Abstract Submitted
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Investigation of surrogate reactions near A=100: $^{102,104}Ru(\alpha,\alpha')$ for $^{101,103}Ru(n,\gamma)$ J.A. CHURCH, L.A. BERNSTEIN, J.T. BURKE, F. DIETRICH, J. ESCHER, C. FORSSEN, E.B. NORMAN, LLNL, H.-C. AI, Yale, L. PHAIR, R. CLARK, P.A. FALLON, D. LEE, I.Y. LEE, A.O. MACCHIAVELLI, P. MCMAHAN, S. SINHA, M. STEPHENS, E. R.-VIETEZ, M. WIEDEKING, LBNL — For two-step, neutron-induced reactions proceeding through an equilibrated intermediate state, an alternate, "surrogate reaction" technique [1] is applicable. Measured decay probabilities for the intermediate nucleus formed via a light-ion reaction are combined with optical-model calculations for the formation of the same intermediate nucleus via the n- induced reaction, and result in the overall (n, γ/n/2n) cross sections. $^{102,104}Ru(\alpha,\alpha')$ were studied separately as surrogate reactions for $^{101,103}Ru(n,\gamma)$. The test, $^{101}Ru(n,\gamma)$, has been previously measured directly (EXFOR). The unknown, $^{103}Ru(n,\gamma)$, is a branch in the s-process. Energies of scattered α particles were detected in double-sided silicon detectors (STARS) over scattering angles of 42-60 degrees. Ge clover detectors (LiBerACE) were used to count γ-rays in coincidence with α particles scattered at energies corresponding to 0-3 MeV equivalent neutron energy in the desired (n,γ) reaction. Work performed under the auspices of the U.S. DOE by the Univ. of CA, LLNL contract No. W-7405-Eng-4, and DOE grants DE-FG02-91ER-40609 and DE-FG03- 03NA00081, LDRD-04-ERD-057.

[1] J.D. Cramer and H.C. Britt, Nucl. Sci. Eng., **41**, 177 (1970).

Jennifer Church
Lawrence Livermore National Laboratory

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