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PHOTONUCLEAR REACTIONS ON NATURAL MIXTURE OF SELENIUM

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The method of induced activity was used to study photonuclear reactions on a natural mixture of selenium isotopes. This study measured the yields of the radionuclides $^{73(m+g)}\text{Se}$, ^{75}Se , ^{79m}Se , $^{81(m+g)}\text{Se}$, ^{71}As , ^{72}As , ^{74}As , ^{76}As , ^{77}As , ^{78}As , and ^{79}As produced in $\text{natSe}(\gamma, xnyp)$ multiparticle reactions with bremsstrahlung end-point energy of 55 MeV. The bremsstrahlung radiation was generated using the RM-55 electron accelerator at the Skobel'syn Institute of Nuclear Physics, Lomonosov Moscow State University, Russia, and the reaction yields were derived from the induced activities measured using off-line γ -ray spectrometry. The measurement of the production yields for the radionuclides produced in the photoproton reactions on natural selenium is the first of its kind. The experimentally obtained yields of photonuclear reactions are compared with the yields calculated using theoretical cross-sections of photonuclear reactions from CMPR and the TALYS program. On the whole, we can see a satisfactory agreement between the experimental yields and the theoretical calculations. The difference in values can be due to two main factors: TALYS uses default photoabsorption cross-sections, and also does not take into account the isospin splitting of the giant dipole resonance, which has a significant effect on the yields of photoproton reactions. There is a good agreement between the experimental data and the results of calculations by the CMPR method for both photoneutron and photoproton reactions.

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