

Cross sections of the $^{35}\text{Cl}(n,\alpha)^{32}\text{P}$ reactions at fast-neutron energies from 3.3 to 5.3 MeV

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ABSTRACT

The reaction cross sections of $^{35}\text{Cl}(n,\alpha)^{32}\text{P}$ were measured at incident neutron energies in the range of 3.3–5.3 MeV. The experiment was performed at the Van de Graff accelerator EG5 of Frank Laboratory of Neutron Physics, Joint Institute for Nuclear Research. Fast neutrons were produced via the $^2\text{H}(d,n)^3\text{He}$ reaction. Alpha particles from the reactions were detected by the gridded ionization chamber (GIC) in which different samples of ^{35}Cl (NaCl and BaCl_2) on to Ta backing placed back-to-back. The relative and absolute neutron fluxes were determined due to $^{238}\text{U}_3\text{O}_8$ (99.999%) samples inside the GIC. The obtained data were compared with other experimental data, evaluation libraries and TALYS code.