ISOMERIC YIELD RATIOS OF THE REACTIONS 144SM(Γ,N)143M,GSM AND 144SM(N,2N)143M,GSM

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In the present work results of investigation of the isomeric yield ratios reactions $^{144}Sm(\gamma,n)^{143m,g}Sm$ and $^{144}Sm(n,2n)^{143m,g}Sm$ are presented. The isomeric yield ratios were measured by the induced radioactivity method.

Samples of natural Sm have been irradiated in the bremsstrahlung beam of the betatron SB-50 of Institute of Applied Physics of National University of Uzbekistan in the energy range of 10÷35 MeV with energy step of 1 MeV. For 14 MeV neutron irradiation we used the NG-150 neutron generator of Institute of Nuclear Physics..

The induced activities were measured by gamma-spectrometer equipped with a 63 cm^3 Ge(Li)-semiconductor detector. The counting system had a resolution of ~3,5 keV for the 1332 keV γ-line of ^{60}Co.

The yields of the metastable state decays were evaluated by using the 754 keV (^{143m}Sm, $J^{\pi}=11/2^-$, $T_{1/2}=65$ s) γ-rays. The yields of the ground state decays were evaluated by using the 1056 keV (^{143g}Sm, $J^{\pi}=1/2^+$, $T_{1/2}=8,83$ m) γ-rays.

The results of calculation are given in the table below (25÷30 MeV).

$E_{\gamma max}$, MeV	Y_m/Y_g
20	0,041±0,001
25	0,039±0,001
30	0,042±0,001

For the ^{144}Sm the results are in good agreement with the date of ref. [1] and {2}. The isomeric yield ratios of the reaction (γ, n) on ^{144}Sm in the 25-35 MeV energy range are obtained at first. $(\gamma, n)^m$ and $(\gamma, n)^g$ reactions cross section are obtained. The results are compared with the calculations made in the statistical Fermi-gas theory.

1. Hoang Dac Luc e.a.Bolg. fiz. J. t. 14, N2, 1987, s.152.
2. Mazur V.M. e.a. In: Abst. of paper of Intern.Conf. on nuclear spectroscopy and structure of the atomic nucleus. L., Nauka, 1992, p. 246