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Prompt Gamma Activation Analysis of ^{188}Re T. W. WARREN, Air Force Institute of Tech - WPAFB, D. A. MATTERS, Defense Threat Reduction Agency, A. M. HURST, Lawrence Berkeley Laboratory, L. SZENTMIKLOSI, Budapest Neutron Centre, J. J. CARROLL, U. S. Army Research Laboratory, J. W. MCCLORY, Air Force Institute of Tech - WPAFB, T. BELGYA, Budapest Neutron Centre — Prompt γ activation analysis was used to determine partial γ production cross sections from the $^{187}\text{Re}(n,\gamma)^{188}\text{Re}$ reaction at the Budapest Neutron Centre in Budapest, Hungary. The 10-MW_t research reactor provided the source of neutrons, which were cooled to a spectrum of ~ 140 K and collimated onto a target of powdered rhenium metal enriched to 99.52% ^{187}Re . Prompt γ spectra were collected with a single Compton-suppressed HPGe detector. Subsequent fitting of the raw spectral data produced precise energies and intensities of the observed transitions. The ^{188}Re cross sections were determined by standardizing measured peak intensities to well-known $^{35}\text{Cl}(n,\gamma)^{36}\text{Cl}$ cross sections via a second spectrum from a sample of ReCl_3 . However, the non-trivial volume of the enriched sample resulted in energy-dependent self-attenuation of γ -rays originating in the sample bulk. This necessitated estimating the effective optical thickness of the enriched sample to derive intensity adjustments, particularly for γ -rays below ~ 300 keV. Forthcoming analysis will use statistical decay modeling to predict the population of known levels from the neutron-capture state for comparison with observed cross sections.

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