

Double Differential Neutron Emission Cross Sections on $n + \text{Fe-56}$ reaction for Reactor Shielding

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Abstract

We have evaluated energy-angle correlated neutron emission spectra on the $n + \text{Fe-56}$ reaction for incident neutron energies from a few MeV to 20 MeV, based on available measurements and theoretical models. Optical-statistical approach was applied to take into account consistently the contribution of the direct, preequilibrium and statistical equilibrium processes into different reaction channels. Coupled-channel optical model calculation was performed to prepare neutron transmission coefficients and direct reaction contributions to inelastic scattering from low-lying discrete state. The Kalbach-Mann systematics was applied to generate the energy-angle correlated spectra of emitted neutrons into continuum state.