Development of an experimental set-up for the containment of radioactive volatile isotopes in SPIRAL2

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Over the next 5-10 years, the accelerator and experimental facilities at GANIL (Caen/France) will receive a new facility called SPIRAL2. It will be constituted in a superconducting linear accelerator which will drive deuterons beam of 40 MeV energy (5 mA; 200 kW). These accelerated particles will produce a very high neutron flux ($\sim 10^{15}$ n/s) with an epithermal spectrum (the energy range between 1 keV and 40 MeV). With the neutron- induced fission of the depleted uranium, an intense beams of neutron-rich nuclei will be created and will become available at SPIRAL2.

The high fission rate will produce an important fission products radioactivity in the separator. This will require a rigorous and reliable containment system to avoid the propagation of isotopes, especially the volatile ones, in experimental areas and even in the present installation. To reach this objective we are developing, within both Vacuum and Safety teams of the GANIL, a cryotrapping system.

In our simulation we used the code MOVAK3D for particles transmission in a molecular regime, MCNPX, DARWIN PEPIN2 and FISPACT for respectfully neutron transport, uranium target evolution and its decay.

The calculation showed that about 99.9 % of the incident activity, due to the volatile gazes, will be trapped on the croytrapping system as it is simulated. The experiment, carried out in Vacuum laboratory of GANIL, are in agreement with this calculus.

Keywords : cryotrapping, fission products, volatile isotopes, vacuum, containment