



Integrated Modeling of Natural Tin Photoactivation

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Abstract

In this study photoactivation reaction cross sections on natural Sn were evaluated in the Giant Dipole Resonance region for incident neutron energy up to some ten's of MeV's. For each Sn isotope, the contribution of compound, direct and preequilibrium mechanisms were extracted. The cross sections and isomer ratios were calculated. The results are compared with existing experimental data obtained by Bremsstrahlung source and activation methods.

Theoretical evaluations of the photoactivation cross sections obtained with Talys are in good agreement with existing experimental data. Taking into account the satisfactory description of experimental cross section data, the isomer ratios for incident photons energy from the neutron threshold (8 - 9 MeV) up to 36 MeV were calculated.

If the isomer nuclei are obtained in the final states then the isomer ratios were evaluated using the corresponding production cross sections (σ_m , σ_g) in the exclusive ($\sigma, 1n$) reactions. In the present work the results of (σ, n) reaction on ^{114}Sn and ^{120}Sn nuclei are analyzed.

Keywords: photoactivation, natural Tin, nuclear mechanisms, isomer ratios, cross sections