

CROSS SECTIONS INVESTIGATION OF NUCLEAR REACTION INDUCED BY NEUTRON OF ENERGY ABOVE 20 MEV AND SYSTEMATIC STUDIES OF TRANSMUTATION RATES.

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The nuclear data of the transmutation reactions induced by fast neutrons are very rare for the neutrons energy higher than 20 MeV. In this work, one presents the theoretical formalism allowing the calculation of the differential cross section, the spectrum of the emitted particles and the integrated cross section for the nuclear reactions induced by fast neutrons in the range of energy going from some MeV to 100 MeV.

The Combination of the weisskopf-Ewing theory, the exciton model, the model of the intranuclear cascades and direct interaction MSD treated within the framework of approximation DWBA have been used to give the different expressions that allow to calculate the spectra of the emitted particles ($d\sigma/dE$) and the angular distribution ($d\sigma/d\Omega$).

The calculated cross sections constitute a data base very important and very useful to evaluate the transmutation rate of the long live radioisotopes produced in nuclear reactors, by means of nuclear reactions induced by the fast neutrons. In this objective we have established the expressions of the integrated cross sections of (n,p), (n, α), and (n,2n) nuclear reactions. These expressions were compared to the available data of the cross sections in order to determine the systematic behaviour of the transmutation rate, that showing a dependence with the mass number A and atomic number Z of the target nucleus.