MINERAL RESOURCES TASMANIA

Laboratory Report

LJN2020-127

Including LJN2018-082, 093, 20-094

MINERALOGICAL, PETROLOGICAL AND GEOCHEMICAL ANALYSES,

An unpublished Mineral Resources Report for:

JC van Moort

POIMENA & LOTTAH GRANITES

By: R S Bottrill, L Unwin, and J Renaud

Date: 18 November 2020

Mineral Resources Tasmania
Department of State Growth

Tasmanian Government

SUMMARY

The granitoids from Poimena are mostly monzogranites, with subequal amounts of plagioclase and Kspar, and minor muscovite, biotite and chlorite. The granitoids from Lottah are mostly syenogranites, with less plagioclase than Kspar, and mostly minor muscovite, biotite and chlorite. One Lottah granite is greisenised, with abundant muscovite, minor topaz and trace tourmaline).

INTRODUCTION

Fifteen granitic rock samples from the Poimena/Lottah area, collected by Jan van Moort, University of Tasmania, were submitted for mineralogical analysis to determine the rock types. Details are shown in Table 1.

Table 1: Sample details

Reg Number	Field No.	Location	Sample Description	XRF all	XRF major	XRD	TS
C111606	LOT 6	roadside cutting Weldborough Road, Lottah	Lottah granite				y
C113265	LOT 8	Just W of Crystal Creek bridge on Lottah Road	Medium grained equigranular biotite muscovite granite Lottah Granite/ Poimena granite?			y	?
C113266	LOT 9	Anchor mine portal, Blue Tier	Equigranular altered biotite muscovite topaz granite. Lottah Granite			y	y
G406058	OCD	Old Chum Dam	Poimena Granite	y		y	?
C111608	POI 1	Poimena	Poimena Granite			y	y
C113256	POI 3	Poimena	Poimena Granite	y		y	y
C113257	POI 4	Poimena	Poimena Granite	y		y	?
C113258	POI 5	Poimena	Poimena Granite	y		y	y
G408769	POI 6	Poimena	Poimena Granite		y	y	
G408770	POI 7	Poimena	Lottah Granite/ Poimena granite?		y	y	
G408772	POI 9	Poimena	Poimena Granite			y	
G408773	POI 10	Poimena	Poimena Granite		y	y	
G408774	POI 11	Poimena	Lottah Granite/ Poimena granite?		y	y	
G408775	POI 12	Poimena	Poimena Granite			y	
G408776	POI 13	Poimena	Poimena Granite		y	y	

Commented [UL1]: Are these supposed to have ??

METHODS

To determine the nature of the rocks, the samples were examined and variably subsampled for analysis by XRD, XRF, NDIR and petrography in the Mineral Resources Tasmania (MRT) Laboratories, Rosny Park and Mornington.

SAMPLE DESCRIPTIONS

C111606 LOT6

In hand specimen, sample C111606 is an aphyric, micaceous and kaolinitic, coarse grained, cream-grey granite (Fig. 1).

Fig. 1. Sample C111606 as submitted, broken surface. FOV ~100mm.

C111608 POI-1

In hand specimen, sample C111608 is an aphyric, coarse grained, cream granite (Fig. 2).

Fig. 2. Sample C111608, cut surface, FOV ~100mm.

C113256 POI3

Sample C113256 is an aphyric, medium grained, cream-grey granite (Fig. 3).

Fig. 3. Sample C113256 as submitted, cut surface. FOV ~100mm.

C113257 POI-4

In hand specimen, sample C113257 is an aphyric, medium grained, grey granite (Fig. 4).

Fig. 4. Sample C113257 as submitted, broken surface. FOV ~100mm.

C113258 POI5

Sample C113258 is an aphyric, medium grained, pale grey granite (Fig. 5).

Fig. 5. Sample C113258 as submitted, broken surface. FOV ~100mm.

C113265 LOT8

Sample C113265 is an aphyric, medium grained, pale pinkish grey granite (Fig. 6).

Fig. 6. Sample C113265 as submitted, cut surface. FOV ~100mm.

C113266 LOT9

Sample C113266 is an aphyric, coarse grained, pale grey granite (Fig. 17).

Commented [UL2]: 7 not 17

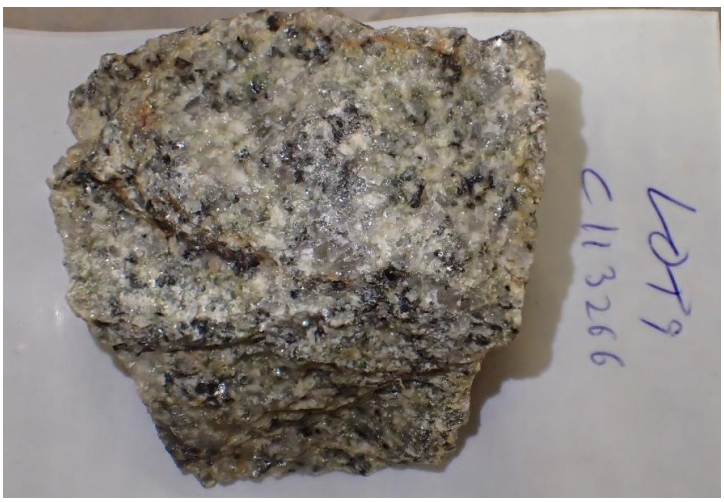


Fig. 7. Sample C113266*, as received, FOV ~100mm.*

G406058 OCD

Sample G406058 is an aphyric, coarse grained, pale grey granite (Fig. 8).

Fig. 8. Sample G406058*, as received, FOV ~80mm.*

G408769 POI 6

Commented [UL3]: No picture

In hand specimen, sample G408769 is an aphyric, coarse grained, pale grey granite.

G408770 POI 7

In hand specimen, sample G408770 is an aphyric, coarse grained, pale grey granite (Fig. 9).

Fig. 9. Sample as submitted, broken surface; sample G409770. FOV ~100mm.

