

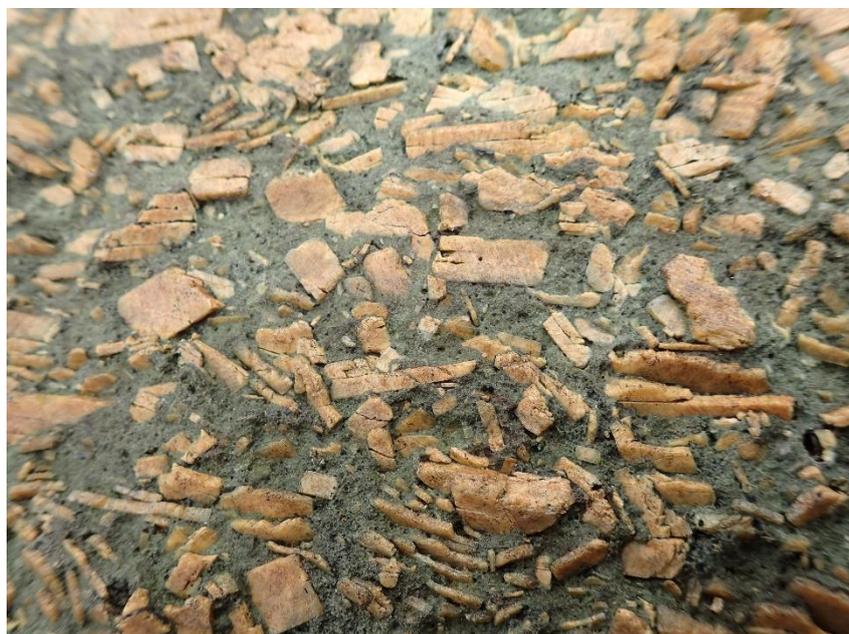
Mineral Resources Tasmania

Laboratory Report

LJN2019-092-1

Including LJN2019-050-2

MINERALOGICAL AND PETROGRAPHIC ANALYSES, CYGNET



An Unpublished Mineral
Resources Tasmania Report for:

MRT

By: R.S. Bottrill

Date: 26 September 2022

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SUMMARY

The green porphyritic “tinguaite” intrusive from Cygnet contains coarse sanidine phenocrysts in a matrix of mostly fine grained sanidine, albite, sodalite and aegirine, with some felsic patches rich in cancrinite-vishnevite and nepheline with traces of manganoedialyte. There are also small amphibole phenocrysts (magnesian-arfvedsonite) altering to aegirine and some sparse augite phenocrysts. Other minerals found include strontianite (mostly within manganoedialyte), a possible mosandrite-like mineral, pectolite, lamprophyllite, phlogopite, fluorite and fluorstrophite. The rock is alkaline, despite a moderate silica content, and is enriched in Ba and Sr. Some of these minerals have potential for geochronology.

INTRODUCTION

One sample of a green porphyritic “tinguaite” intrusive, being float originating from the well known Cretaceous dyke outcropping near Cygnet, was submitted for mineralogical analysis, with details shown in Table 1, to determine the mineralogy of the pink grains, and look for zircon and other minerals suitable for geochronology.

Table 1: Sample details.

Reg. No	Location	Description	Process
G409192	Cygnet	Green matrix porphyry dyke	PTS, SEM, XRF

SAMPLE PREPARATION

The sample was cut, prepared as a polished thin Section at UTas, and described petrographically in the MRT laboratories. It was also analysed for mineral chemistry by SEM/EDS in the CSL, Utas.

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SAMPLE DESCRIPTION

The sample in hand specimen is a felsic porphyry dyke with prominent large glassy to milky, pale pink to creamy, tabular sanidine crystals (to about 3cm long) and abundant small black phenocrysts to about 2mm, in a fine grained, bright green groundmass (Figs. 1 - 2). There are some small white, felsic enclaves, to a few mm across, which can contain some deep pink eudialyte crystals (Fig. 3).



Fig. 1: Syenite dyke in outcrop, showing pale pink sanidine crystals, flow banded at the top and bottom, in a green groundmass. FOV: about 600 mm.

