Geoscience Australia

Geochronology Laboratory Sample Submission Form

This form must be fully completed before any work can be submitted to the Laboratory. It is a requirement that sample location and description data be entered into the GA databases before laboratory work begins.

Person submitting samples:	A Clark		
Project Code:		**Project Name:**	
Sample Number (SITE ID):	2018339537 / 2786115		
Date submitted:	29 Apr 2019		

GEOGRAPHIC AREA/ PROVINCE/ BASIN:	Warramunga Province		
1:250k SHEET NAME:	Alroy	**NUMBER:**	SE5315
1:100k SHEET NAME:	Dalmore	**NUMBER:**	6058
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)	GDA94		
ZONE:			
EASTING:		**NORTHING:**	
LATITUDE:	-19.520077	**LONGITUDE:**	135.95583

FORMAL NAME:	N/A
INFORMAL NAME:	Folded cordierite-sillimanite gneiss
LITHOLOGY:	Gneiss

DRILLHOLE ID:	DDH005	**DEPTH FROM:**	168.89
PROSPECT:		**DEPTH TO:**	169.04

Dating Objective

What is the geological question Ar-Ar analysis will potentially solve?

Amphibolite facies metamorphism and deformation of this sample are known to have occurred at ~1845 Ma (unpublished monazite ages). The primary metamorphic fabric is folded. However, there is little evidence of recrystallization during this second? event. Mica ages should therefore indicate when these rocks were uplifted? and cooled through the 'closure temperatures' of biotite/muscovite.

What type of age(s) are expected? (e.g. magmatic crystallisation, metamorphism, maximum depositional age, detrital age spectrum):

Cooling ages (biotite and muscovite)

Mineral target for dating:

Biotite and muscovite

Sample Information

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

Lithological characteristics (rock description):

Sample 2786115 contains andalusite-sillimanite-plagioclase-quartz-biotite bands interlayered with quartz and muscovite-quartz-feldspar-cordierite bands that collectively define a moderate gneissosity (S_1). S_1, and all minerals noted above, are tight to isoclinally folded (F_2). Both micas are strongly aligned with S_1. Biotite is also commonly included in andalusite. Andalusite porphyroblasts are up to five millimetres in diameter, exhibit ragged grain boundaries and are surrounded by biotite and, locally, sillimanite. Andalusite both overgrow and parallel S_1. Sillimanite (fibrolite) is often intergrown with biotite and aligned with S_1. Feldspar is dispersed throughout the sample but is more common near cordierite. Cordierite are aligned to S_1 but are mostly altered to sericite. Pinnite haloes surrounding monazite in cordierite are common, even in sericitised grains. Cordierite-quartz grain boundaries are often curved. Quartz in quartz-rich bands exhibits amoeboid grain boundaries, with local signs of bulging. Subtle chessboard extinction is preserved locally. Apatite and tourmaline are common matrix accessory phases. Monazite are present as subhedral matrix grains up to ~50 μm long that are sub-parallel to S_1. Monazite are subtly zoned in backscattered electron images. Rounded zircon grains with diameters of several hundred μm are common throughout the sample.

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

A single population of metamorphic monazite from this sample have an age of 1844 ± 3 Ma (in prep). No other age information is available.

Thin section description (if available):

See sample description above.

Photograph(s):

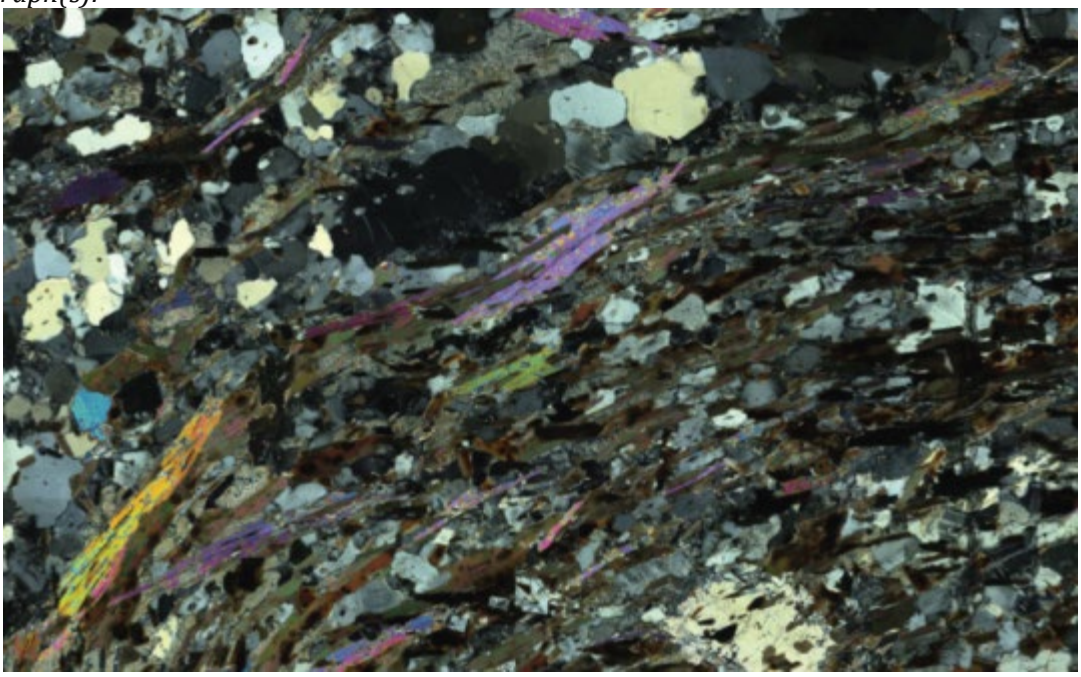

Figure 1: XPL image of sample. FOV approx. 5mm across.

Relevant bibliographic references:

Confidential Data

Is this sample confidential? No

If so, until what date and reason?