(α,n) reaction cross section measurements on Mo isotopes for γ-process

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On the neutron deficient side of the valley of stability there are ∼35 stable nuclei which cannot be synthetized by neutron capture reactions. According to our knowledge these — so-called p — isotopes are mainly synthetized by the γ-process [1] which takes place during the collapse of a type II supernovae or during the explosion of a type Ia supernovae.

Modeling the γ-process requires the use of an extended nuclear reaction network involving ten thousands of reactions on thousands of mostly radioactive nuclei. The necessary cross sections are taken from the Hauser-Feshbach (H-F) statistical model. To improve the predictive power of the H-F model, precise knowledge on the nuclear inputs — like optical potentials, level densities, γ-strength functions etc. — are necessary. By carrying out precise (α,n) cross section measurements the uncertainty of the α-nucleus optical potential can be reduced and the reliability of the model can be improve [2].