

^{166}Ho formation in photonuclear reactions on a natural mixture of erbium isotopes

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The method of induced activity was used to study photonuclear reactions on a natural mixture of erbium isotopes. The experiment was performed on a bremsstrahlung of an RM55 electron accelerator at an electron energy of 55 MeV. The study examined the possibility of producing carrier-free ^{166}Ho isotope in photonuclear reactions on a natural mixture of erbium isotopes. Experimental data on the cross-sections of photoproton reactions on Er isotopes are not available in the literature. The yields of the formation of $^{161,165}\text{Er}$ isotopes as a result of $^{nat}\text{Er}(\gamma, in)$ reactions, the target nuclide ^{166}Ho and the side nuclide ^{165}Ho as a result of $^{nat}\text{Er}(\gamma, in1p)$ reactions were measured. The yield of ^{166}Ho formation under the experimental conditions was approximately $4 \cdot 10^4 \text{ Bq}/(\mu\text{A} \cdot \text{h} \cdot \text{g}/\text{cm}^2)$. The experimentally obtained yields of photonuclear reactions are compared with the yields calculated using theoretical cross-sections of photonuclear reactions from the combined model of photonuclear reactions (CMFR) and the TALYS program. There is a good agreement between the experimental data and the results of the calculation by CMFR for both photoneutron and photoproton reactions.

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