Annotation

Project E&T&RM

Part III

In the 2013-2016 years within the framework of the project "E & T of SNF" have been carried out the study with irradiation sectional uranium target weight of 515 kg on carbon deuteron and proton beams, as Nuclotron-M and on Phasotron.

The experiments included the following activities:

1. The energy generated by fission of U238 nuclei, depending on the input beam parameters;
2. The study of the energy spectrum of generated neutrons;
3. The study of the spatial spectrum and the energy spectrum of the neutron leakage;
4. Development of neutron detectors based on diamond structures - narrow-band detectors; broadband - based on registration of recoil protons.
5. Investigation of transmutation processes of Pu, Th minor actinides in the fast neutron flux.

As part of the research at the facility it has been discovered the emergence of high-energy neutron torch from the exit surface of the nuclear assembly with fairly high intensity. This neutron torch can be used for transmutation of spent nuclear fuel.

In the process of research on nuclear setup on carbon beams with an energy of 2 ÷ 4GeV/nucleon discovered a significant increase in energy output, which is associated with an increase in the number of neutrons in the generating U238 target due to intranuclear processes.

The "E&T&RM" on the 2017-2019 years aims to build a nuclear research of natural uranium U238 assembly weight of 25 tones, which according to theoretical estimates is "endless assembly" (quasi infinite) with the level of leakage (5 ÷ 10%).

Since the inside of the target neutron fluxes generated ≈1011n / cm2•c with more part of the spectrum that lies beyond 1 MeV, this circumstance allows to carry out the research of the radiation resistance of materials used to build the collider (superconductors, HTSM materials, composite materials, etc.)

It is planned to continue the study of the influence of a powerful microwave radiation at a frequency f = 30 ÷ 60 GHz on the radioactive decay of nuclei, including the minor actinides.