

EFFUSION CALCULATIONS FOR THE DIRECT SPES TARGET WITH THE RIBO CODE

V. Rizzi¹, M. Barbui¹, A. Andrighetto¹, C. Antonucci², S. Carturan¹, S. Cevolani², M. Cinausero¹, P. Colombo⁴, A. Dainelli¹, P. Di Bernardo³, F. Gramegna¹, G. Meneghetti⁴, M. Lollo¹, C. Petrovich², G. Prete¹, M. Tonezzer¹, P. Zanonato³, D. Zafiropoulos¹

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

² ENEA, Via M.M.Sole 4, 40129 Bologna, Italy

³ Dipartimento di Scienze Chimiche, Via Marzolo, 1 - 35131 Padova, Italy

⁴ Dipartimento di Ingegneria Meccanica, Via Venezia, 1 - 35131 Padova, Italy

A R&D study for the realization of a Direct Target is in progress in view of the construction of a RNB ISOL-type facility at LNL, in the framework of the SPES project [1]. A proton beam (40 MeV energy, 200 μ A current) is supposed to impinge on a UCx multiple thin disks target leading to the production of 10^{13} fissions per second.

With the RIBO code [2] it is possible to estimate the mean effusion time of the in-target produced isotopes, their mean number of collisions, their mean free path, etc.

The calculations were performed for a target prototype (fig. 1) in 1:5 scale that will be realised in the next two years as a test for the final target. The possible choices for the target constituent materials are various and the low density, carbon dispersed, metal carbides are quite promising.

As a first step, the target material used for the prototype will be the SiC, that is commercially available and has no problem of handling and radioactivity. Preliminary simulations for the SiC target show a quick release of the ions produced directly by the proton beam interactions.

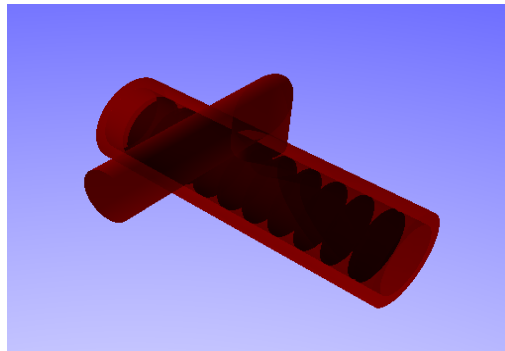


Figure 1: *Prototype target geometry.*

[1] SPES Technical Design Report LNL-INFN (REP) 181/02 (2002) (www.lnl.infn.it/~spes)

[2] See: <http://ribo.web.cern.ch/ribo>