PETROLOGY

In thin section the sample is an alkaline porphyry containing feldspar and mafic phenocrysts in a fine grained green, felsic groundmass (Figs. 4 - 7). The main phenocrysts are tabular sanidine crystals to <30 mm long, plus sparse euhedral, equant, brown to green, altered amphibole and clinopyroxene

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crystals to ~2 mm. It contains irregular, angular, fine grained felsic enclaves or segregations up to about 5 mm in diameter, rich in various feldspathoids (mostly cancrinite-visheveite and nepheline, plus minor sodalite) and containing pink, euhedral eudialyte to about 1mm in size. The groundmass is a fine grained, felsic matrix (typically <100 microns in grain size), rich in acicular green aegirine, plus sanidine, albite, sodalite and nepheline. There are some small irregular aggregates of pectolite, lamprophyllite, strontianite, an apatite group mineral and other poorly known minerals.



Fig. 2: Syenite dyke in hand specimen, showing pale pink sanidine crystals, flow banded at the top and bottom, in a green groundmass. FOV: about 100 mm.

The rock is petrographically a porphyritic phonolite rather than a syenite, as commonly described, as excepting the phenocrysts, most of the rock is <2mm in grainsize and comprises mostly alkali feldspars and feldspathoids. The feldspathoidal segregation are enigmatic and possibly altered zeolitic

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amygdules? The late alteration of the amphiboles to aegirine and other alkaline minerals is also enigmatic.

The sample is composed of (approx. vol. %):

- Sanidine: 30%, < 0.5 mm
- Pyroxene: 20%, green, <1 mm
- Cancrinite?: 5%, brown, <1 mm
- Albite: 210%, green < 0.5 mm
- Nepheline: 10%, brown < 0.5 mm
- Magnetite: 5%, veinlets and disseminated euhedra < 0.5 mm
- Pyrite: 2%, veinlets and disseminated euhedra < 1 mm
- Leucoxene/titanite: 5% < 0.2 mm
- Epidote: 5% < 0.5 mm

