

Thin and thick targets for radioactive ion beam production at SPIRAL1 facility

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The upgrade of the Système de Production d'Ions Radioactifs Accélérés en Ligne (SPIRAL1) facility will deliver its new Radioactive Ion Beams (RIB) by spring 2017. The goal of the upgrade is an improvement of the performances of the installation in terms of isotopes species and ion charge states [1]. Ion beams are produced using the Isotope Separator On Line Method, consisting in an association of a primary beam of stable ions, a target and an ion source. The primary beam impinges on the material of the target. Radioactive isotopes are produced by nuclear reactions and propagate up to the source, where they are ionized and accelerated to create a RIB. One advantage of SPIRAL1 is the variety of the available primary beams, from carbon to uranium with energies up to 95 MeV/A. Coupled with target made of a large choice of materials, the variety of possible nuclear reactions (fusion-evaporation, transfer, fragmentation) leads to the production of a wide range of isotopes, and for some of them in regions of the nuclide chart still rarely explored.

Depending on the reaction process, the collision energy and the primary beam power, thin and thick targets are used. Their design has to cope with specific constraints related to each primary beam / target couple and to the ion source.

After a brief presentation of the SPIRAL1 Target Ion Source System challenges, the main target features, studies and designs under progress will be presented.

[1] P. Jardin et al., Nuclear Instrum. and Methods B 376 (2016) 64-67

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