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Prompt Fission Neutron Spectra of 241Am, 242Am, and 243Am(n, F) Reactions

Prompt fission neutron spectra (PFNS) of 241Am(n,F), 242mAm(n,F) and 243Am(n,F) are obtained at 10-5 <En <20 MeV. The methods of analysis of integral PFNS for americium nuclides were elaborated via comprehensive analysis of 233,235,238U(n,F) and 239,240Pu(n,F) PFNS data [1, 2]. Average PFNS energies of 241,242m,243Am(n,F) are strictly correlated with fission chances contributions 241,242m,243Am(n,xnf) of observed fission cross sections and average prompt fission neutron numbers. The strongest influence on PFNS is predicted in case of 243Am(n,F) and 243Am(n,nf)1 reactions at En ˜6 to 8 MeV (Fig. 1). The largest relative amplitude of pre-fission neutrons is predicted for 243Am(n,xnf)1 reaction at En ˜6.0 to 6.25 MeV. In case of 241Am(n,F) reaction influence of pre-fission neutrons on and PFNS is much weaker but is of similar shape. In case of 242mAm(n,F) reaction at Ennf <En<En2nf is quite different (Fig. 2). It depends mostly on Ennf and En2n reaction thresholds and excitation energies of fission fragments. Exclusive pre-fission neutron spectra 241,242m,243Am(n,xnf)1,..x are consistent with σ(n,F) of 241,242m,243Am(n,F), 241Am(n, 2n) and 243Am(n, 2n)242gAm reaction cross sections. Average total kinetic energies TKE for fission fragments and products, partial contributions of 241,242m,243Am(n,xnf)1,..x reactions of prompt fission neutrons number and observed fission cross section are predicted and compared with evaluated data [3, 4].
Fig. 1 PFNS of 242mAm(n,F) and 243Am(n,F) Fig. 2 of 242mAm(n,F) and 243Am(n,F) PFNS
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3. V.M. Maslov et al., https://www-nds.iaea.org/publications/indc/indc-blr-0022/

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