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

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The measurement of creation cross-sections of ^{178m2}Hf ($T_{1/2}$ = 31 y., J^{π} = 16^{+}) and ^{179m2}Hf ($T_{1/2}$ = 25 d., J^{π} = $25/2^{-}$) 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: σ = (8.0±1,2)·10^{-30} sm^2 for nuclear reaction ^{181}Ta(α,α2np)^{178m2}Hf σ = (7.2±0,7)·10^{-30} sm^2 for reaction ^{176}Lu(α,p)^{179m2}Hf. The integral cross-sections also has been measured for nuclear reactions ^{181}Ta(α,α2n)^{179}Ta, ^{181}Ta(α,6n)^{179}Re, ^{181}Ta(α,5np)^{179}W, which is σ = (33±7)·10^{-26} sm^2. 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.