

NEUTRON TOTAL AND SCATTERING CROSS SECTIONS
OF SOME EVEN ISOTOPES OF MOLYBDENUM AND
THE OPTICAL MODEL

By

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Abstract

Neutron total and elastic and inelastic scattering cross sections of ^{92}Mo , ^{96}Mo , ^{98}Mo and ^{100}Mo were measured. Neutron total cross sections were determined at intervals of ~ 10 keV from 1.6 to 5.5 MeV with resolutions of ~ 10 keV. Neutron elastic and inelastic scattering cross sections were measured from 1.8 to 4.0 MeV at intervals of 0.2 MeV. Neutron groups corresponding to the excitation of forty states were identified. The experimental results were examined in the context of optical- and statistical-nuclear models. It was concluded that the real part of the optical potential includes a term proportional to $\left[\frac{N-Z}{A}\right]$ and suggested that the imaginary part is shell dependent with decreasing magnitude as $N=50$ is approached. Comparison of measured and calculated inelastic neutron excitation cross sections suggested a number of J^π assignments extending previous knowledge. The experimental and calculational results were used, together with previously reported values, to generate an evaluated neutron total and scattering cross section file in the ENDF format extending over the energy range 0.1 to 8.0 MeV.