G408772 POI 9

In hand specimen, sample G408772 is an aphyric, coarse grained, pale grey-white granite (Fig. 10).

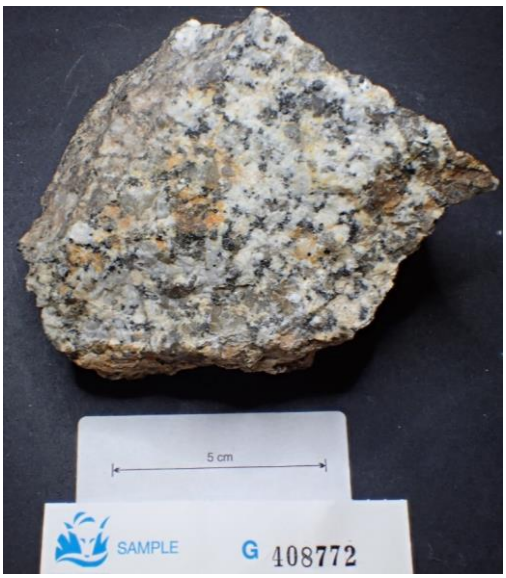


Fig. 10. Sample G408772, as received, FOV ~100mm.

G408773 POI 10

Sample G408773 is an aphyric, coarse grained, pale grey granite (Fig. 11).

Fig. 11. Sample G408773, as received, FOV ~120mm.

G408774 POI 11

Sample G408774 is an aphyric, coarse grained, pale grey granite (Fig. 12).

Fig. 12. Sample as submitted, broken surface; sample G409774. FOV ~90mm.

G408775 POI 12

Sample G408775 is an aphyric, medium grained, pale grey granite (Fig. 13).

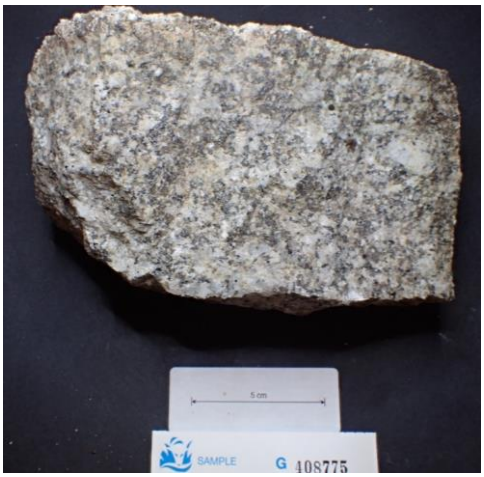


Fig. 13. Sample G408775, as received, FOV ~120mm.

G408776 POI 12

Sample G408776 is an aphyric, coarse grained, pale grey-white granite (Fig. 14).

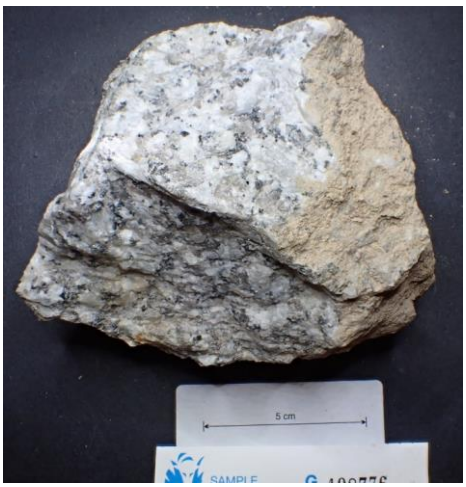


Fig. 14. Sample G408776, as received, FOV ~120mm.

PETROLOGY SUMMARY

Several samples were prepared as thin sections and studied by polarised light microscopy. The results are summarised in Appendix 1.

Table 1: Sample details

Mineral	C111606	**C113266**	**C111608**	**C113256**	**C113258**
Field No	LOT 6	LOT 9	POI 1	POI 3	POI 5
Quartz	30	30	35	30	35
K-Feldspar	30	40	40	25	15
Plagioclase/Albite	10	15	15	30	40
Topaz	5		0		
Biotite	3	8	5	2	5
Muscovite/illite	20	2	5	5	5
Kaolinite/Halloysite					
Chamosite		2	1	5	
Schorl	2		0		
Hornblende					
Ilmenite		1		2	

The samples are all coarse grained, aphyric granitic rocks, with mostly minor biotite and muscovite. The feldspars are quite altered and the Kspar is perthitic microcline or orthoclase. Topaz and muscovite are pervasive in one sample.

XRF

Representative subsamples of fresh material from some samples were crushed, milled and analysed for major elements on a fused disc, and some for trace elements on a pressed pellet, in a Bruker ASX58 XRF (X-ray fluorescence spectrometer), with proprietary Bruker software and a series of commercial standards. The results are shown in Appendix 1.

NDIR

The carbon and sulphur contents of G406058 were determined by Non-dispersive infrared (NDIR) analysis using a Bruker G4 Icarus analyser, in the MRT laboratories, Rosny Park. The results have been included in Appendix 1.

XRD ANALYSES

Some samples were prepared, examined, and analysed in the MRT laboratories, Rosny Park, Tasmania. They were run on a Rigaku Miniflex 600 X-Ray Diffractometer system: a 600W generator 150mm goniometer with a Cu tube; 40kV/15mA, sample spinner and a Scintillation counter (SC) with Be window, a graphite counter monochromator and a Kß Ni- filter. Measurement setup: 3-63˚ Theta/2Theta range, with a scanning speed of 0.5˚/min. The analysis software used is the PDXL2 using the ICCD database.

Quantification is largely manual, using a series of prepared standards of the more common minerals to enable some semi-quantitative analysis. Quartz, if present, is used as an internal standard; and if not present, it is often added to the sample for a supplementary scan. Our semi-quantitative results are calculated using single-peak calibration factors derived from scans of known mixtures of minerals.

The results are shown in Appendix 2 and Table 3: the main minerals are quartz, feldspars, micas and chlorites.

