Accelerator driven transmutation systems could be a solution to the problem with long-lived nuclear waste and opening the way to thorium fuel cycle. Due to intensive neutron source based on spallation reaction are these systems very litle dependent on the arrangement of the core and fuel quality. These systems can transmute the spent fuel, eventually 232Th or 238U without affecting maintenance of fission reaction. Additionally subcritical blanket ensures high safety. For these systems it is necessary to know the cross sections of reactions of fast neutrons produced in the spallation reaction with different materials. This data is necessary not only for the selection of appropriate construction materials, but also for creation of programs simulating accelerator driven transmutation systems.

This thesis is focused on the experimental determination of cross sections of reactions 89Y(n,2n)88Y and 89Y(n,3n)87Y with neutron energies from 17,6 to 33,6 MeV. Yttrium is analyzed for its (n,xn) threshold reactions, which makes it appropriet activation detector for study of the neutron fields in model configurations of accelerator driven transmutation systems.

The obtained cross sections are unique, in that so far there are no experimental data for used neutron energies.