Contribution ID: **238** Type: **not specified**

STUDY OF EXCITATION OF ISOMERIC STATES OF ^{109m,g}Pd IN REACTIONS $^{110}Pd(\gamma, n)$, $^{110}Pd(n, 2n)$ AND $^{108}Pd(n, \gamma)$

The cross sections for the formation of isomeric states ^{109m,g}Pd in the reactions $^{110}Pd(\gamma, n)$, $^{110}Pd(n, 2n)$ and $^{108}Pd(n, \gamma)$ on palladium isotopes were measured using the induced activity method. Samples of natural Pd have been irradiated in the bremsstrahlung beam in the energy range of $10 \div 35$ MeV with energy step of 1 MeV. For 14.1 MeV neutron irradiation, we used the NG-150 neutron generator. For the (n, γ) reaction, experiments were carried out at the BB3-CM research reactor of the Institute of Nuclear Physics of the Academy of Sciences of the Republic of Uzbekistan. The gamma spectra reactions products were measured with a spectroscopic system consisting of HPGe detector CANBERRA with energy resolution of 1.8 keV at 1332 keV gamma ray of 60Co, amplifier 2022 and multichannel analyzer 8192 connected to computer for data processing. The filling of the isomeric and ground levels was identified according to their γ lines.
To evaluate and compare the experimental results, we calculated the reaction cross-section using the TALYS-1.6 software package [1].
The general scheme of the reaction is assumed to be as follows: first, the absorption of the dipole γ-quantum on the nucleus occurs with the formation of a compound nucleus, then the neutron evaporates with the formation of an excited state of the final nucleus. The excitation of the daughter nucleus is removed by a cascade emission of γ-quanta with the formation of the ground or isomeric state of the final nucleus. It was possible to improve the quantitative agreement between the calculations and the experiment by fixing the spin limitation parameter σ. In this case, satisfactory agreement is achieved at $\sigma = 2.5$ ħ.
The experimental results have been discussed, compared with those of other authors as well as considered by the statistical model.

References
1. www.talys.eu

Section

Nuclear physics (Section 1)

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Track Classification: The V International Scientific Forum "Nuclear Science and Technologies": Nuclear physics (Section 1)