CALCULATION SPALLATION NEUTRON YIELD FOR ADS TARGETS

Nguyen Thi Ai Thu, Nguyen Mong Giao
Physics Institute-1 Mac Dinh Chi Street, District 1- Ho Chi Minh City- Viet Nam
Email: nmgiao@hotmail.com, thu604405@yahoo.com

The Accelerator Driven System (ADS), is an innovative reactor which is being developed as a dedicated burner to incinerate nuclear waste. The ADS system consists of a sub-critical assembly driven by accelerator delivering a proton beam on a target to produce neutrons by a spallation reaction. The spallation target constitutes the physical and functional interface between the accelerator and the sub-critical reactor. For this reason it is probably the most innovative component of the ADS. The target design is a key issue to investigate in designing ADS and its performances are characterized by the number of neutrons emitted for incident proton, the mean energy deposited in the target for neutron produced, the neutron spectrum and spallation product distribution.

In this work, spallation neutrons were generated by bombarding some thick targets such as $^{207}_{82}\mathrm{Pb}$, $^{184}_{74}\mathrm{W}$, $^{238}_{92}\mathrm{U}$, $^{241}_{95}\mathrm{Am}$ with the incident energy from 0.5GeV to 3GeV. Neutron multiplicities and the number of residual protons on those targets were calculated by using database of JENDL-HE library. The obtained results have been discussed and compared with the experimental data taken from [1],[2]. The excellent agreement with experimental data found.

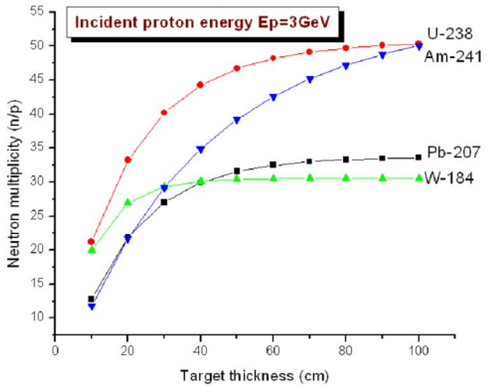

Figure1: Neutron multiplicities depend on target thickness

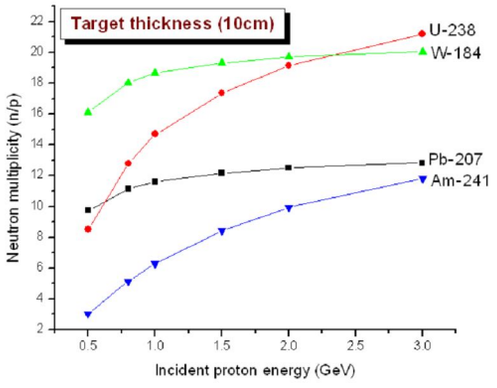

Figure2: Neutron multiplicities depend on incident proton energy and target material

[1] Marcus Eriksson, *Accelerator-Driven Systems: Safety and Kinetics*, Doctoral Thesis - Department of Nuclear and Reactor Physics- Royal Institute of Technology- Stockholm 2005-

[2] Seiguei E.Chigrinov, Anna I.Keivitskaia,Igor L.Rakhno, Christina K.Rutkovskaia, *The code sonnet to calculate accelerator driven system performance*, Radiation Physics and Chemistry Problems Institute, National Academy of Sciences, Minsk-Sosny, Belarus