MINSQ

XRF and XRD data for G408776 were combined into the MINSQ program to refine the mineralogical results, using a least-squares refinement process (Herrmann and Berry, 2002). This data is incorporated in Table 2.

Table 3: Summary of XRD Results (wt.%, +/-error)

Mineral	C113265	C113266	G406058	C111608	C113256	C113257	C113258
Field No	LOT 8	LOT 9	OCD	POI 1	POI 3	POI 4	POI 5
Quartz	27(2)	27.0(10)	25(8)	29(5)	49.2(12)	33.1(14)	29.5(10)
K-Feldspar	29(5)	53.6(8)	43(10)	49(10)	18.2(9)	24.9(14)	33.0(15)
Plagioclase/Albite	11.1(2)	12.4(2)	12(4)	11(4)	25.6(9)	20(2)	22.5(16)
Topaz		3.3(5)	2(2)				
Biotite	6.3(5)	1.4(1)		5(2)	2.4(14)	9.6(3)	5.4(10)
Muscovite/illite	11.3(9)	1.2(4)	14(4)				3.8(5)
Kaolinite/Halloysite		<1	3(2)				
Chamosite		<1		1(1)	4.19(17)	9.3(8)	
Schorl	2.1(9)		1(1)	5(2)			
Hornblende							
Ilmenite					<1	2.7(9)	5.9(18)

Mineral	G408770	G408772	G408773	G408774	G408775	G408776
Field No	POI-7	POI-9	POI-10	POI-11	POI-12	POI-13
Quartz	41(10)	43(10)	35(10)	31(8)	38(10)	32(8)
K-Feldspar	29(8)	26(8)	33(8)	60(10)	33(8)	29(8)
Plagioclase/ Albite	25(8)	23(5)	21(5)	5(3)	20(5)	35(10)
Muscovite	3(2)	4(2)	6(3)	2(2)	7(3)	1(1)
Biotite	2(2)	3(2)	4(2)	1(1)	3(2)	1(1)
Chlorite	1(1)	<1(1)	1(1)	1(1)	<1(1)	1(1)
Magnetite						1(1)

CONCLUSIONS AND DISCUSSION

The rocks all consist of quartz, K-feldspar, Na-rich plagioclase, muscovite, biotite and chlorite, with one greisenised sample (C111606) containing abundant muscovite, trace tourmaline and minor topaz. The mineral proportions indicate the Lottah granite rocks to be mostly classified as syenogranite , and the Poimena granite to be monzogranite (previously called adamellite). G408774 was labelled Poimena but is a greisenised alkali-feldspar granite, probably from the Lottah granite. The sample G408770 was labelled as a Lottah granite but mineralogically is a monzogranite, indistinguishable from the Poimena granite. The low -moderate muscovite contents are typical of peraluminous granites. G406058 is a

MINERAL RESOURCES TASMANIA

Lottah granite by XRD mineralogy but Poimena granite by geochemistry – this is possibly due to a sample mixup?

Table 4: Summary of Results (L: Lottah, P: Poimena)

Reg Number	Field No.	Sample Description	XRF all	XRF major	XRD	TS
C111606	LOT 6	Lottah granite (greisenised)				L
C113265	LOT 8	Lottah Granite			L	
C113266	LOT 9	Lottah Granite			L	L
G406058	OCD	?	P		L	
C111608	POI 1	Lottah Granite			L	L
C113256	POI 3	Poimena Granite	P		P	P
C113257	POI 4	Poimena Granite	P		P	
C113258	POI 5	Poimena Granite	P		P	P
G408769	POI 6	Poimena Granite		P	P	
G408770	POI 7	Poimena granite		P	P	
G408772	POI 9	Poimena Granite			P	
G408773	POI 10	Poimena Granite		P	P	
G408774	POI 11	Lottah Granite		L	L	
G408775	POI 12	Poimena Granite			P	
G408776	POI 13	Poimena Granite		P	P	

Commented [UL4]: I sent you the updated results for this one weren't they any good?

R.S. Bottrill
MINERALOGIST/PETROLOGIST

J Renaud and L Unwin
TECHNICAL OFFICERS

Mineral Resources Tasmania

Appendix 1: XRF Reports

Client: JC van Moort
Sample Source: Poimena district
MRT Job Number: LJN2020-094
Analysis: Chemistry
Analyst: J Renaud
Methods: XRF

TIGER ID		POI 13
Sample Name		G408776
Measurement Finished		14/10/20 12:42
Comments		Cr pot
Calibration Method	Traces All (No Sulphides)	Majors 2016
Job No	DL	LJN2020 066
Sum (%)		99.61
LOI(%)		0.41
SiO2 (%)	0.10	73.03
TiO2 (%)	0.01	0.16
Al2O3 (%)	0.20	14.03
Fe2O3 (%)	0.10	1.75
MnO (%)	0.01	0.02
MgO (%)	0.02	0.25
CaO (%)	0.01	1.64
Na2O (%)	0.10	3.13
K2O (%)	0.01	5.12
P2O5 (%)	0.01	0.07

Mineral Resources Tasmania

Appendix 1a: XRF Laboratory Report

MRT Job Number: LJN2018-082
Client: R. Bottrill
Sample Source: Lottah-Poimena
Analysis: Geochemistry
Method: X-Ray Fluorescence – Major elements
Analyst: L Unwin
Lab Manager: R Bottrill
Date: 22/12/2017

Results:

Reg. #	C113256	C113257	C113258	G406058
Sample Description	Granite	Granite	Granite	Greisen
Field #	POI3	POI4	POI5	OCD
Other References				LJN2016-103
Locality	Poimena	Poimena	Poimena	Old Chum dam
TOTAL %	100.03	99.6	100.13	100.14
SiO2 %	73.48	71.21	73.11	72.72
TiO2 %	0.28	0.4	0.29	0.34
Al2O3 %	13.59	13.92	13.9	13.84
Fe2O3 %	2.41	3.1	2.27	2.65
MnO %	0.07	0.08	0.06	0.06
MgO %	0.55	0.73	0.54	0.56
CaO %	1.06	1.14	1.62	1.49
Na2O %	2.97	2.7	3.32	3.14
K2O %	4.68	4.59	4.41	4.57
P2O5 %	0.11	0.12	0.1	0.14
LOI %	0.69	1.47	0.38	0.5
C wt %				0.13
S wt %				0.1

