

# Studies of Empirical Formulas for Total Reaction Cross Sections at 14-15 MeV Neutrons

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Around 14-15 MeV neutron incident energy elastic, nonelastic and total nuclear reaction cross sections have been investigated by many authors in literature. But theoretical calculations have not been adequate because of the character of the nuclear structure is not exactly known. Flerov and Talyzin obtained an empirical nonelastic cross section formula and also they found that the total cross section is quite different a function of atomic weight for 14-15 MeV neutrons. Lastly, Tel et al. developed a new empirical formula for (n,2n) and (n,d) cross sections by using Flerov and Talyzin expression for the inelastic reaction at 14-15 MeV neutrons. In the calculations, the scattering theory was used and the obtained new empirical formula was found as better agreement with experimental data.

In this study, the total reaction cross sections, around 14-15 MeV energy, for target nuclei in the mass region (A:1-238) have been investigated. The total cross sections calculations have been done by using optical model parameters and using SCAT2 code. The obtained theoretical results compared with the taken from EXFOR experimental nuclear data library. Consequently, calculations of the total cross sections in the present study may provide a reference to neutron reactions considering the lack of experimental data for around 14-15 MeV energy.