

## Sample 6 of 20: 104919

<b>Person submitting samples:</b> Dave Kelsey
<b>Affiliation:</b> Geological Survey of Western Australia
<b>Project Title:</b> Tectonism and Exhumation of the Paterson Orogen and East Pilbara Craton margin
<b>Sample Number(s) (including IGSN if one exists):</b> 104919
<b>Mineral separation required? Yes or No:</b> yes
<b>Date submitted:</b>

<b>GEOGRAPHIC AREA/ PROVINCE/ BASIN :</b> Rudall Province	
<b>1:250k SHEET NAME:</b> Rudall	<b>NUMBER:</b> SF51-10
<b>1:100k SHEET NAME:</b> Broadhurst	<b>NUMBER:</b> 3353
<b>LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)</b> GDA94	
<b>ZONE:</b> 51	
<b>EASTING:</b> 402399.68	<b>NORTHING:</b> 7518999.57
<b>LATITUDE:</b> -22.43243000	<b>LONGITUDE:</b> 122.05158000

<b>STRATIGRAPHIC UNIT FORMAL NAME *:</b>
<b>STRATIGRAPHIC UNIT INFORMAL NAME:</b> Talbot and Connaughton Zones metagranitic unit
<b>LITHOLOGY:</b> muscovite–quartz metasiltstone

<b>DRILLHOLE ID (if applicable):</b>
<b>PROSPECT (if applicable):</b>
<b>DEPTH FROM (metres):</b>
<b>DEPTH TO (metres):</b>

\* 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?**

What is the cooling/exhumation age from this sample?

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

Cooling/exhumation.

**Mineral target(s) for dating:**

Muscovite

**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):**

WAROX database (field observations) site GSD104919.

**Lithological characteristics (rock description):**

Mylonitic muscovite-bearing siltstone with pervasive S–C fabric. It is a fine-grained muscovite–quartz schist. Accessory tourmaline and Fe–Ti oxide.

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

Magmatic ages for granitic rocks in the Talbot Zone are c. 1765 Ma. Maximum deposition ages of sediments in the Talbot Zone are provided by the intruding c. 1765 Ma Kalkan Supersuite. Cooling/exhumation age is expected to be Neoproterozoic, corresponding to the Miles (c. 810 – 650 Ma) or Paterson (c. 550 Ma) Orogenies.

**Thin section description (if available):**

The sample consists of quartz, muscovite, Fe – Ti oxide and accessory tourmaline. Muscovite defines a strong and pervasive fabric (perhaps C planes) as well as an S-shaped fabric, to give an S–C-like fabric. It is not clear whether it is a true S–C fabric. Quartz has an inequigranular–polygonal shape. Thicker foliae of muscovite are slightly iron-stained to give a brown colour analogous to biotite; however, it is not biotite based on the optical properties of the mineral. Fe – Ti oxide grains occur within and aligned with the muscovite fabric but are commonly subhedral–anhedral in shape.

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



**Relevant bibliographic references:**

Hickman, AH and Bagas, L 1999, *Geological evolution of the Palaeoproterozoic Talbot Terrane and adjacent Meso- and Neoproterozoic successions, Paterson Orogen, Western Australia: Geological Survey of Western Australia, Report 71, 91p.*  
Bagas, L, Williams, IR and Hickman, AH 2000, *Rudall, Western Australia: Geological Survey of Western Australia, 1:250 000 Geological Series Explanatory Notes, 50p.*

*Hickman, AH and Clarke, GL 1994, Geology of the Broadhurst 1:100 000 sheet: Geological Survey of Western Australia, 1:100 000 Geological Series Explanatory Notes, 40p.*