National Argon Map: an AuScope Initiative
$^{40}Ar/^{39}Ar$ 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.

Person submitting samples: Ian T Graham
Affiliation: UNSW Sydney
Project Title: Ar-Ar geochronology of the Rylstone Volcanics
Sample Number(s) (including IGSN if one exists): BD17011-178.5
Mineral separation required? Yes or No: Yes
Date submitted:

GEOGRAPHIC AREA/ PROVINCE/ BASIN : Lachlan Fold Belt/Sydney Basin boundary	
1:250k SHEET NAME: Dubbo	**NUMBER:** SI/55-04
1:100k SHEET NAME: Mudgee	**NUMBER:** 8832
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)	
ZONE:	
EASTING:	**NORTHING:**
LATITUDE: -32.646855	**LONGITUDE:** 149.869841

STRATIGRAPHIC UNIT FORMAL NAME *: Rylstone Volcanics
STRATIGRAPHIC UNIT INFORMAL NAME:
LITHOLOGY: A series of rhyolitic to dacitic volcanic tuffs and minor epiclastics

DRILLHOLE ID (if applicable): BF17011
PROSPECT (if applicable): Bowdens
DEPTH FROM (metres): 178.5
DEPTH TO (metres):178.6

* 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 $^{40}Ar/^{39}Ar$ analysis will address?

The age of crystallisation of muscovite/illite from this tuff sample which will give us am age of the alteration event intimately associated with the Ag-Pb-Zn mineralisation in the Rylstone Volcanics.

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

Alteration/mineralisation

Mineral target(s) for dating:

Muscovite-illite

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

I would expect an age between the middle to late Carboniferous and Early Permian.

Sample Information

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

This sample was collected from a diamond drillcore at Bowdens Ag prospect which is 1.5 km northwest of the town of Lue.

Lithological characteristics (rock description):

A mineralised rhyolitic welded tuff with relatively abundant muscovite-illite (confirmed by XRD).

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

The only radiometric age to date on the Rylstone Volcanics is a Rb-Sr age on biotite of 292 Ma (Shaw et al., 1989) but this lacks details as it is only reported in a conference abstract.

Thin section description (if available):

A thin-section is currently being made for this. Quantitative XRD shows 15 wt% muscovite-illite..

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

Relevant bibliographic references:

COLQUHOUN G., MEAKIN N., KRYNEN J., WATKINS J., YOO E., HENDERSON G. & JAGODZINSKI E. 1997. Stratigraphy, Structure and Mineralisation of the Mudgee 1:00 000 Geological Map Sheet. Quarterly Notes of the Geological Survey of New South Wales 102, 1-16.
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ELLIOT, J., LEACH, T. M. & PRINGLE, I. 2004. Hydrothermal Alteration at the Bowdens Silver Deposit, NSW. PACRIM, 303-306.
FERGUSSON C. L. & COLQUHOUN G. P. 1996. Early Palaeozoic quartz turbidite fan and volcaniclastic apron, Mudgee District, north eastern Lachlan Fold Belt, New South Wales. Australian Journal of Earth Sciences 43, 497 – 507.
MORGAN E. J., BAYLY K., BARRON L., CAMERON R., COLQUHOUN G., DOWNES P., LEYS M., MEAKIN S., OSBORNE A., PALMER D., PICKETT J., RAYMOND O., SCOTT M., SHERWIN L., WATKINS J., WARREN A. & WYBORN D. 1997. Geology and metallogenesis of the Fifield – Peak Hill – Wellington–Gulgong–Mudgee region New South Wales Narromine–Dubbo 1:250 000 geological sheets field conference guide. Geological Survey of New South Wales Report GS1997/080.
PERRY B. 1998. The geological setting of the Bowdens Ag-Pb-Zn Deposits, Lue. B.Sc honours thesis, University of New South Wales, Sydney (unpubl.).
PEMBERTON J. W., COLQUHOUN G. P., WRIGHT A. J., BOOTH A. N., CAMPBELL J. C., COOK A. G. & MILLSTEED B. D. 1994. Stratigraphy and depositional environments of the northern Capertee High. Proceedings of the Linnean Society of New South Wales 114, 195– 224