

## Development of new methods for medical radionuclide production for radioisotope complex at NRC "KI" - PNPI

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At NRC "KI" - PNPI (National Research Center "Kurchatov Institute" - Petersburg Nuclear Physics Institute) the cyclotron C-80 capable of producing 40–80 MeV proton beam with a current of 100  $\mu$ A has been constructed. One of the main goals of C-80 is production of a wide spectrum of medical radionuclides for diagnostics and therapy. A special beam line will be erected as well for the treatment of malignant eye diseases. Currently a project is being worked out for the construction of radioisotope complex with three target stations at the beam of C-80. The peculiarity of the proposed facility is the use of the mass-separator with the target-ion source device as one of the target stations for on-line, or semi on-line production of a high purity separated medical radionuclides. The radionuclides planned to be produced are  $^{64,67}\text{Cu}$ ,  $^{68}\text{Ge}$ ,  $^{82}\text{Sr}$ ,  $^{111}\text{In}$ ,  $^{123,124}\text{I}$ ,  $^{223,224}\text{Ra}$ ,  $^{225}\text{Ac}$  and others, believed to be promising for diagnostics and therapy. Presently new thermal methods for selective production of radionuclide pointed out are being developed. The general idea is to use the difference in volatility of atoms of the needed radionuclide and target material when it is heated in a high vacuum at definite temperature. The results of a new high temperature method utilization for separation of  $^{67}\text{Cu}$ ,  $^{82}\text{Sr}$  from irradiated target materials have been presented. Also the results of experiments for the production of radioisotopes  $^{223,224}\text{Ra}$  and  $^{225}\text{Ac}$  by the mass-separator method are discussed. It is important to emphasize that the method of "dry" thermal separation allows the subsequent use of the mass-separator method for further purification of the targeted radionuclides.

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