

ON-LINE PRODUCTION OF NEUTRON-RICH ISOTOPES FROM URANIUM CARBIDE TARGETS

V. Rizzi¹, A. Lanchais¹, O. Alyakrinskiy¹, A. Andrighetto¹, O. Bajeat², A.E. Barzakh³, M. Dubois⁴,
S. Essabaa², D.V. Fedorov³, G. Gaubert⁴, A.M. Ionan³, V.S. Ivanov³, P. Jardin⁴, C. Lau², R. Leroy⁴,
G. Lhersonneau¹, K.A. Mezilev³, F.V. Moroz³, S.Y. Orlov³,
V.N. Pantelev³, L. Stroe¹, L. Tecchio¹, Y.M. Volkov³, A.C.C. Villari⁴

¹ INFN, Laboratori Nazionali di Legnaro, Viale dell'Università 2, 35020 Legnaro (Pd), Italy

² IPNO, Institute de Physique Nucléaire, F-91406 Orsay Cedex, France

³ PNPI, Petersburg Nuclear Physics Institute, 188350, Gatchina, Russia

⁴ GANIL, Blvd. Becquerel, B.P.5027, 14021 Caen Cedex, France

In the framework of EURISOL project [1], a collaboration between “Laboratori Nazionali di Legnaro” of Legnaro (Italy), “Institute de Physique Nucléaire” of Orsay (France), GANIL (France) and “Petersbug Nuclear Physics Institute” of Gatchina (Russia) started from 2002 with the aim of producing an efficient Uranium Carbide target that quickly releases the reaction products and survives a long term irradiation.

The experiments were done at the IRIS facility of PNPI Institute, using on-line mass separation of neutron-rich nuclei produced by 1 GeV proton beam on natural U. The characteristics of targets (Fig. 1) with different density and internal structure, in various container materials and various ionization methods have been established.

We devoted special attention to reliably extract isotopic yields in case of complex decay schemes and to the valuation of release efficiency of some isotopic chains.

In addition, a formalism was developed to disentangle the contribution of beta-decay in the target from direct production by fission and to provide more consistent data for the interpretation of release curves.

Results will be shown for the Cs and Rb isotopic chains.

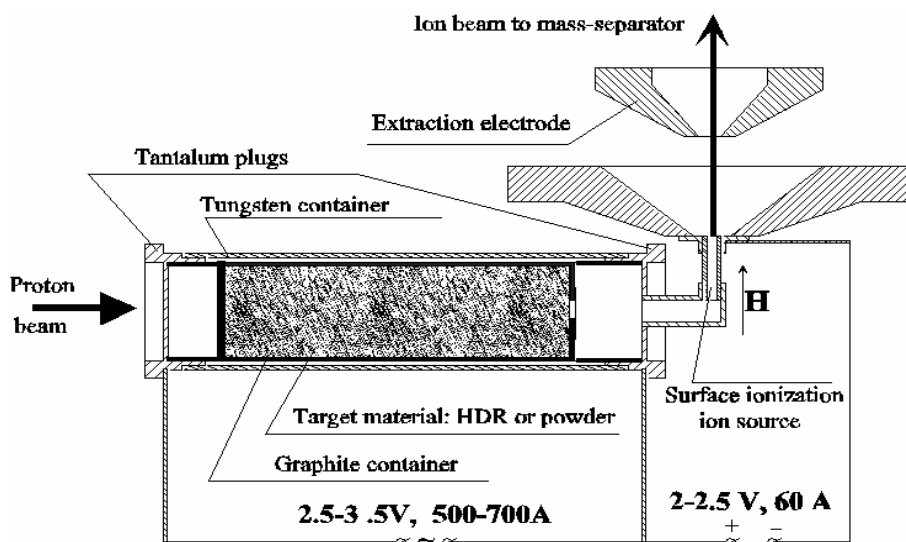


Figure 1: Example of an Uranium Carbide target.