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Channel effect in isomeric ratio of 137m,gCe produced in different nuclear reactions

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This report presents the experimental study of the isomeric ratio of 137mCe to 137gCe produced in 138Ce(γ, n)137m,gCe photonuclear reaction, 136Ce(n, γ)137m,gCe neutron capture reaction and in the two simultaneous 138Ce(γ, n)137m,gCe and 136Ce(n, γ)137m,gCe reactions in the mixed photon –neutron field by the activation method. The investigated samples were irradiated at the bremsstrahlung photon beam, thermal and epithermal neutron flux and in the mixed photon-neutron field constructed at the electron accelerator Microtron MT-25 of the Flerov Laboratory of Nuclear Reaction, Joint Institute for Nuclear Research, Dubna, Russia. The results were analyzed, discussed and compared with those of other authors to examine the role of the channel effect in the nuclear reaction and to provide the nuclear data for theoretical model interpretation of nuclear reactions.

Summary

The IRs of 137mCe to 137gCe produced in 138Ce(γ, n)137m,gCe photonuclear reaction at 22.7 MeV end-point bremsstrahlung energy, in 136Ce(n, γ)137m,gCe neutron capture reaction and from the two simultaneous 138Ce(γ, n)137m,gCe and 136Ce(n, γ)137m,gCe reactions in the mixed photon –neutron field have been determined, in which the first and the last ones are first time measurements. The IRs are different in 137m,gCe produced by different projectiles, which show the role of the channel effects in nuclear reactions and could be used for the test of nuclear reaction models.

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