

COMPILATION AND EVALUATION OF
14-MeV NEUTRON ACTIVATION CROSS
SECTIONS FOR NUCLEAR TECHNOLOGY
APPLICATIONS: SET I*

by

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ABSTRACT

Available 14-MeV experimental neutron activation cross sections are compiled and evaluated for the following reactions of interest for nuclear-energy technology applications: $^{27}\text{Al}(n,p)^{27}\text{Mg}$, $\text{Si}(n,X)^{28}\text{Al}$, $\text{Ti}(n,X)^{46}\text{Sc}$, $\text{Ti}(n,X)^{47}\text{Sc}$, $\text{Ti}(n,X)^{48}\text{Sc}$, $^{51}\text{V}(n,p)^{51}\text{Ti}$, $^{51}\text{V}(n,\alpha)^{48}\text{Sc}$, $\text{Cr}(n,X)^{52}\text{V}$, $^{55}\text{Mn}(n,\alpha)^{52}\text{V}$, $^{55}\text{Mn}(n,2n)^{54}\text{Mn}$, $\text{Fe}(n,X)^{54}\text{Mn}$, $^{54}\text{Fe}(n,\alpha)^{51}\text{Cr}$, $^{59}\text{Co}(n,p)^{59}\text{Fe}$, $^{59}\text{Co}(n,\alpha)^{56}\text{Mn}$, $^{59}\text{Co}(n,2n)^{58}\text{Co}$, $^{65}\text{Cu}(n,p)^{65}\text{Ni}$, $\text{Zn}(n,X)^{64}\text{Cu}$, $^{64}\text{Zn}(n,2n)^{63}\text{Zn}$, $^{113}\text{In}(n,n')^{113\text{m}}\text{In}$, $^{115}\text{In}(n,n')^{115\text{m}}\text{In}$. The compiled values are listed and plotted for reference without adjustments. From these collected results those values for which adequate supplementary information on nuclear constants, standards and experimental errors is provided are selected for use in reaction-by-reaction evaluations. These data are adjusted as needed to account for recent revisions in the nuclear constants and cross section standards. The adjusted results are subsequently transformed to equivalent cross sections at 14.7 MeV for the evaluation process. The evaluations are performed utilizing a least-squares method which considers correlations between the experimental data.

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