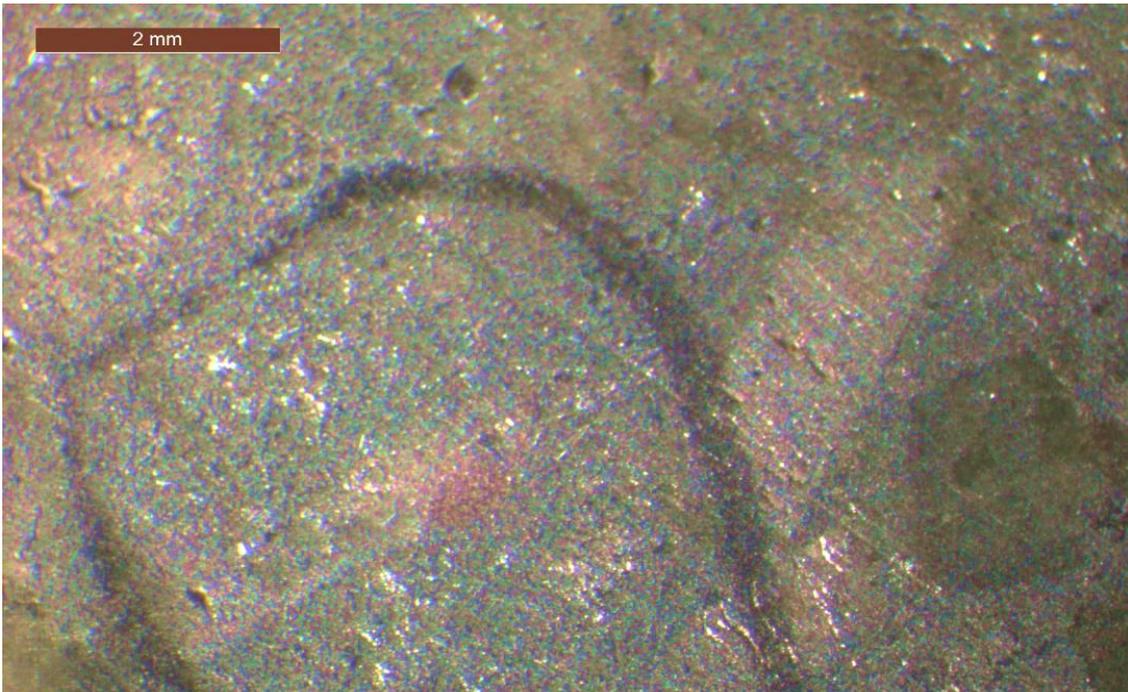


Fig. 3: Sample G409192. Cut surface of syenite, showing pink Eudialyte, and pale grey sanidine phenocrysts in a green groundmass rich in fine green aegirine. The black circle is ink. FOV: about 10 mm.

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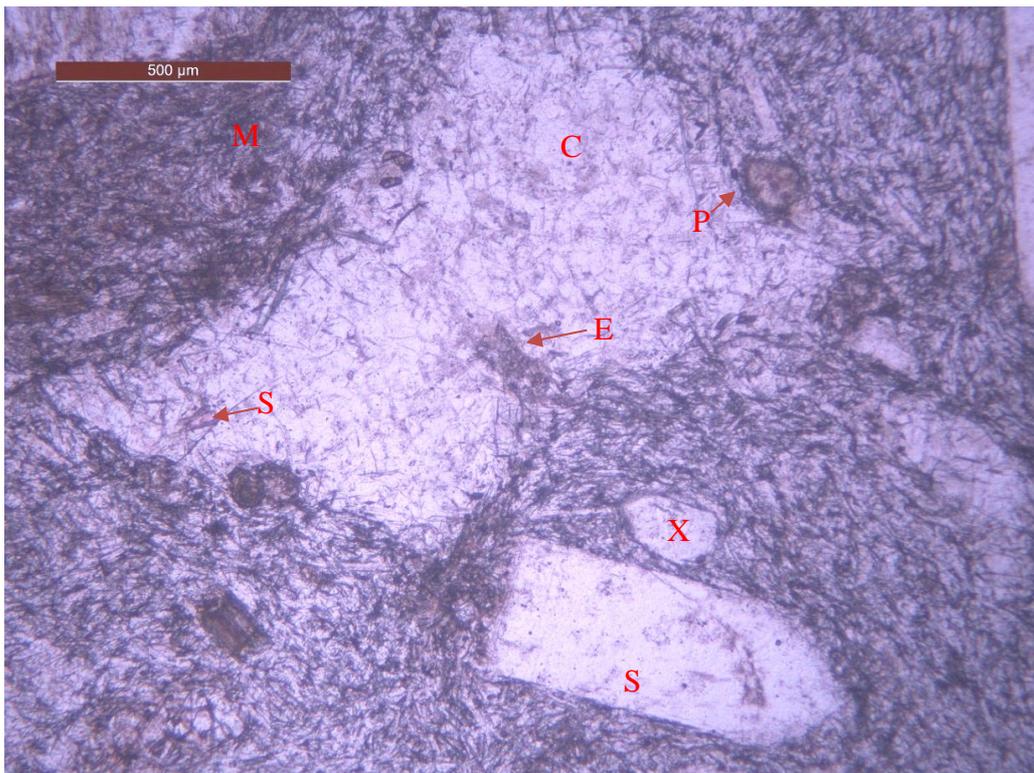


Figure 4: G409192. Clast of granular cancrinite (C) in a sanidine-pyroxene matrix (M) with phenocrysts of sanidine (S) and altered pyroxene (X). Small pink crystals of eudialyte (E) and pectolite (P) occur in the cancrinite. Polarised light, plane polars.



Figure 5: G409192. Clast of granular cancrinite (C) in a sanidine-pyroxene matrix (M) with phenocrysts of sanidine (S) and altered pyroxene (X). Small pink crystals of eudialyte (E) and pectolite (P) occur in the cancrinite. Polarised light, cross polars.

