Neutron generators

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Neutron generators are relatively small and cheap devices that are able to provide strong neutrons beams. Recent developments report fluxes up to 10^{11} n/s, values in the range 10^{9}-10^{10} n/s are routinely achieved for commercially available units. The cost of such device, with shielding that allows for installation in practically any place, is about 300 k$. With such a affordable price these devices can provide a number of scientific and application studies opportunities, that should be a perfect add-on for polish low-energy nuclear community.

Neutron generators are typically based on D-T and D-D reactions providing either 2.4 MeV or 14.1 MeV beam. The neutrons can thermalized or used directly for further experiments. Typical application of generators is a neutron activation analysis (both prompt and delayed). This method of non-destructive, very sensitive and independent of chemical form is capable of detection of about 80 elements up to ppt sensitivity. Neutron generators can be applied to: security, art and archeology, industrial applications, educational, medical, environmental, geological, and scientific studies. Some examples of possible research programs for such devices will be presented in more details.

Bibliography

[1] IAEA Radiation Technology Reports No. 1, Neutron Generators for Analytical Purposes