YIELD OF LOW-LYING HIGH-SPIN STATES AS A FUNCTION OF THE PROJECTILE NEUTRON NUMBER AND THE BOMBARDING ENERGY

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At present the development of investigations of nuclear isomers is expected in the context of the use of unstable nuclear beams. In the present paper we discuss the probability of low-lying high-spin states production in the reactions with light neutron-rich (halo) projectiles. The ratio of cross sections of a certain pair of isomeric states (high-spin and low-spin respectively) in one and the same nucleus allows to obtain an information on angular momentum dynamics of a preceding reaction and spin dependence of nuclear level density. This dynamics depends on the properties of a target, projectile and emitted particles. It is important to find out optimal reaction parameters to populate high-spin isomer. In the present work we investigate the dependence of its yield on the projectile neutron number and the bombarding energy. Measurements of isomeric cross-section ratios (ICSR) in the reactions ^{114}Cd(α p)^{117mg}In in the energy range 17-29 MeV were carried out by us earlier using off-beam measurements of induced activity of the isomeric pair [1]. The activation method is a reliable tool for identification of reaction products. Here we present for the first time our results improved through the handling of the activation data with the use of the optimal extraction formula from [2]. Calculations of ICSR for the indicated reactions ^{114}Cd(α p)^{117mg}In, ^{112}Cd(^{6}He,p)^{117mg}In and ^{110}Cd(^{8}He,p)^{117mg}In are performed using the upgraded code EMPIRE-II-19 [3]. This code is based on Hauser-Feshbach version of the statistical theory of nuclear reactions [4]. The field of application of the model is placed over the area of 10 - 50 MeV excitation energy of a compound nucleus, where the widths of resonance are greater than the distances between them.

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