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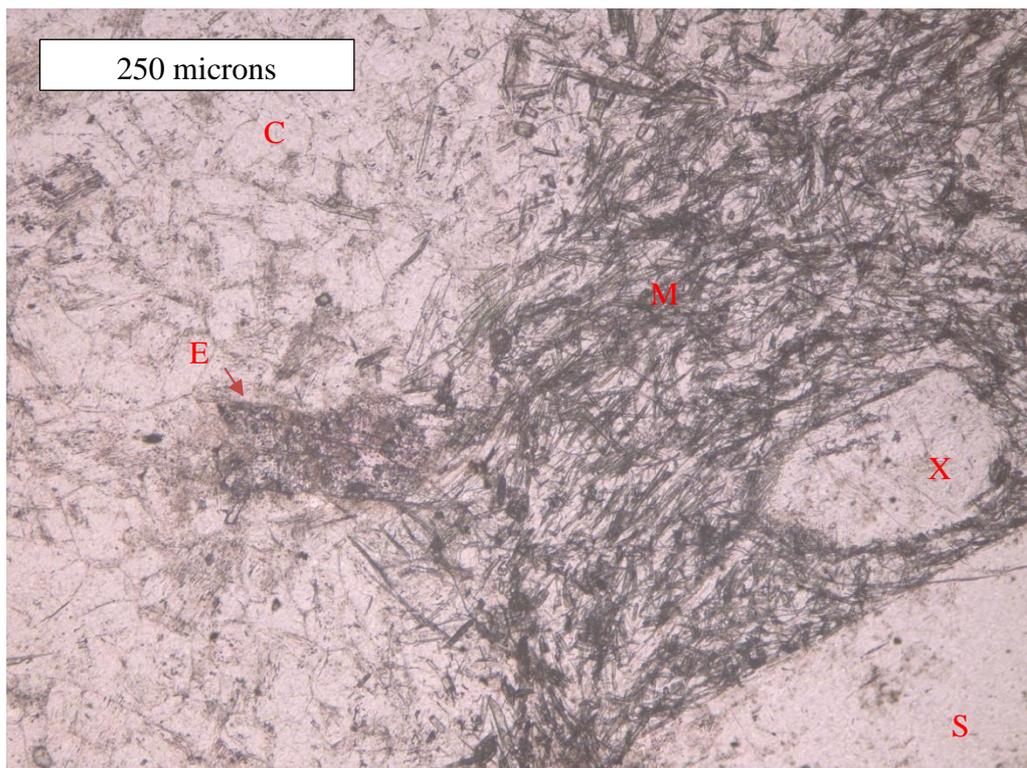


Figure 6: G409192. Clast of granular cancrinite (C) in a sanidine-pyroxene matrix (M) with phenocrysts of sanidine (S) and altered pyroxene (X). Small pink crystals of eudialyte (E) and pectolite (P) occur in the cancrinite. Polarised light, plane polars.

