

Evaluation of Neutron and Proton Cross Sections of Al-27 up to 2 GeV

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Abstract

We evaluated neutron and proton cross sections of Al-27 for energies up to 2 GeV which are important in shielding and structure for accelerator-driven system and also as monitor reactions. The optical model parameters up to 250 MeV were optimized by ECISPLOT with phenomenological potential form proposed by Chiba. The resulting total, reaction cross section and elastic angular distributions reproduced the experimental data fairly well. The derived transmission coefficients for neutron and proton from the optical models are fed into the GNASH code system to evaluate angle-energy correlated emission spectra for light ejectiles and gamma rays. For energies above 250 MeV up to 2 GeV, the total, reaction cross sections were evaluated by an empirical fit and recent systematics. The nucleon emission spectra including pion were estimated by use of QMD+SDM (Quantum Molecular Dynamics + Statistical Decay Model).