

Publication

Activation method combined with characteristic X-ray counting: a possibility to measure (α, γ) cross sections on heavy p-nuclei

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 813731**Author(s)** Kiss, G. G.; Szuecs, T.; Gyuerky, Gy.; Fueleop, Zs.; Farkas, J.; Kertesz, Zs.; Somorjai, E.; Laubenstein, M.; Froehlich, C.; Rauscher, T.**Author(s) at UniBasel** [Rauscher, Thomas](#) ;**Year** 2011**Title** Activation method combined with characteristic X-ray counting: a possibility to measure (α, γ) cross sections on heavy p-nuclei**Journal** Nuclear physics. A, Nuclear and hadronic physics**Volume** 867**Number** 1**Pages / Article-Number** 52-65**Keywords** NUCLEAR REACTIONS Tm-169(alpha, gamma), (alpha, n), E=11.5-17.5 MeV, measured E gamma, I gamma, E(K X-ray), I (K X-ray), deduced sigma. Activation method with HPCe and LEPS detectors

For an improved modeling of the astrophysical nucleosynthesis of p-nuclei, low energy cross section data of alpha-induced reactions on heavy isotopes are needed. Technical difficulties hamper the experimental determination of these cross sections, therefore the relevant experimental data are almost completely missing. Here we present a new method for the cross section measurements, the activation technique based on the detection of characteristic X-ray radiation. The feasibility of the method is illustrated through the measurement of the Tm-169(alpha, gamma)Lu-173 and Tm-169(alpha, n)Lu-172 reaction cross sections. Despite the relatively long half-life of the reaction products ($T_{1/2} = 500$ and 6.7 days, respectively) it was possible to measure the cross section of the Tm-169(alpha, gamma)Lu-173 reaction between E-c.m. = 13.16 and 17.08 MeV. The Tm-169(alpha, n)Lu-172 reaction cross section was derived from close above the threshold up to E-c.m. = 17.08 MeV. Details of the new method and the experimental results are presented. (C) 2011 Elsevier B.V. All rights reserved.

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