

INVESTIGATION OF $^{178m2}, ^{179m2}\text{Hf}$ ISOMERS CREATION IN REACTIONS WITH ALPHA-PARTICLES

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The measurement of creation cross-sections of $^{178m2}\text{Hf}$ ($T_{1/2} = 31$ y., $J^\pi = 16^+$) and $^{179m2}\text{Hf}$ ($T_{1/2} = 25$ d., $J^\pi = 25/2^-$) at targets irradiation of natural both tantalum and lutetium by alpha-particles with energy near 100 and 27.2 MeV, properly Irradiation has been done by U-120 and U-240 accelerators of Kyiv institute for Nuclear Research of NAS of Ukraine. The measurement of induced activity has been performed by Ge-spectrometers with energy resolution 2 keV for the 1332-keV γ -line of ^{60}Co and detection efficiency of 15-40% in comparison with a 3"×3" NaI(Tl)-detector. In gamma-spectra all γ -transitions have been observed which necessary for identification of abovementioned isomeric states.

The next cross-sections have been obtained: $\sigma = (8.0 \pm 1.2) \cdot 10^{-30}$ sm² for nuclear reaction $^{181}\text{Ta}(\alpha, \alpha 2n)^{178m2}\text{Hf}$ $\sigma = (7.2 \pm 0.7) \cdot 10^{-30}$ sm² for reaction $^{176}\text{Lu}(\alpha, p)^{179m2}\text{Hf}$. The integral cross-sections also has been measured for nuclear reactions $^{181}\text{Ta}(\alpha, \alpha 2n)^{179}\text{Ta}$, $^{181}\text{Ta}(\alpha, 6n)^{179}\text{Re}$, $^{181}\text{Ta}(\alpha, 5np)^{179}\text{W}$, which is $\sigma = (33 \pm 7) \cdot 10^{-26}$ sm². Experimental values of the cross-sections have been compared with the theoretical values, which calculated by using code TALYS-1.4.

The discussion is transacted about obtained data.