

National Argon Map: an AuScope Initiative

$^{40}\text{Ar}/^{39}\text{Ar}$ 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: Nick Roberts
Affiliation: Mineral Resources Tasmania
Project Title: Mid-Cenozoic chronostratigraphy of central and northern Tasmania
Sample Number(s) (including IGSN if one exists): R010173 (MRT Reg No.); SHB3 (field number)
Mineral separation required? Yes or No: No
Date submitted: 20/07/2021

GEOGRAPHIC AREA/ PROVINCE/ BASIN : NW Tasmania	
1:250k SHEET NAME: Geology of NW Tasmania (2020)	NUMBER: SK55-3 Burnie (old series)
1:25k SHEET NAME: Sheffield	NUMBER: 4441
LOCATION METHOD: 1:25000 topographic map, converted to GDA coordinates	
ZONE: 55	
EASTING: 452812	NORTHING: 5417383
LATITUDE: 41°23'37"S	LONGITUDE: 146°26'8"E

STRATIGRAPHIC UNIT FORMAL NAME *:
STRATIGRAPHIC UNIT INFORMAL NAME: Tertiary basalts
LITHOLOGY: Basalt (olivine nephelinite)

DRILLHOLE ID (if applicable):
PROSPECT (if applicable):
DEPTH FROM (metres):
DEPTH TO (metres):

* 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 sample is from a distinctive flow near the base of an extensive thick (~100 m) local basalt sequence, and will provide an age for the onset of volcanism in this poorly dated area.

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

Cooling/emplacement age.

Mineral target(s) for dating:

Groundmass.

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

Cenozoic. The geographically nearest published K/Ar dates of basalts are 25.9 Ma (12km NNE) and 26.7 Ma (30 km to WNW), but these are chemically different basalts from separate eruptive centres. Based on ^{40}K - ^{40}Ar and $^{40}\text{Ar}/^{39}\text{Ar}$ ages of other Tertiary basalt-flow sequences in this part of NW Tasmania, the age is likely to be between ca. 40 and 20 Ma.

Sample Information

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

This surface sample is from 5.5 km south of Railton, Tasmania, along Stoodley Road from ~250 m asl.

Lithological characteristics (rock description):

Olivine nephelinite.

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

The only direct constraint on the local basalt sequence is that it overlies Permian strata. However, this sample probably underlies the nearby hawaiite sample R010174 (submitted in the same batch) and thus is expected to be older than that sample.

Thin section description (if available):

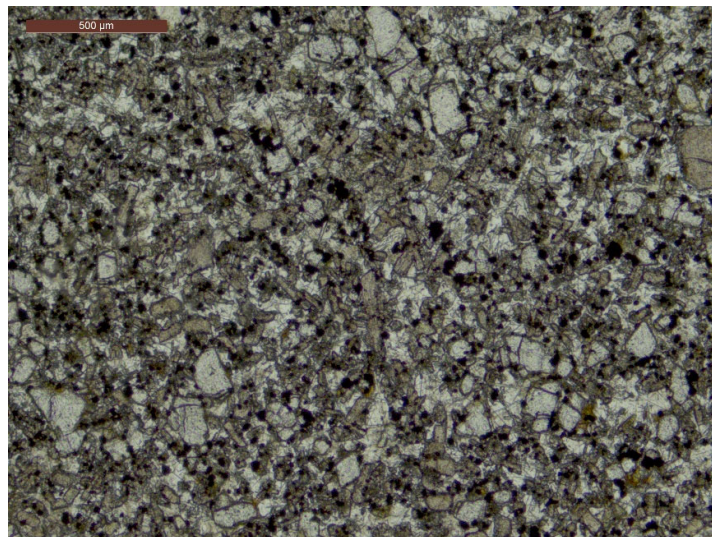
A relatively coarse-grained, well crystallised nephelinite, collected from lower part of the local basalt. Closely packed equant anhedral olivine (mostly 100-300um), pinkish titaniferous augite (up to 200um) and equant opaque grains (mostly 10-40um) are set in a colourless mesostasis of low relief and birefringence (nepheline and analcime). Slightly coarser-grained patches within the mesostasis consist of a mosaic of anhedral colourless untwinned grains (uniaxial negative, probably nepheline) up to 50um across. Acicular apatite (up to 100um x 1-3um) is very abundant within the mesostasis. Small ragged laths (<50um, mostly <20um) of pleochroic, medium to dark red-brown biotite are present in small amounts.

Rare phenocrysts (up to 1mm) of olivine are subhedral to anhedral and show signs of reaction with the groundmass, and may be xenocrysts. Rare rounded anhedral opaque grains (<300um) may be reacted chrome spinel xenocrysts. Lherzolite nodules were noted from near this locality. Rare rounded amygdales (<1mm) are filled with zeolite, clear and colourless to turbid and pale brownish. Although there is some alteration of olivine at the margin of the slide, most of the rock is very fresh.

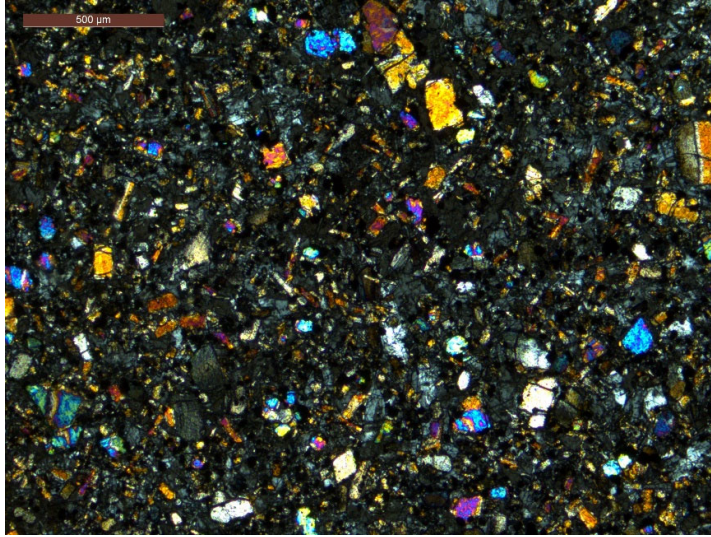
X-ray diffraction has confirmed major augite, olivine, nepheline and analcime; minor magnetite and phillipsite; and minor to trace smectite.

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

These and additional photomicrographs have been provided to laboratory staff at Curtin University.



R010173_SHB3_x5_PPL



R010173_SHB3_x5_XN

Relevant bibliographic references:

None.