EXPERIMENTAL CROSS SECTIONS OF PROTON-INDUCED REACTIONS ON ^{152}GD FOR THE ASTROPHYSICAL P-PROCESS

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The p-process is a nucleosynthesis mechanism in explosive environments in the temperature range of 2–3 GK, such as the O/Ne layers of Type-II supernovae. The p-process is responsible for the production of about 35 proton rich stable isotopes (p nuclei) between ^{74}Se and ^{196}Hg shielded by stable nuclei from the production via the slow and rapid neutron capture processes. Because experimental studies are relatively few in the heavier mass region, where ^{152}Gd (p nucleus) is located, the cross sections of ^{152}Gd(p,γ)^{153}Tb and ^{152}Gd(p,n)^{152}Tb reactions have been measured by the activation technique in order to extend the experimental database for the astrophysical p-process and to test the reliability of statistical model predictions. The experiments were carried out in the energies from 3.5 to 8 MeV, close to the astrophysically relevant energy range. The targets were prepared by evaporating 30.6 % isotopically enriched ^{152}Gd oxide on Aluminum backing foils, and bombarded with proton beams provided by the cyclotron accelerator of the Institute of Nuclear Research of the Hungarian Academy of Sciences (ATOMKI). Preliminary results are presented and compared with the Hauser-Feshbach statistical model predictions.