Mineral Resources Tasmania

MRT Job Number: LJN2018-082
Client: R. Bottrill
Sample Source: Lottah-Poimena
Analysis: Geochemistry
Method: X-Ray Fluorescence – Trace elements
Analyst: L Unwin
Lab Manager: R Bottrill
Date: 22/12/2017

Results:

Reg. #	C113256	C113257	C113258	G406058	Detection Limit	Units
As ppm	0	0	22	0	3	ppm
Ba ppm	285	365	277	365	5	ppm
Bi ppm	0	0	0	0	1	ppm
Ce ppm	59	67	51	47	5	ppm
Co ppm	3	4	2	4	2	ppm
Cr ppm	0	0	0	0	1	ppm
Cs ppm	20	24	19	18	3	ppm
Cu ppm	4	5	17	4	2	ppm
Ga ppm	18	18	16	18	1	ppm
La ppm	27	33	25	23	6	ppm
Mo ppm	0	0	0	0	1	ppm
Nb ppm	13	13	10	11	1	ppm
Nd ppm	17	25	20	17	7	ppm
Ni ppm	49	97	54	59	2	ppm
Pb ppm	33	34	33	34	2	ppm
Rb ppm	297	252	239	242	1	ppm
Sb ppm	0	1	0	0	2	ppm
Sc ppm	5	7	6	6	2	ppm
Sn ppm	7	11	16	8	2	ppm
Sr ppm	89	101	109	111	1	ppm
Th ppm	18	21	16	15	2	ppm
U ppm	8	9	9	3	1	ppm
V ppm	23	38	27	30	2	ppm
W ppm	2	2	2	2	2	ppm
Y ppm	28	32	32	34	1	ppm
Zn ppm	48	61	73	53	1	ppm
Zr ppm	115	138	104	126	2	ppm

Mineral Resources Tasmania

Reg. #	G408769	G408770	G408773	G408774
Originators	Van Moort J C	Van Moort J C	Van Moort J C	Van Moort J C
Sample Description	Poimena Granite	Lottah Granite	Poimena Granite	Poimena Granite
Lithostratigraphy	Poimena Granite	Lottah Granite	Poimena Granite	Poimena Granite
Field #	POI 6	POI 7	POI 10	POI 11
Locality	Poimena Granite	Lottah Granite	Poimena Granite	Poimena Granite
SiO2 %	72.95	74.81	71.11	72.52
TiO2 %	0.29	0.33	0.39	0.38
Al2O3 %	13.57	12.72	14.54	13.61
Fe2O3 %	2.84	2.47	3.11	3.15
MnO %	0.05	0.05	0.05	0.05
MgO %	0.59	0.52	0.64	0.67
CaO %	1.52	1.24	0.65	0.33
Na2O %	2.91	2.6	3.28	1.41
K2O %	4.48	4.57	4.95	5.15
P2O5 %	0.12	0.1	0.12	0.14
LOI %	0.74	0.7	1.23	2.46
TOTAL %	100.07	100.12	100.08	99.85
C wt %				
S wt %				

Commented [UL5]: Did we do these?

Mineral Resources Tasmania

Appendix 2: XRD Laboratory Reports

MRT Job Number: LJN2018-082
Client: R. Bottrill
Sample Source: Lottah-Poimena
Analysis: Approximate Mineralogy

Method: X-Ray Diffraction
Analyst: L Unwin
Lab Manager: R Bottrill
Date: 10/4/2021

XRD Results-C111608-LJN2018-082-Van Moort

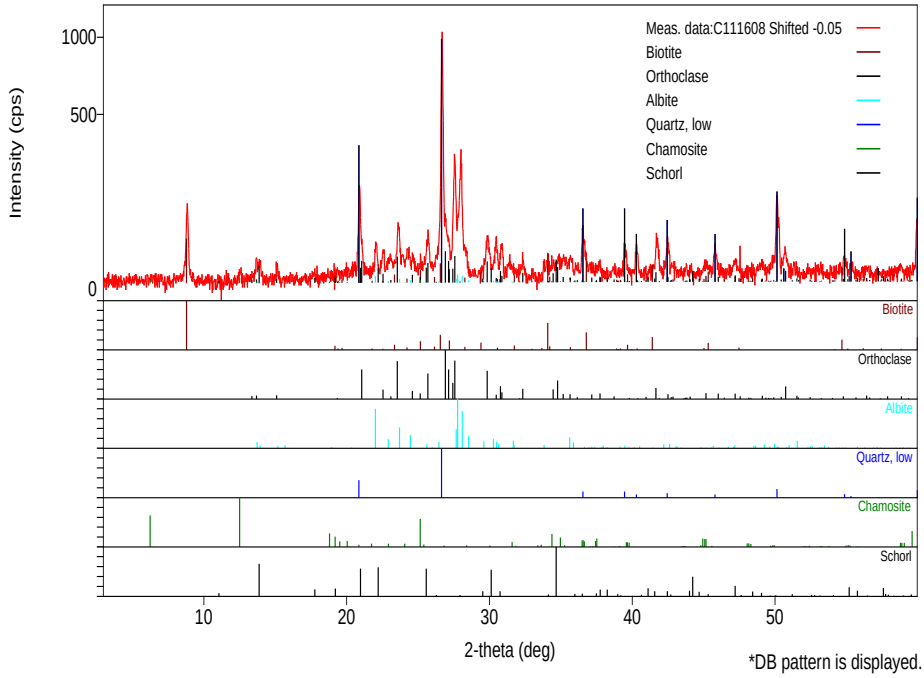
General information

Analysis date	2021/03/25 16:26:22		
Sample name	LJN2018-082	Measurement date	2018/07/03 13:32:34
File name	C111608.ras	Operator	lunwin
Comment	Shifted -0.05		

Quantitative analysis results

Phase name	Content(%)	Formula
Quartz	29(5)	Si O2
Orthoclase	49(10)	K4 Al4 Si12 O32
Albite	11(4)	Na (Al Si3 O8)
Biotite	5(2)	(K2) (Fe2 Mg3) (Si6 Al2) O22.(OH)2
Chamosite	1(1)	Mg1.78 Mn0.08 Fe2.72 Al2.44 Si2.88 O10 (OH)8
Schorl	5(2)	Na Fe3 Al6 (BO3)3 (Si6 O18) (OH)4

Phase data pattern



*DB pattern is displayed.

