

ENERGY-DIFFERENTIAL CROSS SECTION MEASUREMENT FOR THE
 $^{51}\text{V}(n,\alpha)^{48}\text{Sc}$ REACTION*

by

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ABSTRACT

The activation method was used to measure cross sections for the $^{51}\text{V}(n,\alpha)^{48}\text{Sc}$ reaction in the threshold region, from 5.515 MeV up to 9.567 MeV. Twenty approximately-monoenergetic cross section values were obtained in this experiment. These data points span the energy region at roughly equal intervals. The experimental resolutions were in the range 0.153 to 0.233 MeV (FWHM). The present differential data cover $\sim 50\%$ of the total integral response of this reaction for the standard ^{235}U thermal-neutron-induced-fission neutron spectrum, and $\sim 44\%$ of the corresponding response for the standard ^{252}Cf spontaneous-fission neutron spectrum. Over the range 7.6 to 9.5 MeV the present experimental cross sections are noticeably larger (e.g., by $\sim 50\%$ at ~ 8.6 MeV) than the corresponding values from the ENDF/B-V evaluation. From ~ 6.7 - 7.5 MeV, the present values are somewhat below those of ENDF/B-V. At still lower energies the agreement is reasonably good considering the uncertainties introduced by energy scale definition very near the effective threshold where the cross section varies rapidly with neutron energy. Calculated integral cross sections based in part on the present work agree reasonably well within errors with reported integral results, provided that the reported data are renormalized to conform with recently-accepted values for appropriate standard reactions.

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