

Photoneutron Cross Sections Of Cobalt

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PHOTONEUTRON CROSS SECTIONS OF COBALT

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From measurements of gamma ray activities, induced by irradiating ⁵⁹Co with 55 MeV bremsstrahlung, the yields of the reactions (γ,n), ($\gamma,2n$), ($\gamma,3n$), ($\gamma,2pn$) were determined. Absolute yields were obtained by reference to cross section data for the Cu(γ,n) process. The isomeric yield ratio (Y_m/Y_g) of ⁵⁸Co, which was measured at this energy, is 1.255 ± 0.004 . This value is in a good agreement with previous experimental data, such as 1.33 ± 0.09 at the maximum beam energy equal 54 MeV [1].

The flux-weighted average cross-sections for the (γ,n), ($\gamma,2n$) reactions of ⁵⁹Co are 18.53 ± 0.03 , 6.99 ± 0.04 mb, respectively. They were compared with the flux-weighted average cross-sections obtained from other experimental data, based on mono-energetic and bremsstrahlung data, and theoretical predictions. These results of current experiment are lower than results, obtained by Alvarez [2] for (γ,n) reaction, and higher for ($\gamma,2n$) reaction, which are 22.6 mb and 6.19 mb respectively.

The theoretically simulated ⁵⁹Co(γ,n), ⁵⁸Co, ⁵⁹Co($\gamma,2n$), ⁵⁷Co reaction average cross-sections based on TALYS show a general agreement with experimental data (18.58, 6.69 mb respectively).

1. H. Lichblau, A. Goldmann, Z. Phys., 205, No. 1, 47 (1967).
2. R.A. Alvarez, B.L. Berman, Phys. Rev. C, Vol. 20, 1 (1979).

The speaker is a student or young scientist

Yes

Section

1. Experimental and theoretical studies of nuclear reactions

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