Mineral Resources Tasmania

XRD Results-C113256-LJN2018-082-Van Moort

General information

Analysis date	2018/07/11 10:57:40		
Sample name	LJN2018-082-Van Moort	Measurement date	2018/07/03 14:39:00
File name	C113256.ras	Operator	lunwin
Comment	Shifted -0.09		

Quantitative analysis results

Phase name	Content(%)	Formula	Figure of merit
Quartz	49.2(12)	Si O2	1.214
Albite	25.6(9)	Na Al Si3 O8	1.682
Orthoclase	18.2(9)	K Al Si3 O8	1.053
Chamosite	4.19(17)	(Mg1.5 Fe7.9 Al2.6) (Si6.2 Al1.8 O20) (O H)16	1.305
Biotite	2.42(14)	(K1.907 Na0.033) (Al0.090 Fe2.397 Mg3.071	0.861
Ilmenite	0.41(17)	Fe1.04 Ti0.96 O3	2.914

XRD Results-C113257-LJN2018-082-Van Moort

General information

Analysis date	2018/07/11 11:06:11		
Sample name	LJN2018-082-Van Moort	Measurement date	2018/07/06 08:36:09
File name	C113257.ras	Operator	lunwin
Comment	Shifted -0.1		

Quantitative analysis results

Phase name	Content(%)	Formula	Figure of merit
Quartz	33.1(14)	Si O2	0.455
Orthoclase	24.9(14)	K Si3 Al O8	1.255
Albite	20(2)	Na Al Si3 O8	0.931
Biotite	9.6(3)	K Fe Mg2 (Al Si3 O10) (O H)2	0.687
Chamosite	9.3(8)	Mg1.78 Mn0.08 Fe2.72 Al2.44 Si2.88 O10 (	1.686
Ilmenite	2.68(9)	Fe1.04 Ti0.96 O3	1.350

XRD Results-C113258-LJN2018-082-Van Moort

General information

Analysis date	2018/07/11 09:30:31		
Sample name	LJN2018-082-Van Moort	Measurement date	2018/07/06 10:18:55
File name	C113258.ras	Operator	lunwin
Comment	Shifted -0.13		

Quantitative analysis results

Phase name	Content(%)	Formula
Orthoclase	33.0(15)	K Si3 Al O8
Quartz	29.5(10)	Si O2
Albite	22.5(16)	Na Al Si3 O8
Ilmenite	5.88(18)	Fe1.04 Ti0.96 O3
Biotite	5.4(10)	K Fe Mg2 (Al Si3 O10) (O H)2
Illite	3.8(5)	K0.7 Na0.01 Ca0.01 Mg0.15 Fe0.04 Al2.59 Si3.27 O10 (O H)2

Mineral Resources Tasmania

XRD Results-G406058-LJN2018-082-Van Moort

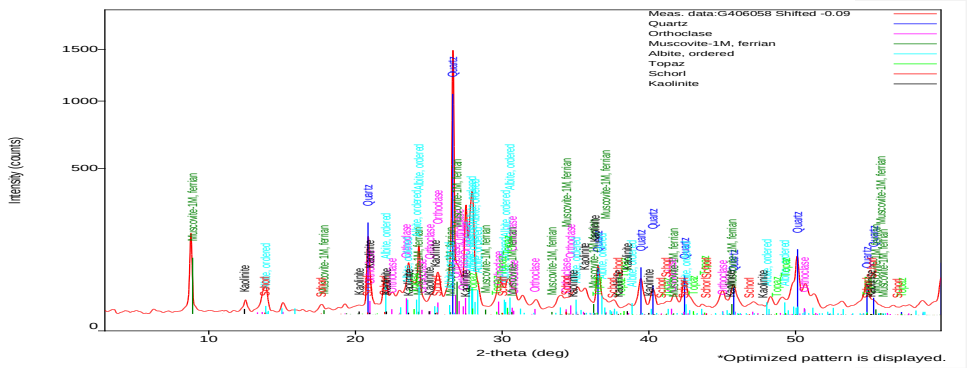
General information

Analysis date	2021/03/25 15:39:39		
Sample name	LJN2018-082-Van Moort	Measurement date	2018/07/05 15:26:43
File name	G406058.ras	Operator	lunwin
Comment	Shifted -0.09		

Quantitative analysis results

Phase name	Content(%)	Formula	Figure of merit
Quartz	25(8)	Si O2	0.675
Orthoclase	43(10)	K4 Al4 Si12 O32	1.569
Albite	12(4)	Na Al Si3 O8	1.389
Muscovite	14(4)	K0.9 (Li0.20 Fe0.92 Al1.2) (Al0.82 Si3.18 O10) (O	1.113
Topaz	2(2)	Al2 (F0.95 (O H)0.05)2 (Si O4)	2.573
Schorl	3(2)	Na0.55 (Fe1.9 Al0.83) Al6 (BO3)3 (Si5.86 Al0.14	2.674
Kaolinite	1(1)	Al2 Si2 O5 (O H)4	2.588

Phase data pattern



XRD Results-C113265-LJN2018-093-Van Moort

General information

Analysis date	2018/08/16 14:17:53		
Sample name	LJN2018-093-JvM	Measurement date	2018/08/16 09:26:23
File name	C113265.ras	Operator	lunwin

