Contribution ID: **94** Type: **Poster**

Pd-based intermetallic targets for high intensity irradiations

Wednesday, 19 September 2012 18:00 (1h 50m)

I. Usoltsev1,2, R. Eichler1,2, J.P. Omtvedt4, O. V. Petrushkin3, D. Piguet1, A. V. Sabel'nikov3, A. Türler1,2, G. K. Vostokin3 , A. V. Yeremin3

1Paul Scherrer Institut, CH-5232 Villigen PSI, Switzerland
2University of Bern, CH-3012 Bern, Switzerland
3Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research, 141980 Dubna, Russian Federation
4University of Oslo, 0316 Oslo, Norway

The stability of actinide targets during the irradiation with intense heavy ion beams is a prerequisite to successful experiments with super heavy elements [1]. Due to higher thermal conductivity, electrical conductivity and mechanical stability metallic targets are suggested to be superior to the widely used nowadays solely electroplated ones. Recently we proposed a simple method which allows producing Pd-based intermetallic targets for high intensity irradiations [2]. Based on the molecular plating technique [3] followed by coupled reduction [4] this method was successfully applied to different lanthanide and actinide isotopes. 3 ⊠m Pd backing foils were found to be the most suitable for preparing pinhole-free targets [5].
First irradiation experiments with intermetallic targets were carried out in November 2011 at the Oslo Cyclotron Laboratory, University of Oslo, Norway. 0.73 mg/cm2 238U/Pd target was irradiated at the MC-35 Scanditronix cyclotron using a 0.5 ⊠A proton beam with cyclotron energy of 30 MeV.
Two 243Am/Pd intermetallic targets (0.85 and 1.7 mg/cm2) have been prepared and irradiated at the U-400 cyclotron at the Flerov Laboratory of Nuclear Reactions in March 2012 for several days with intense beams of 48Ca. Both 243Am targets were characterized by alpha-particle spectroscopy and light microscopy before and after irradiation. For direct comparison, the performance of a 'classical'electroplated 243AmO2/Ti target was examined.

This research project was supported by Swiss National Science Foundation grant 200020_126639.

[1] R. Eichler, et al., Nature, 447 (2007) 72.
[2] I. Usoltsev, Attempts to produce intermetallic targets for heavy ion irradiations, 4th International Conference on the Chemistry and Physics of the Transactinide Elements, 5-11 September 2011, Sochi, Russia.
[3] W. Parker, et al., Nucl. Instr. and Meth. 26 (1964) 61.
[4] S. Möbius, L. Hellwig, C. Keller, J. Less-Common Met., 121 (1986) 43.
[5] I. Usoltsev, et al., Preparation of Pd-based intermetallic targets for high intensity irradiations, Nucl. Instr. and Meth. A (2012), 10.1016/j.nima.2012.06.060.

Primary author: Mr USOLTSEV, Ilya (Paul Scherrer Institut, Switzerland)

Co-authors: TÜRLER, Andreas (P); EICHLER, Robert (Paul Scherrer Institute)

Presenter: Mr USOLTSEV, Ilya (Paul Scherrer Institut, Switzerland)

Session Classification: Poster Session

Track Classification: Nuclear Chemistry, Radionuclide Production, High-Power Targetry