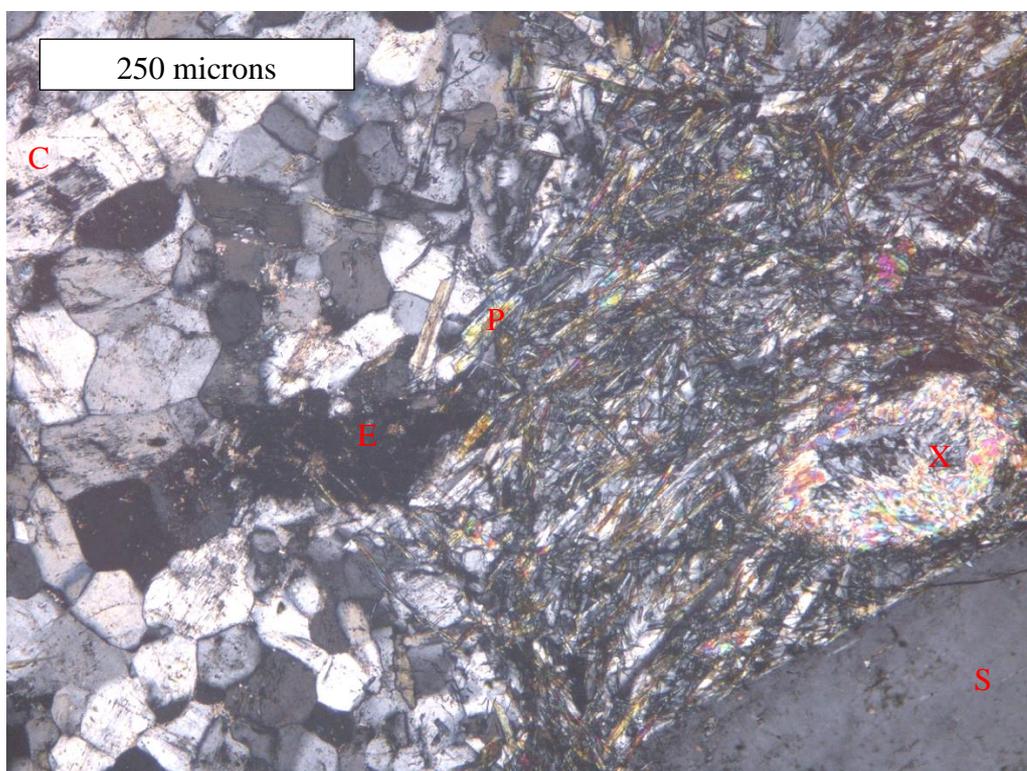


Figure 7: G409192. Clast of granular cancrinite (C) in a sanidine-pyroxene matrix (P) with phenocrysts of sanidine (S) and altered pyroxene (X).-Small pink crystals of eudialyte (E) occur in the cancrinite. Polarised light, plane polars.

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SEM/EDAX ANALYSES

The sample G409192 was analysed by SEM-EDS, in the CSL, University of Tasmania, with analytical conditions shown in Appendix 2. The results are given in Appendix 3.

Results indicate the pink crystals are manganoedialyte (Figs. 8, 10- 9) hosted within fine grained felsic patches comprising of mostly a cancrinite-group mineral and nepheline with minor albite and sanidine. The main groundmass is a mixture of aegirine, sanidine, albite, sodalite and nepheline, with some phenocrysts of sanidine, amphibole (altering to aegirine) and augite (altering to pectolite, phlogopite and fluorite), and patches of fine grained pectolite, lamprophyllite, strontianite, possible mosandrite and fluorstrophite. Details are shown below.