Quantitative analysis results

Phase name	Content(%)	Formula
Microcline	29(5)	K0.97 Na0.01 Al0.98 Si3.02 O8
Quartz	27(2)	Si O2
Albite	11.1(18)	Na Al Si3 O8
Muscovite	11.3(9)	K0.77 Al1.93 (Al0.5 Si3.5 O10) (OH)2
Biotite	6.3(5)	K Fe Mg2 (Al Si3 O10) (O H)2
Schorl	2.1(9)	Na Fe3 Al6 (BO3)3 (Si6 O18) (OH)4

Mineral Resources Tasmania

XRD Results-C113266-LJN2018-093-Van Moort

General information

Analysis date	2018/08/16 15:46:37		
Sample name	LJN2018-093-JvM	Measurement date	2018/08/16 11:05:45
File name	C113266.ras	Operator	lunwin

Quantitative analysis results

Phase name	Content(%)	Formula
Microcline	53.6(8)	K0.97 Na0.01 Al0.98 Si3.02 O8
Quartz	27.0(10)	Si O2
Albite	12.44(18)	Na Al Si3 O8
Topaz	3.3(5)	Al2 (F0.95 (O H)0.05)2 (Si O4)
Biotite	1.41(17)	(K1.9Na0.1) (Fe2.4 Mg3.1 Ti0.4) ((Si5.6 Al2.4) O21 (O H)2.5)
Muscovite	1.2(4)	K0.77 Al1.9 (Al0.5 Si3.5 O10) (O H)2
Halloysite-	0.8(3)	Al2 Si2 O3 (O H)8
Chamosite	0.20(3)	Mg1.3 Fe3.4 Al2.6 Si2.7 O10 (O H)8

Mineral Resources Tasmania

Appendix 2b: XRD Mineralogy Report

Client: JC van Moort
Sample Source: Poimena district
MRT Job Number: LJN2020-094
Analysis: Mineralogy
Methods: XRD

XRD Results-G408769-LJN2020-127-VanMoort-QA1-4/2/21

General Information

Measurement date:	4/2/2021	**Interpretative date:**	4/2/2021
Job Number/Client:	LJN2020-127	**XRD**	Rigaku Miniflex 600
Registration Number:	G408769	**Analyst:**	LUnwin
Quantitative Method:	XPlot	**Process Medium:**	Wholerock
Sample Holder:	Standard	**Speed (deg/min):**	0.5
Comment:	Shifted -0.2		

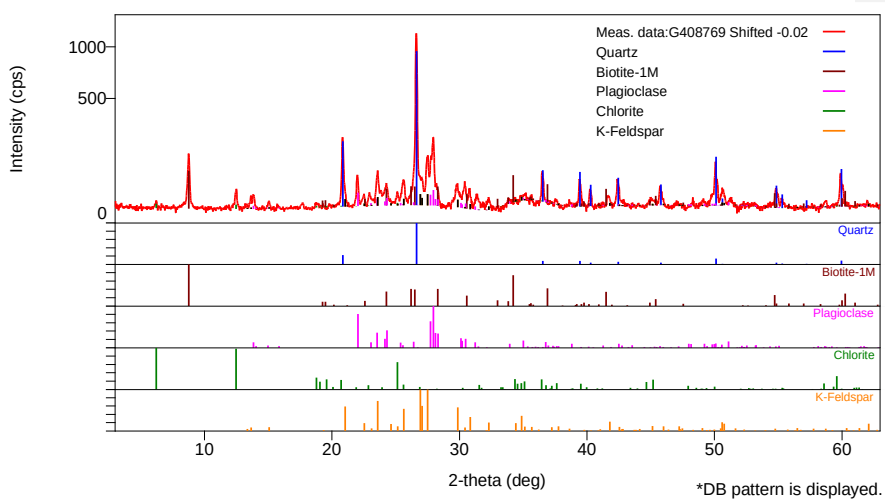
Analysis Results

Phase name	Content wt% (± error)	Formula
Quartz	39(10)	SiO_2
Biotite-1M	8(3)	$K(Mg,Fe)_3[AlSi_3O_{10}](OH)_2$
Plagioclase	23(5)	$NaAlSi_3O_8$
Chlorite	1(1)	$(Mg,Fe,Al)_6(Si,Al)_4O_{10}(OH,O)_8$
K-Feldspar	29(8)	$K(AlSi_3O_8)$

Notes
Peak overlap may interfere with identifications and quantitative calculations.
Amorphous minerals and minerals present in trace amounts may not be detected.
Plagioclase* probably Albite
Chlorite* probably Clinochlore
K-Feldspar probably Orthoclase

Mineral Resources Tasmania

Phase Data Pattern



*DB pattern is displayed.

XRD Results - G408772

General Information

Measurement date:	25/9/2020	**Interpretative date:**	12/11/2020
Job Number/Client:	LJN2020-094 Moort	**XRD**	Rigaku Miniflex 600
Registration Number:	G408772	**Analyst:**	J Renaud
Quantitative Method:	XPlot	**Process Medium:**	Wholerock
Sample Holder:	Standard	**Speed (deg/min):**	0.5
Comment:	Shifted -0.1		

