

Chemical Purification of Actinium-225 from Proton-Irradiated Thorium Targets

The chemical separation of actinium from proton-irradiated ^{232}Th targets is being performed as part of a tri-laboratory (Oak Ridge National Laboratory, Brookhaven National Laboratory, and Los Alamos National Laboratory) effort focused on the accelerator production of ^{225}Ac . Actinium-225 ($t_{1/2} = 9.92$ days) is produced by proton irradiation of a thorium metal target via the $^{232}\text{Th}[p,x]^{225}\text{Ac}$ reaction and can be used in targeted alpha therapy applications. The irradiation produces a suite of radioisotopes, including fission products, that must be chemically separated from actinium, as well as a vast excess of thorium. This separation is achieved by chemically processing irradiated thorium targets through a series of ion separation and extraction chromatography columns. This effort has produced purified ^{225}Ac over 15 campaigns, providing material for use in targeted alpha therapy research and development.

Funding Agency

DOE, Office of Nuclear Physics, Isotope Program

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Presentation Type

Poster

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