

National Argon Map: an AuScope Initiative

⁴⁰Ar/³⁹Ar Geochronology Laboratory Sample Submission Form

This form must be completed and returned to Marnie Forster (Marnie.Forster@anu.edu.au) before any work can be commenced in the Argon Laboratories.

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| Person submitting samples: Joshua Shea |
| Affiliation: Macquarie University |
| Project Title: Geochronology of the eastern Australia leucitite suite |
| Sample Number(s) (including IGSN if one exists): 0901 |
| Mineral separation required? Yes or No: No |
| Date submitted: 15/02/2021 |

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| GEOGRAPHIC AREA/ PROVINCE/ BASIN : Lachlan Orogen | |
| 1:250k SHEET NAME: Bourke | NUMBER: SH/55-10 |
| 1:100k SHEET NAME: Byrock | NUMBER: 8136 |
| LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94): WGS 84 | |
| ZONE: N/A | |
| EASTING: N/A | NORTHING: N/A |
| LATITUDE: -30.709733 | LONGITUDE: 146.316817 |

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| STRATIGRAPHIC UNIT FORMAL NAME *: n/a |
| STRATIGRAPHIC UNIT INFORMAL NAME: Byrock Leucitite |
| LITHOLOGY: Leucitite |

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| DRILLHOLE ID (if applicable): n/a |
| PROSPECT (if applicable): n/a |
| DEPTH FROM (metres): n/a |
| DEPTH TO (metres): n/a |

* Stratigraphic Unit names can be searched and checked within the Australian Stratigraphic Units Database via the following link: <https://asud.ga.gov.au/>

Dating Objective

What is the geological question ⁴⁰Ar/³⁹Ar analysis will address?

Updating legacy ages ⁴⁰K/⁴⁰Ar ages with ⁴⁰Ar/³⁹Ar ages, and comparing Rb-Sr ages with updated Ar ages to assess Ar loss. We hope to see if assess if the magmatic event was longer lived or to confirm it was a short lived event with preferred Ar ages.

What type of age(s) are expected? (e.g. magmatic crystallisation, metamorphism, fluid alteration/mineralisation, cooling, shearing etc):

Magmatic crystallisation

Mineral target(s) for dating:

Leucite groundmass

Estimated ⁴⁰Ar/³⁹Ar age (e.g. Cenozoic, Mesozoic, Paleozoic, Proterozoic, Archean – provide estimated numerical age range if possible):

Miocene (Cohen *et al.* 2008)

Sample Information

Location description (e.g. a sample of x was collected from y, z km from abc town):

Taken from an outcrop on the side of a driveway at the co-ordinates given above, which provided a fresh sample.

Lithological characteristics (rock description):

Porphyritic mafic rock with phlogopite phenocrysts and a blue hue.

Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology):

n/a

Thin section description (if available):

n/a

Photograph(s) e.g. field site, hand-specimen, photomicrograph:

n/a

Relevant bibliographic references:

Cohen, B. E., Knesel, K. M., Vasconcelos, P. M., Thiede, D. S. & Hergt, J. M. 2008. $^{40}\text{Ar}/^{39}\text{Ar}$ constraints on the timing and origin of Miocene leucitite volcanism in southeastern Australia. *Australian Journal of Earth Sciences*, 55, 407-418.