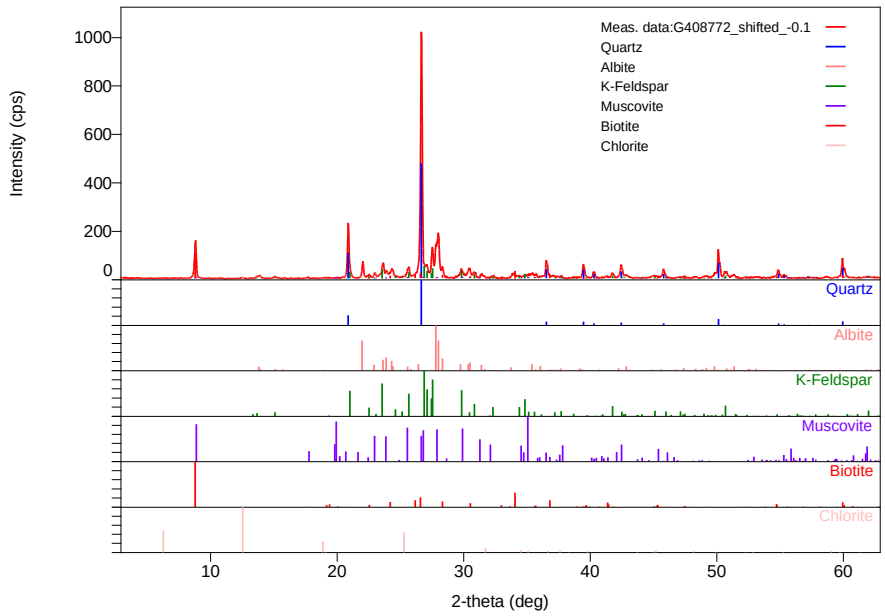
Analysis Results

Phase name	Content wt% (± error)	Formula
Quartz	43(10)	SiO_2
K-Feldspar	26(8)	$KAlSi_3O_8$
Albite	23(5)	$Na_{0.5}Ca_{0.5}Si_3AlO_8$
Muscovite	4(2)	$KAl_2(AlSi_3O_{10})(OH)_2$
Biotite	3(2)	$K(Mg,Fe)_3[AlSi_3O_{10}(OH)_2$
Chlorite	<1(1)	$(Mg,Fe,Al)_6(Si,Al)_4O_{10}(OH,O)_8$

Notes
Peak overlap may interfere with identifications and quantitative calculations.
Amorphous minerals and minerals present in trace amounts may not be detected.

Mineral Resources Tasmania

Phase Data Pattern



XRD Results - G408773

General Information

Measurement date:	25/9/2020	**Interpretative date:**	12/11/2020
Job Number/Client:	LJN2020-094 Moort	**XRD**	Rigaku Miniflex 600
Registration Number:	G408773	**Analyst:**	J Renaud
Quantitative Method:	XPlot	**Process Medium:**	Wholerock
Sample Holder:	Standard	**Speed (deg/min):**	0.5
Comment:	Shifted -0.08		

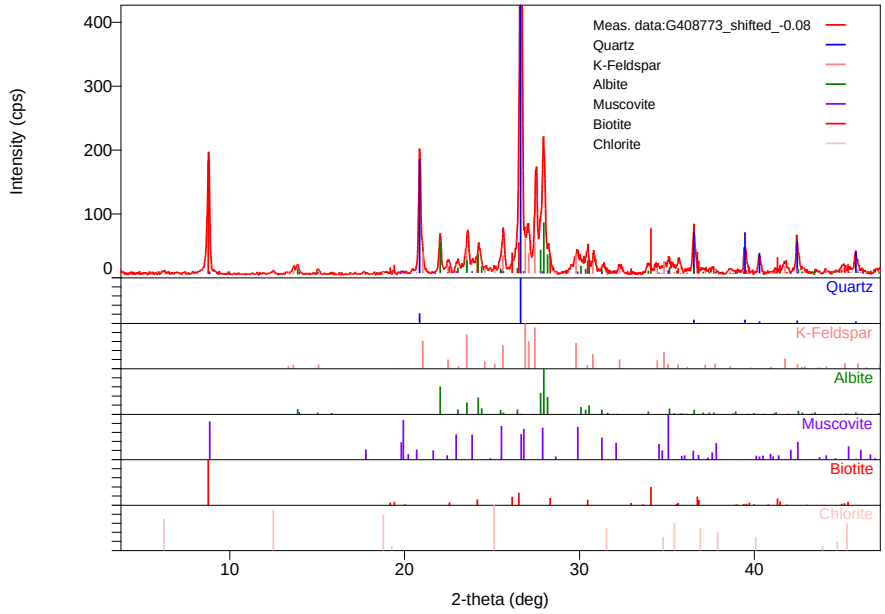
Analysis Results

Phase name	Content wt% (± error)	Formula
Quartz	35(10)	SiO_2
K-Feldspar	33(8)	$KAlSi_3O_8$
Albite	21(5)	$Na_{0.5}Ca_{0.5}Si_3AlO_8$
Muscovite	6(3)	$KAl_2(AlSi_3O_{10})(OH)_2$
Biotite	4(2)	$K(Mg,Fe)_3AlSi_3O_{10}(OH)_2$
Chlorite	1(1)	$(Fe,Mg,Al,Fe)_6(Si,Al)_4O_{10}(OH,O)_8$ to $Mg_5Al(AlSi_3O_{10})(OH)_8$

Notes
Peak overlap may interfere with identifications and quantitative calculations.
Amorphous minerals and minerals present in trace amounts may not be detected.

Mineral Resources Tasmania

Phase Data Pattern



XRD Results - G408774

General Information

Measurement date:	23/9/2020	**Interpretative date:**	17/11/2020
Job Number/Client:	LJN2020-094	**XRD**	Rigaku Miniflex 600
Registration Number:	G408774	**Analyst:**	LUnwin + JRenaud
Quantitative Method:	XPlot	**Process Medium:**	Wholerock
Sample Holder:	Standard	**Speed (deg/min):**	0.5
Comment:	Shifted -0.05		

