CROSS-SECTION MEASUREMENT FOR THE $^{7}Li(n,n't)^{4}He$ REACTION AT 14.74 MeV*

by

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ABSTRACT

The cross section for the $^{7}Li(n,n't)^{4}He$ reaction is measured at an average neutron energy of 14.74 MeV, with a resolution of 0.324 MeV, relative to the ^{238}U neutron-fission cross section. Tritium activities for the irradiated lithium-metal samples (enriched to 99.95% in ^{7}Li) are deduced using a liquid-scintillation counting method which relies upon the tritiated-water standard from the U.S. National Bureau of Standards. The measured cross section ratio of $^{7}Li(n,n't)^{4}He$ to ^{238}U neutron fission is 0.2523 (± 2.2%). The derived $^{7}Li(n,n't)^{4}He$ reaction cross section is 0.301 (± 5.3%) barn, based on the ENDF/B-V value of 1.193 (± 4.8%) barn for the ^{238}U neutron-fission cross section.

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