



Contribution ID: 4

Type: **oral**

Actinide Target Use at ATLAS

Thursday 1 April 2010 10:00 (30 minutes)

Molecular plating provides an efficient method to prepare sources and targets of actinide elements on thick and thin backings. These are required for experiments at the Argonne Tandem Linac Accelerator System (ATLAS) heavy-ion accelerator. Although the technique is simple and fairly reproducible, because of the radioactive nature of the targets, it is vital to record the various parameters employed during the preparation process. At Argonne National Laboratory, 200-500 $\mu\text{g}/\text{cm}^2$ thick actinide targets were required for Coulomb Excitation (COULEX) studies involving GAMMASPHERE. These targets were plated on 50 mg/cm^2 Au backings and were subsequently covered by a 200 $\mu\text{g}/\text{cm}^2$ Au foil in order to capture any material lost by sputtering. Targets of ^{230}Th , ^{237}Np , 239 , 240 , 242 , ^{244}Pu , ^{241}Am , ^{248}Cm , and ^{249}Cf were prepared by dissolving the material in isopropyl alcohol and electroplating the actinide ions by applying a potential of 600 V. The amount of material in the target was determined by alpha particle counting and gamma-ray spectroscopy. Many laboratories routinely prepare these targets on thick backings using this technique. However, it becomes more difficult when employing thin backings (i.e. less than 1 mg/cm^2). In recent years, we have plated targets on, for example, thin Ni and carbon backings. The Ni foils, evaporated on a copper substrate, are purchased commercially. We used these foils to plate ^{234}U . Afterwards we removed the copper by acid dissolution. In this way 400 $\mu\text{g}/\text{cm}^2$ ^{234}U targets were prepared on a 200 $\mu\text{g}/\text{cm}^2$ Ni backing. Another application involved preparation of a 100 $\mu\text{g}/\text{cm}^2$ ^{243}Am target by plating onto a commercially available 75 $\mu\text{g}/\text{cm}^2$ carbon film left on its glass substrate for subsequent floating. A column made of DelrinTM was used which did not produce any scratches on the carbon film surface. Details of the technique as well as future prospects will be presented.

(DelrinTM is a registered trademark of E. I. du Pont de Nemours and Company)

This work was supported by the U.S. Department of Energy, Office of Nuclear Physics, under Contract No. DE-AC02-06CH11357

Author: Mr GREENE, John (Argonne National Laboratory)

Co-authors: Dr AHMAD, Irshad (Argonne National Laboratory); Dr JANSSENS, Robert (Argonne National Laboratory)

Presenter: Mr GREENE, John (Argonne National Laboratory)

Session Classification: WAT-III

Track Classification: Actinide handling