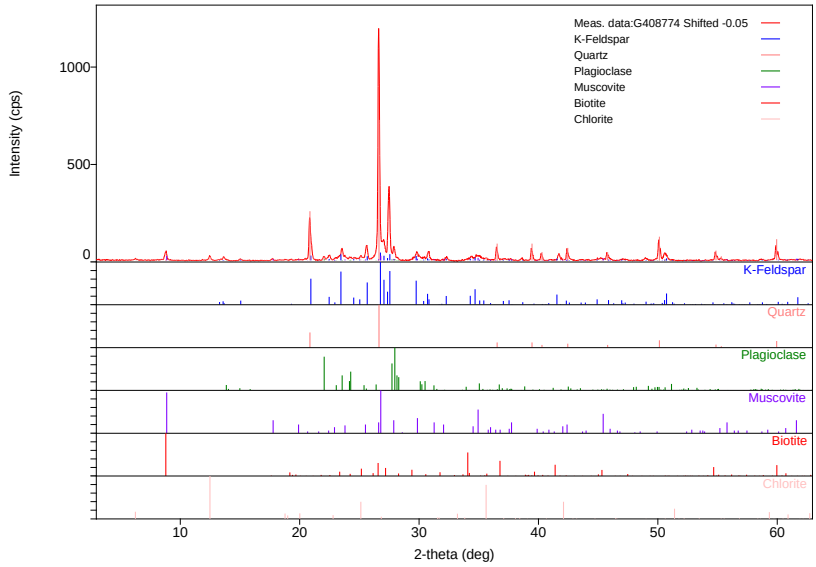
Analysis Results

Phase name	Content wt% (± error)	Formula
K-Feldspar	60(10)	$KAlSi_3O_8$
Quartz	31(8)	SiO_2
Plagioclase	5(3)	$Na_{0.5}Ca_{0.5}Si_3AlO_8$
Muscovite	2(2)	$KAl_2(AlSi_3O_{10})(OH)_2$
Biotite	1(1)	$K(Mg,Fe)_3[AlSi_3O_{10}(OH)_2$
Chlorite	1(1)	$(Mg,Fe,Al)_6(Si,Al)_4O_{10}(OH,O)_8$

Notes
Peak overlap may interfere with identifications and quantitative calculations.
Amorphous minerals and minerals present in trace amounts may not be detected.

Mineral Resources Tasmania

Phase Data Pattern



XRD Results - G408775

General Information

Measurement date:	23/9/2020	**Interpretative date:**	17/11/2020
Job Number/Client:	LJN2020-094 Moort	**XRD**	Rigaku Miniflex 600
Registration Number:	G408775	**Analyst:**	LUnwin + JRenaud
Quantitative Method:	XPlot	**Process Medium:**	Wholerock
Sample Holder:	Standard	**Speed (deg/min):**	0.5
Comment:	Shifted -0.05		

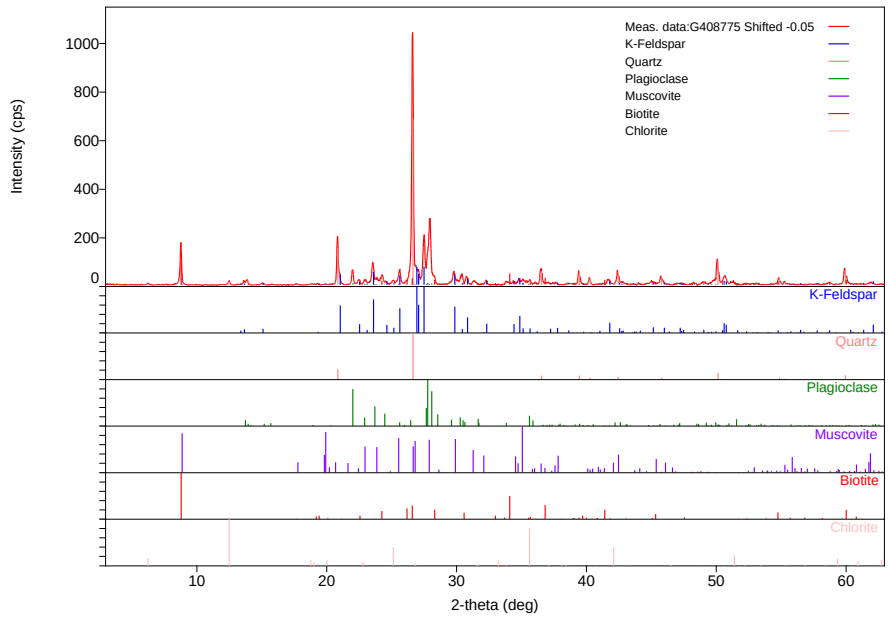
Analysis Results

Phase name	Content wt% (± error)	Formula
K-Feldspar	38(10)	$KAlSi_3O_8$
Quartz	33(8)	SiO_2
Plagioclase	20(5)	$NaAlSi_3O_8$
Muscovite	7(3)	$KAl_2(AlSi_3O_{10})(OH)_2$
Biotite	3(2)	$K(Mg,Fe)_3[AlSi_3O_{10}(OH)_2$
Chlorite	<1(1)	$(Mg,Fe,Al)_6(Si,Al)_4O_{10}(OH,O)_8$

Notes
Peak overlap may interfere with identifications and quantitative calculations.
Amorphous minerals and minerals present in trace amounts may not be detected.

Mineral Resources Tasmania

Phase Data Pattern



XRD Results - G409776

General Information

Measurement date:	23/9/2020	**Interpretative date:**	25/9/2020
Job Number/Client:	LJN2020-094 Moort	**XRD**	Rigaku Miniflex 600
Registration Number:	G409776	**Analyst:**	LUnwin
Quantitative Method:	XPlot	**Process Medium:**	Wholerock
Sample Holder:	Standard	**Speed (deg/min):**	0.5
Comment:	Shifted -0.08		

Analysis Results

Phase name	Content wt% (± error)	Formula
Plagioclase	35(10)	$NaAlSi_3O_8$
Quartz	32(8)	SiO_2
K-feldspar	29(8)	$KAlSi_3O_8$
Muscovite	1(1)	$KAl_2(AlSi_3O_{10})(OH)_2$
Biotite	1(1)	$K(Mg,Fe)_3[AlSi_3O_{10}(OH)_2$
Chlorite	1(1)	$(Fe,Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$
Magnetite	1(1)	$Fe^{2+}Fe^{3+}{}_2O_4$

Notes
Peak overlap may interfere with identifications and quantitative calculations.
Amorphous minerals and minerals present in trace amounts may not be detected.

Phase Data Pattern