

Actinide and heavy ion isotopic analysis

ANSTO has the capability to analyse heavy isotopes such as ^{129}I , platinum group elements, ^{236}U and Pu isotopes. These are of interest in nuclear monitoring and dating applications.

Plutonium, in particular, has great potential for dating recent sediments and soil erosion. In the past ^{137}Cs has been used for this purpose, but it is becoming rarer due to decay, while Pu is long-lived. Accelerator Mass Spectrometry (AMS) provides very high measurement sensitivity.

The AMS system can also be used to measure a range of other radioisotopes, including the full range of uranium isotopes, thorium isotopes and ^{231}Pa with sensitivity of around 100,000 to 1 million atoms. Stable isotope analysis, for platinum group elements for example, can also be performed.

Please note: The platinum group elements capability is still under development and is currently unavailable for routine analysis.

Capability Selections

- Actinides AMS isotopic analysis capability development
- U AMS isotopic analysis of pre-prepared U_3O_8 in Fe
- U AMS isotopic analysis + target preparation from soil, sediment, biota, water, swipes
- Pu AMS isotopic analysis of pre-prepared PuO_2 in Fe
- Pu AMS isotopic analysis + target preparation from soil, sediment, biota, water, swipes
- U + Pu AMS isotopic analysis + target preparation from soil, sediment, biota, water, swipes
- I-129 AMS analysis of pre-prepared AgI
- I-129 AMS analysis + target preparation from soil, sediment, biota, water, swipes

Material	Quantity
Soil	1 - 2 g
Dried Sediment	2 g
Dried biota (plants/animal tissue)	2 g
Water	1 – 2 L
Ice	2 kg

Table 1. Suggested sample sizes for AMS Actinides analysis



Isotopic analysis can be a valuable tool for soil erosion studies

Sample preparation and measurement

Actinides analysis is performed on a variety of sample types, taken from environmental materials such as soil, sediments, water and ice. The sample mass required will depend upon a number of environmental factors such as erosion, deposition rates, mixing processes, depth and age of sample and location of collection. A suggested guide for approximate sample masses required is listed in Table 1. below, however, AMS scientists should be consulted before a sampling plan is constructed.

Please discuss your proposal with the appropriate ANSTO contact scientist before submitting your proposal as they will assist you in making the correct capability selection.

For further information please contact:

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