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Editorial Board
Nuclear Instruments and Methods in Physics Research Section B:
Beam Interactions with Materials and Atoms

To whom it may concern:

I am writing to submit an original manuscript entitled "*Measurement of the ^{64}Zn,^{47}Ti(n,p) Cross Sections using a DD Neutron Generator for Medical Isotope Studies*" for publication in Nuclear Instruments and Methods in Physics Research Section B. This manuscript describes an original work conducted by myself, the first and corresponding author, along with my co-authors and collaborators M.S. Basunia[b], Jon C. Batchelder[a], Joseph D. Bauer[c], Tim A. Becker[d], Lee A. Bernstein[ab], Eric F. Matthews[a], Paul R. Renne[de], Daniel Rutte[de], Mauricio A. Unzueta[a], and Karl A. van Bibber[a].

This work described in this manuscript is a measurement of the cross sections for the ^{47}Ti(n,p)^{47}Sc and ^{64}Zn(n,p)^{64}Cu reactions. This is part of a new, ongoing effort at UC Berkeley and Lawrence Berkeley National Laboratory to address the gaps in existing nuclear data which have been identified by the applications community, focusing in particular on the production of novel and emerging medical radioisotopes.

The methodology used to measure these cross sections involved neutron activation of metal foils, using the UC Berkeley High Flux Neutron Generator (HFNG), a compact DD 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. Target foils of zinc and titanium were irradiated with co-loaded indium foils. Activating foils in ratio to indium removes the flux dependence from cross section measurements, which in turn eliminates the largest source of uncertainty for cross section measurements. As a result, our cross sections depend only on the relative detector efficiencies for the measured decay gamma rays, allowing for high-precision cross section measurements.

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Several major novel contributions are reported in the present work. Most directly, the cross sections for the ^{47}Ti(n,p)^{47}Sc and ^{64}Zn(n,p)^{64}Cu reactions have been measured to a lower uncertainty than existing empirical measurements. The work also provides the first detailed characterization of the energy spectrum of the HFNG. Most notably, the work outlines the desirable characteristics of the HFNG for isotope production applications, and discusses a formalism describing the utility of it and other DD-based neutron generators for high-specific activity isotope production.

The attached manuscript is an original work which bears no significant overlap with any journal or conference papers published by any of the authors herein. Several previous measurements exist in the literature for both of the cross sections presented in this work, though our measurements have lower uncertainty than any previous measurements at the energy in this work. The most recent previous measurement of the ^{64}Zn(n,p)^{64}Cu reaction was by Shimizu *et. al.*[a], and the most recent previous measurement of the ^{47}Ti(n,p)^{47}Sc reaction was by Shimizu *et. al.*[b].

Several notable experts have been proposed as potential reviewers for this manuscript: Md. Uddin of the Atomic Energy Research Establishment, Bangladesh (`md.shuzauddin@yahoo.com`), Steve Wender of Los Alamos National Laboratory (`wender@lanl.gov`), Ron Nelson of Los Alamos National Laboratory (`rnelson@lanl.gov`), Steven Yates of the University of Kentucky (`yates@uky.edu`), Arjan Plompen of the Belgian Joint Research Centre (`Arjan.Plompen@ec.europa.eu`), Roland Beyer of Helmholtz-Zentrum Dresden-Rossendorf (`roland.beyer@hzdr.de`), and Zsolt Revay of the Technical University of Munich (`zsolt.revay@frm2.tum.de`). All of these individuals are highly experienced in the nuclear data community, and have many years of experience in nuclear reaction evaluation and cross section measurements.

As a physicist with a background in ion beam interactions and accelerator physics, I believe that Mark Breese would be the best-qualified editor to handle this paper during the review process. However, any of the editorial staff with the technical background to properly evaluate the manuscript would be welcome on our end. This would primarily involve a familiarity with activation experiments and nuclear spectroscopy.

Please find our manuscript attached. I hope that this work will be deemed of sufficient merit to be published in NIM, and I look forward to working with the editorial staff if this is the case.

Sincerely yours,

Andrew S. Voyles

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[a] T. Shimizu, *et. al.*, NIM A: 527 (3) (2004) 543553. doi:10.1016/j.nima.2004.03.184.

[b] T. Shimizu, *et. al.*, Annals of Nuclear Energy 31 (9) (2004) 975990. doi:10.1016/j.anucene.2003.12.005.