

# Noble Gas Geochronology Laboratory

## Workflow for $^{40}\text{Ar}/^{39}\text{Ar}$ samples

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- (1) Client provides information on geological context of samples, including any existing age constraints.
- (2) Client sends petrographic thin sections/annotated photographs and descriptions to the University of Melbourne (UoM) for assessment of viable phases for  $^{40}\text{Ar}/^{39}\text{Ar}$  dating and grain-sizes and sample mass required. Electron microprobe analysis may be recommended at this stage.
- (3) Client undertakes mineral separation of target mineral(s) and supplies high-purity mineral separates to UoM. Client should ensure that a high-purity separate is provided, to avoid incurring additional costs.<sup>a</sup>

OR

- (3) Client sends rock samples to UoM for mineral separation (additional mineral separation fees apply, depending on sample type and amount required)
- (4) If necessary, samples are purified (hand-picked under binocular microscope), cleaned with appropriate acids, demineralized water and acetone. Samples are then weighed and packaged for irradiation.
- (5) Samples sent for neutron-irradiation
- (6)  $^{40}\text{Ar}/^{39}\text{Ar}$  analyses are conducted at UoM and the data (and/or technical report, depending on nature of agreement), is sent to the client.

*NB. The time between receipt of samples and analysis is typically 9–12 months, largely dependent on reactor schedules. Typical reactor queue times vary from 0.5–3 months. Irradiation durations may range from 0.5 hours to ~1 month, depending on sample ages. Before being shipped to UoM, the irradiated samples must be held by the reactor until the radioactivity decreases to levels acceptable for freighting (this initial ‘cooling’ period is typically 1 month). After the package is received by the UoM, it must be left to cool for an additional ~1-1.5 months (depending on irradiation duration) before it can be safely opened and samples processed as soon as possible with respect to their position in the analysis queue.*

<sup>a</sup> **Instructions for sample preparation:**

- **DO NOT** treat samples with HCl
- **DO** wash samples thoroughly with acetone thoroughly if mineral separation has involved heavy liquids (e.g. SPT and DIM)
- **DO** provide pure high-purity (>95%) mineral separates (screen grains under binocular microscope)
- In the case of basalt samples, avoid submitting vesicular and/or altered material.