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^{230}Pa ISOLATION FROM IRRADIATED Th-TARGET AND DEVELOPMENT OF A ^{230}U/^{226}Th GENERATOR

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Among alpha-emitting radionuclides prospective for targeted alpha-therapy, ^{230}U ($T_{1/2}$=20.8 d) has strong potential due to appropriate nuclear properties. It can be utilized directly or as a parent of ^{226}Th ($T_{1/2}$=31 min) in a generator system. ^{230}U is accumulated via decay of ^{230}Pa ($T_{1/2}$=17.4 d), Ci-amounts of which may be produced in natural thorium under proton irradiation in the energy range 200-60 MeV together with other useful alpha-emitters ^{225}Ac ($T_{1/2}$=9.9 d) and ^{223}Ra ($T_{1/2}$=11.4 d).

Radiochemical procedures were developed for ^{225}Ac, ^{223}Ra and ^{230}Pa recovery from natural thorium irradiated with medium-energy protons. Irradiated thorium was dissolved in 6M nitric acid with the addition of catalytic amounts of HF and passed through a column filled with extraction chromatographic sorbent Octanol Resin (TrisKem Int. Company, 1-octanol as an extracting agent). The most part of radionuclides (mono- and bivalent cations, Th, Ac, Ra, lanthanides and others) were passed through the column. The eluate may be further used for isolation of ^{225}Ac and ^{223}Ra according the method, proposed in (*Solvent Extraction and Ion Exchange*, 2014, v. 32, p. 468-477). Pa and partially Nb were sorbed on the column and eluted by 1M nitric acid. Finally, purification of Pa was performed on silica gel using different oxalic acid solutions. The total chemical yield of ^{230}Pa was about 80% and radionuclidic purity >99%.

The capacity factor k' values for U and Th were determined in static experiments (batch technique) for a wide concentration range of nitric and hydrochloric acid solutions on extraction chromatographic resins of TrisKem Int. Company, namely, tri-octylamine on different carriers: C2-caped silica, PS-DVB and Amberchrom CG71. The obtained data are used as starting conditions for column separation and development of a ^{230}U/^{226}Th generator.

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