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Content	
Sponsoring DOE Program Office	USDOE Office of Science (SC), Nuclear Physics (NP) (SC-26)
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Description/Abstract	Cross sections for the 47Ti(n,p)47Sc and 64Zn(n,p)64Cu reactions have been measured for quasi-monoenergetic DD neutrons produced by the UC Berkeley High Flux Neutron Generator (HFNG). The HFNG is a compact neutron generator designed as a “flux-trap” that maximizes the probability that a neutron will interact with a sample loaded into a specific, central location. The study was motivated by interest in the production of 47Sc and 64Cu as emerging medical isotopes. The cross sections were measured in ratio to the 113In(n,n′)113mIn and 115In(n,n′)115mIn inelastic scattering reactions on co-irradiated indium samples. Post-irradiation counting using an HPGe and LEPS detectors allowed for cross section determination to within 5% uncertainty. The 64Zn(n,p)64Cu cross section for View the MathML source MeV neutrons is reported as 49.3 ± 2.6 mb (relative to 113In) or 46.4 ± 1.7 mb (relative to 115In), and the 47Ti(n,p)47Sc cross section is reported as 26.26 ± 0.82 mb. The measured cross sections are found to be in good agreement with existing measured values but with lower uncertainty (<5%), and also in agreement with theoretical values. This work highlights the utility of compact, flux-trap DD-based neutron sources for nuclear data measurements and potentially the production of radionuclides for medical applications.
Subject Categories	07 ISOTOPE AND RADIATION SOURCES; 62 RADIOLOGY AND NUCLEAR MEDICINE; 73 NUCLEAR PHYSICS AND RADIATION PHYSICS
Keywords	DD neutron generator; Medical isotope production; Scandium (Sc) and copper (Cu) radioisotopes; Indium; Ratio activation; Theranostics
Report/Product Number	None

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