

# Neutron Activation Analysis (NAA) client information

**We are offering this information as a means of enhancing the quality of the neutron activation analysis (NAA) results we provide and to help clarify our mutual expectations. Safety and security are paramount.**

Information about NAA and its applications can be found on [here](#).

## Sample preparation

- We use high density polyethylene (HDPE) capsules to irradiate samples in the OPAL research reactor. The most common size is 8 mm in diameter and 5 mm high but we have the option of using larger capsules.
- We will typically place 50 to 100 mg of a sample into a capsule. As described on our website, a complete elemental analysis requires both a short and long irradiation so two subsamples will be placed in two capsules. A single subsample can also be used for both short and long irradiations if required.
- Most commonly a client will provide us with around 2 g of pulverised sample. The particle size is not critical but should be small enough that a 50 mg subsample taken with a spatula can be considered to be representative of the supplied sample. If we are required to determine the moisture content of a sample then we will need around 10 g. If uranium analysis by delayed neutron activation analysis (DNAA) is required we will need a further 10 g of sample.
- Generally sample preparation and contamination control is your responsibility. We will analyse the samples 'as received'. In exceptional circumstances we can grind samples for a client or make equipment available for a client to prepare the samples in our laboratory.
- The information in this section relates to the most common cases we encounter. Please contact us if you have special requirements with regard to sample type, size or preparation.

## Sample declaration form

- Before sending your samples we need you to complete a Sample Declaration Form that we will send you. This forms an important link in our 'chain of custody', safety and security systems. We need to be sure that the material we receive is the same as you sent and that we can assess any risks to our staff and facilities.



- As well as information about each sample in the package, we need you to indicate any potential hazards, whether they are chemical, physical or nuclear (send SDS if available). For example, we need to know if samples are explosive, combustible, contain mineral fibres such as asbestos, or contain appreciable amounts of B, Cd, Hf or U.
- We would appreciate it if you could provide any additional information you may have on the composition of the samples, such as analyses by other methods.
- We need you to take a photograph that clearly shows the sample containers, the identification labels and the colour of the samples if possible.

## Sample submission

- After you have completed the sample declaration form email the Word file to [attila.stopic@ansto.gov.au](mailto:attila.stopic@ansto.gov.au). This makes it easier for us to transfer the information into our sample receipt register. Email the photograph to the same address. Include a signed hardcopy of the declaration form in the sample package.
- Send the package of samples to:

ANSTO Main Store/Receiving Dock  
ATT: Attila Stopic  
New Illawarra Rd  
Lucas Heights NSW 2234  
Australia

- Advise us of the carrier used and any tracking number.
- We will let you know when the package arrives.

## International clients

- Australia operates a very stringent quarantine system that is applied to all imported samples.
- Contact us before sending any samples so we can ensure that appropriate import permits and documentation are in place.
- Without prior approvals, samples are likely to be denied entry into the country and may be destroyed.

## Data collection and analysis

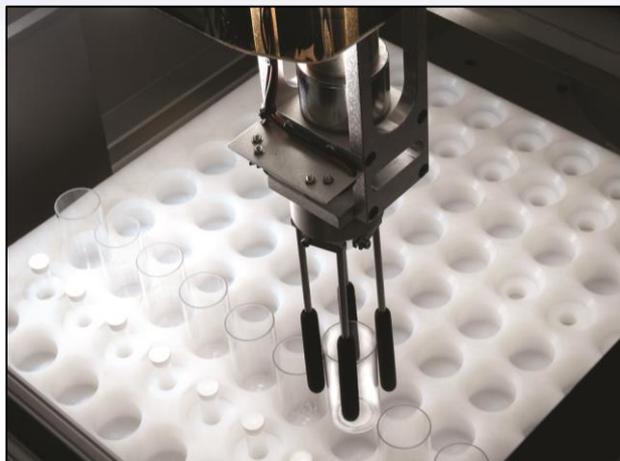
- After a short irradiation of up to 15 minutes, gamma-ray spectra are accumulated from the radioactive sample after a decay time of about 5 minutes and again after about 20 minutes. These two sets of data allow the concentration of a range of elements to be quantified using proprietary software.
- After a long irradiation of up to 20 hours, gamma-ray spectra are accumulated after about 3-5 days and again after about 2 weeks.

## Turn-around time

- Every material that is irradiated in the reactor must be pre-approved to ensure the safety of the facilities and of staff. Many material types already have approvals in place. It may take more than 6 weeks to obtain approval for a new type of material.
- In scheduling samples for irradiation we take into account your priority needs. The minimum time between the receipt of samples and reporting results is around 8 weeks if a full elemental analysis is required and if the material type has already been approved for irradiation. If only a short irradiation is needed then results can usually be reported within 2 weeks.
- Irradiations need to fit in with the reactor schedule which can be seen [here](#). Whilst the OPAL reactor has one of the highest availabilities of any research reactor in the world, there are occasionally unscheduled shutdowns which may increase our turn-around time.

## Reporting

- Results of the analysis will be provided to you in two forms:
  - a PDF report will include tables that list your sample identifier, the concentration of each quantified element and the estimated uncertainty (one standard deviation) of each value; and



- an Excel spreadsheet that also includes an estimate of the detection limit for all elements, even those that could not be quantified.

## Sample disposal

- At the end of a measurement campaign the unused portion of the samples may be returned to you or disposed of, according to your instructions.
- Generally the irradiated samples will be disposed of by ANSTO as radioactive waste.
- In some special circumstances the irradiated samples may be returned to you once radioactivity levels decay below regulatory limits.

## Feedback

- After we have provided the results we will send our invoice for the analyses.
- We will then invite you to provide feedback on the service we have provided.

**To discuss your analytical needs, please contact:**

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