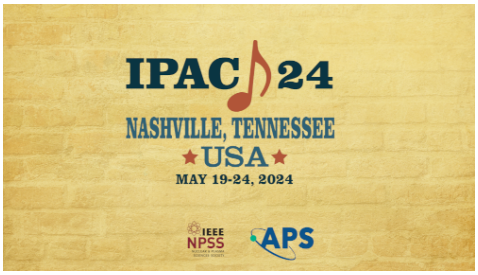

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Recovery of Neptunium-236g from Photon and Proton-Irradiated Actinide Targets

Thursday, 23 May 2024 16:00 (2 hours)

Neptunium-236g is a rare radionuclide used for nuclear material analyses. The availability of 236gNp is limited and the viable production routes are costly, time consuming, and only produce trace quantities of the desired product. For this work, two known production methods were tested to determine product recovery, purity, and viability for use as a tracer. The first method utilizes a photon-irradiated 237Np target to produce 236gNp by the 237Np(γ, n) ⟶ 236Np reaction. The second method utilizes the 238U(d, 4n) ⟶ 236Np reaction. These production routes were evaluated previously, and the former was considered ineffective without isotope separation and the latter was not well-characterized for the 236mNp/236gNp production ratio. Recent resurgence of electromagnetic isotope separation technology has enabled at least partial recovery of 236gNp from part-per-million abundance feeds produced by the photonuclear reaction. To address the lack of production data for the second method, a deuteron-irradiated depleted uranium target was chemically processed to recover and purify the Np for abundance and ratio analyses. The status and analytical results for each production method are presented.

Footnotes

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