High Power Targets – Task 1

Proposal

State-of-the-art

Perspectives

ECOS-task 1 Proposal

Description

Task 1 High-power thin-target technology (participants: CNRS + GANIL+GSI)

The maximum usable primary-beam current with thin targets is among others determined by the long-term stability of the thin targets under irradiation. High beam intensities lead to a considerable heating of the targets, and, hence to thermal stress, possibly phase transitions, oxidation or reduction of the chemical compounds and diffusion into the target backing, respectively.

We propose to study these phenomena in detail and to compare for example the performance of thin actinide targets as function of the production method (painting, spray-painting, electrolysis, electro-deposition, evaporation and sputtering), the used chemical compounds (oxide, carbide, others) and backings/ coatings, respectively.

The way is to bring together labs that use different techniques for target preparation and those that can test the target performance under “real” conditions.

For this task ECOS will have the duty to organize the collaboration and exchange of expertise on the development of high-power target technology.

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Deliverables

D-NA02.1: Report on the development of high-power thin-target technology with special emphasis on new techniques and methods that will allow increasing the primary-beam intensity usable with such targets. [month 40]

Contacts

Initiation in 2007 by U. Koester then transfer to GANIL

2009/11/30 email to confirm participation to the task and to add remarks in the proposal

Replies from IPNO, GSI and Mainz University to positively participate in this task (B. Lommel correspondent from Germany)

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- Experimentally: Target test irradiation with GANIL beams
  - June: 3UT to validate the experimental set-up (with Orsays'targets (mission of 2 IPN's persons))
  - 2012: series of tests with different material produced by various techniques (Orsay, Germany …)

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- Meetings for knowledge exchange and expertise of targets labs:

- **Since 200y:** Discussion with GSI/Mainz (S. Hofmann, July 10, Cm targets at GSI-SHIP; C. Dülmann, K. Eberhardt, M. Schaëdel)
- **October 2009** : Discussion on targets for S3: Intitut Kernchemie, Mainz (K. Eberhardt, J. Kratz, J. Runke), GSI (B. Lommel, C. Düllmann), LBL (H. Nitsche), CACAO (Ch. O. Bacri, V. Petitbon), GANIL (H. Savajols, Ch. Stodel) - Conclusions:
- European needs (SHE, astrophysics, fuel cycle…), common questions about the behavior of targets (depending on backings) under irradiation, supply, R&D for fabrication of larger targets, why not common targets???….
- How to organize together? Sept conf INTDS 10; Orsay meeting on 2010 nov; Enlarge the know-hows, sharings of skills….
- **September 2010** : INTDS
- **November 2010:** Orsay with IRMM, Mainz, GSI (presentation of each labs, requests, manpower…)

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- Tests (stay/travel of participants)
  - GANIL beam time in 2012
- Meetings (one day / FUSHE2012/INTDS2012) (stay/travel of participants)
  - Preparation and results discussions of tests
  - Possibilities of targets'characterisation before/ after irradiation
  - Knowledge exchange and expertise of targets labs
  - Feedback from target irradiations (GSI, Dubna…)

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- Milestones/deliverables
  - Publications relative to the results of the tests
  - Final Report