

MEASUREMENT OF THE $^{51}\text{V}(n,p)^{51}\text{Ti}$ REACTION CROSS SECTION FROM
THRESHOLD TO 9.3 MEV BY THE ACTIVATION METHOD*

by

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ABSTRACT

The activation method was used to measure cross sections for the $^{51}\text{V}(n,p)^{51}\text{Ti}$ reaction from near threshold at 2.856 MeV up to 9.267 MeV. Forty-five approximately-monoenergetic cross section values were obtained; they provide complete, detailed coverage of this energy range with FWHM resolutions of ~ 0.08 to 0.1 MeV below ~ 4.7 MeV and ~ 0.14 to 0.28 MeV above this energy. These data span $\sim 90\%$ of the total response for the standard ^{235}U thermal-neutron-induced-fission neutron spectrum and $\sim 86\%$ of the total response for the standard ^{252}Cf spontaneous-fission neutron spectrum. The present experimental cross sections are significantly larger (e.g., by $\sim 50\%$ at ~ 8 MeV) than the corresponding values from the ENDF/B-V evaluation which was derived from nuclear model calculations. The calculated integral cross section (based on the present work) for the ^{252}Cf spontaneous-fission neutron spectrum agrees very well with a recently reported measurement (the calculated value is only $\sim 2\%$ smaller). Corresponding agreement with the equivalent experimental value for the ^{235}U thermal-neutron-induced-fission neutron spectrum is less favorable (the calculated value is $\sim 20\%$ larger).

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