

Sample 11 of 20: 224218

Person submitting samples: Paul Duuring
Affiliation: GSWA
Project Title: Tectonism and Exhumation of the Paterson Orogen and East Pilbara Craton margin
Sample Number(s) (including IGSN if one exists): 224218
Mineral separation required? Yes or No: Yes
Date submitted:

GEOGRAPHIC AREA/ PROVINCE/ BASIN : Paterson Orogen/Yeneena Basin	
1:250k SHEET NAME: Anketell	NUMBER: SF51-02
1:100k SHEET NAME: Weenoo	NUMBER: 3256
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94) GPS GDA94	
ZONE: 51	
EASTING: 392767	NORTHING: 7718860
LATITUDE: -20.6264	LONGITUDE: 121.97079

STRATIGRAPHIC UNIT FORMAL NAME *:
STRATIGRAPHIC UNIT INFORMAL NAME:
LITHOLOGY: Metapelite

DRILLHOLE ID (if applicable): PND004
PROSPECT (if applicable): Obelisk
DEPTH FROM (metres): 277.68 m
DEPTH TO (metres): 277.72 m

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

The age of Au-Cu mineralisation at the Obelisk deposit.

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

Fluid alteration/mineralisation

Mineral target(s) for dating:

Biotite

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

Mid- to Late-Neoproterozoic

Sample Information

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

Sample 224218 was collected from drillhole PND004 at the Obelisk deposit in the Paterson Orogen. Drillhole PND004 is located 351 km E of Port Hedland in Western Australia.

Lithological characteristics (rock description):

Quartz-sulfide vein and proximal metasomatized wallrock (sample contains mainly vein quartz (85%), with coarse-grained biotite (10%), chalcopyrite, pyrite, minor chlorite)

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

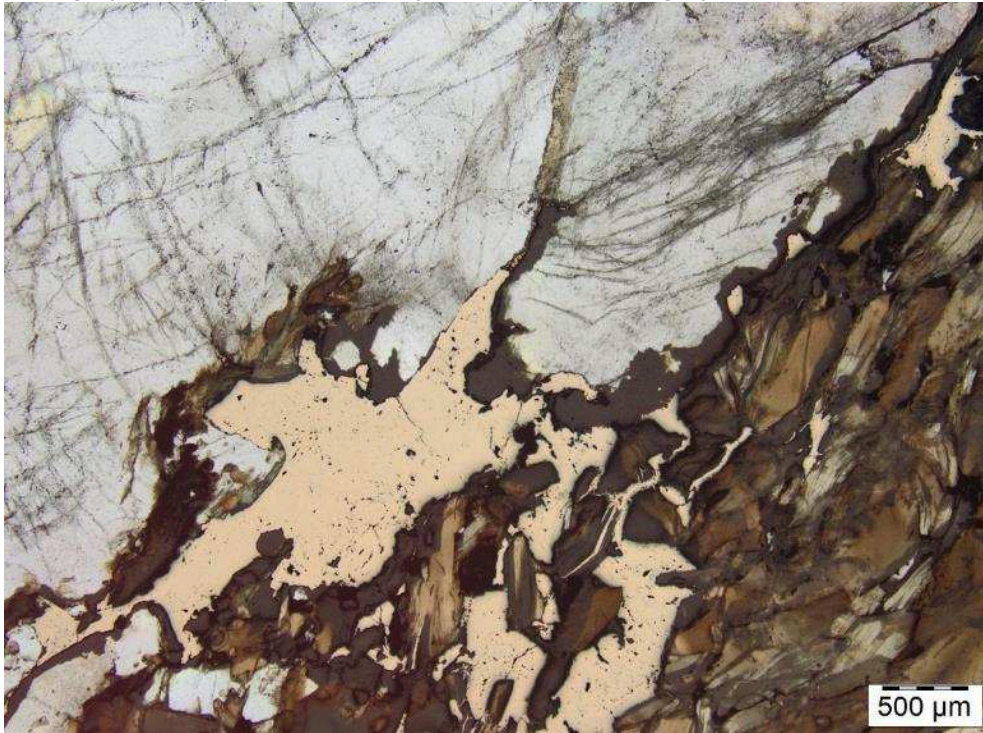
The sample is from basement under Canning Basin sediments and currently assumed to be part of the Yeneena Basin. The mineralisation overprints foliation in the sample and the foliation is expected to correspond to one of either the Miles or Paterson Orogenies. The mineralisation age is expected to be Neoproterozoic, corresponding

to be post- either the Miles (c. 810 – 650 Ma) or Paterson (c. 550 Ma) Orogenies. Sediments of the Yeneena Basin have a maximum depositional age of c. 831 Ma. Alteration & mineralisation is expected to be one of either Miles or Paterson Orogeny timelines.

Thin section description (if available):

An extensional quartz vein that hosts chalcopyrite, pyrite and biotite. The metapsammite wallrock comprises hydrothermal quartz and biotite.

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



Relevant bibliographic references:

Gardiner, NJ, Maidment, DW, Kirkland, CL, Bodorkos, S, Smithies, RH and Jeon, H 2018, Isotopic insight into the Proterozoic crustal evolution of the Rudall Province, Western Australia: *Precambrian Research*, v. 313, 31–50.

Maidment, D, Huston, DL, Maas, R, Czarnota, K, Neumann, N, McIntyre, A and Bagas, L 2008, *The Nifty-Kintyre-Duke Cu-U-Pb-Zn mineralizing events: Links to the evolution of the Yeneena Basin, northwest Paterson Orogen*, in *GSWA 2008 extended abstracts: promoting the prospectivity of Western Australia: Geological Survey of Western Australia: Record 2008/2*, p. 27–29.

Bagas, L 2004, *The Neoproterozoic Throssell Range and Lamil Groups, northwest Paterson Orogen, Western Australia - a field guide: Geological Survey of Western Australia, Record 2004/15*, 18p.

Bagas, L and Nelson, DR 2007, *Provenance of Neoproterozoic sedimentary rocks in the northwest Paterson Orogen, Western Australia*, in *Proceedings of the Central Australian Basins Symposium (CABS), Alice Springs, Northern Territory, 16-18 August 2005* edited by TJ Munson, TJ Munson, GJ Ambrose and GJ Ambrose: Northern Territory Geological Survey: Special Publication, p. 1–10.

Towner, RR 1982, *Anketell, Western Australia (2nd edition): 1:250 000 Geological Series Explanatory Notes: Geological Survey of Western Australia*.