

Detailed Balance Principle in the Photodisintegration Reaction of ^{152}Sm

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One of the waste fission products in nuclear reactor is the ^{151}Sm unstable nucleus and in this respect the knowledge of its thermal capture cross section is of a great interest in nuclear transmutation and also in nuclear astrophysics. The ^{151}Sm neutron cross section can be obtained not only by direct measurement of capture cross section but also by applying detailed balance principle on the s-process $^{152}\text{Sm}(\gamma, n)^{151}\text{Sm}$ at neutron threshold. So photodisintegration of ^{152}Sm plays a complementary role to neutron capture in the s-process study for ^{151}Sm (i.e. (γ, n) and (n, γ)).

$^{152}\text{Sm}(\gamma, n)^{151}\text{Sm}$ cross section in the frame of the Hauser-Feshbach formalism using the Talys software with an analysis of contribution of each type of processes like compound, direct and (γ, n) , $(\gamma, 2n)$, were calculated. The theoretical evaluations are compared with experimental data and after we extracted the capture cross section.

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