Abstract Submitted
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Heavy-Ion Production of Theranostic ^{149}Tb for Potential Medical Applications[1] JOHN WILKINSON, University of Notre Dame, KENDALL BARRETT, University of Madison-Wisconsin, SAMUEL FERRAN, University of Alabama at Birmingham, SEAN MCGUINNESS, University of Notre Dame, LAUREN MCINTOSH, MALLORY MCCARTHY, SHERRY YENNELLO, Texas AM University, JONATHAN ENGLE, University of Madison-Wisconsin, SUZANNE LAPI, University of Alabama at Birmingham, GRAHAM PEASLEE, University of Notre Dame — Theranostics is an emerging field of nuclear medicine that uses radioisotopes to simultaneously image and treat disease. One possible theranostic isotope, ^{149}Tb, performs therapeutic and diagnostic functions with branches of alpha and positron decay modes. As a very proton-rich nucleus, ^{149}Tb ($t_{1/2}$ = 4.12 h) is restricted to accelerator production, harvesting and clinical work in close proximity. It has only been produced for clinical tests by a light-ion spallation reaction at a high-energy nuclear physics facility to date. We propose an alternate production method using a heavy-ion reaction close to the Coulomb barrier. In this study ^{89}Y(^{63}Cu,x)^{149}X was studied as an indirect production pathway for all n=149 isobars. The preliminary physical yields for ^{149}Tb and other reaction products measured by offline gamma spectroscopy are compared to the PACE4 fusion-evaporation predictions. A near symmetric fission yield is also observed. This method has demonstrated significant radiochemical purity compared to spallation production methods, which makes for easier radiochemical separation.

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