Study of Discrepancy Phenomenon for Excitation Function of $^{191}Ir(n,2n)^{190g+m1+m2+8.6\%m3}Ir$

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Accurate $^{191}Ir(n,2n)^{190g+m1+m2+8.6\%m3}Ir$ cross-section data are of great importance for the ICF medium- and high-energy neutron diagnostics and nuclear structure studies. Numerous integration experiments carried out to check the accuracy of the $^{191}Ir(n,2n)^{190g+m1+m2+8.6\%m3}Ir$ cross-section data indicated that the calculated-to-experimental ratios based on ENDF/B-VII.1 evaluation data are large deviations at devices with a large portion of fission neutrons. A new excitation curve Hybrid combining ENDF/B-VII.1 evaluation data with TALYS-1.96 program was constructed, which is in better agreement with the microscopic cross-sectional measurement data above 12 MeV. Several calculation models for the integration test were constructed based on both experiments and literatures, including the Cf source, CFBR-II pulsed reactor, Jezebel, Flattop25, Bigten and Bethe Spheres. A detailed analysis of the deviation between the experiments and calculation was conducted, and it was concluded that the current evaluation data of $^{191}Ir(n,2n)^{190g+m1+m2+8.6\%m3}Ir$ are overestimated in the whole range of 8~20 MeV, where the evaluation in 8~12 MeV will lead to a fission neutron diagnosis bias of ~10%, and that in 12~14 MeV will lead to a fusion neutron diagnosis bias of ~5%.