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The inventory of the radionuclides produced in 1.4 GeV proton irradiated lead bismuth (LBE) targets has been indicated in our recent publication [1]. Quantitative analysis shows that huge amount of radioisotopes are produced in the LBE target, fair enough for clinical and other applications provided the desired activity is separated from the bulk target. Further, the results from Tall et al [2] shows possibility of production of At and Po radionuclides through secondary particle reactions in very thick LBE targets when bombarded with 1.4 GeV proton beam.

We have simulated this condition by irradiating thin LBE target with 50 MeV alpha particles in Variable Energy Cyclotron Centre, Kolkata, India. ²¹⁰-At and ²⁰⁷-Po radionuclides were detected in the matrix. The aim of the experiment was to develop radiochemical method for separation of At radionuclides from bulk lead and bismuth targets and from the radiotoxic polonium radionuclides. The target was dissolved in HNO₃, followed by spiking of ^{200,203}-Pb and ²⁰⁴-Bi radionuclides to monitor the fate of the bulk in the radiochemical processes. It has been found that simple precipitation technique shows quantitative separation of At radionuclides from the bulk targets as well as from polonium radionuclides. The precipitation experiment was carried out by addition of (i) NH₃ (ii) oxalic acid and (iii) K₂Cr₂O₇ of which K₂Cr₂O₇ was found to be most effective. Bulk Pb and Bi and ²⁰⁷-Po were quantitatively precipitated leaving >70% At radionuclides in the supernatant.

The developed separation procedure is simple, environment friendly and applicable for in-vivo use as there is no possibility for organic residue in the final product.

1.M. Maiti, K. Ghosh, T.M. Mendonça, T. Stora, S. Lahiri, Comparison on the production of radionuclides in 1.4 GeV proton irradiated LBE targets of different thickness, J. Radioanal. Nucl. Chem. DOI: 10.1007/s10967-014-3636-6

2.Tall Y., Cormon S., Fallot M., Foucher Y., Guertin A., Kirchner T., Zanini L., Andersson M., Berg K., Frånberg H., Gröschel F., Manfrin E., Wagner W., Wohlmuther M., Everaerts P., Köster U., Ravn H., Noah Messomo E., Jost C., Kojima Y. (2007) Int Conf Nucl Data for Sci and Technol DOI: 10.1051/ndata:07762.

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