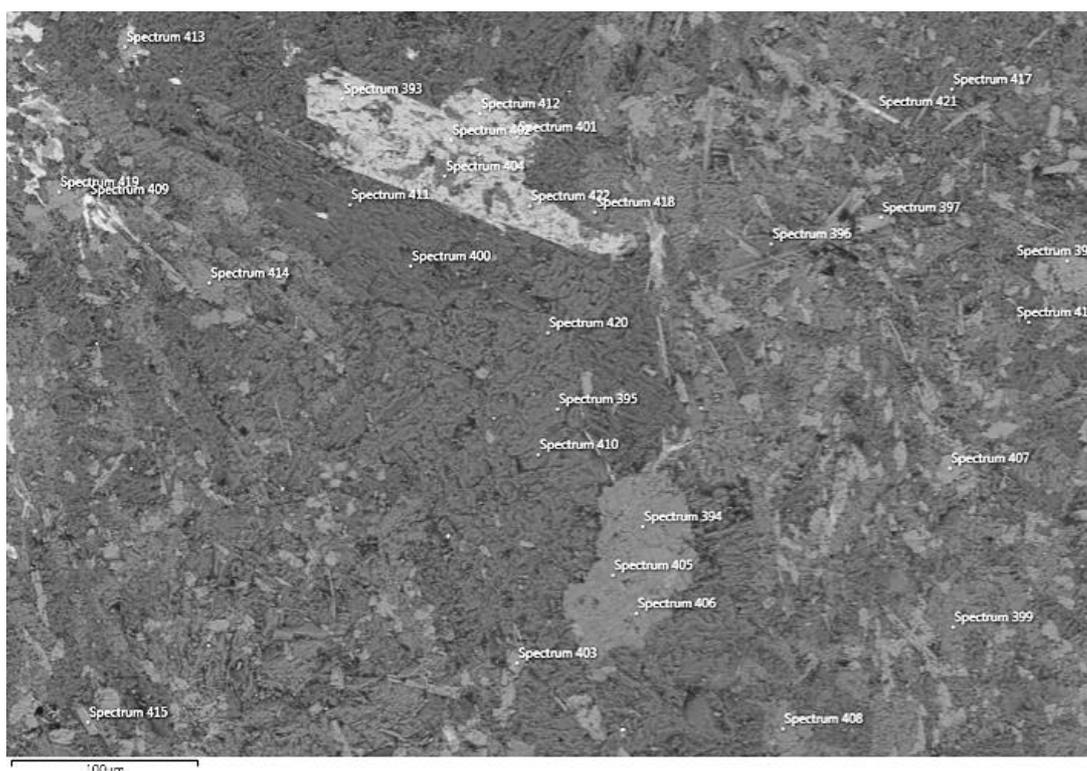


Fig. 8: Sample G409192. Darker dendritic material in the centre is a mixture of nepheline and cancrinite. The bright crystal in the top centre is Eudialyte with sanidine inclusions. Granular material to the left and right is a mixture of aegirine (light grey), sanidine, albite and nepheline (all darker). The light grey, amorphous blob below centre is pectolite. FOV: about 0.6 mm.

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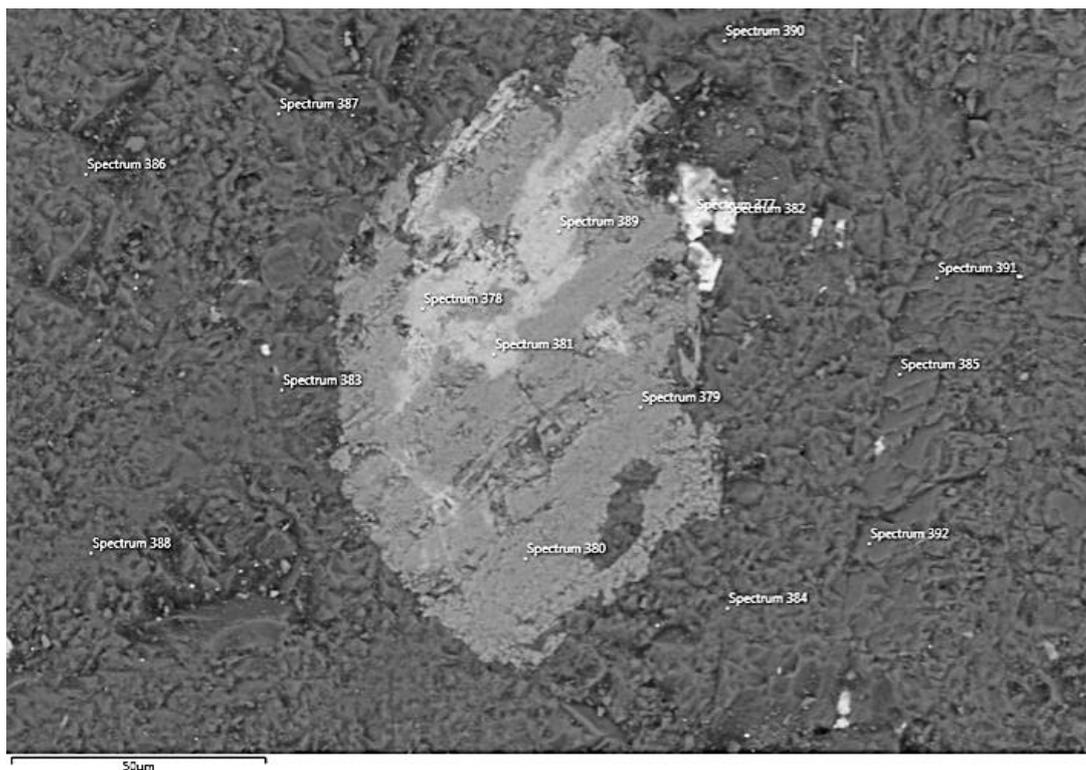


Fig. 9: Sample G409192. FOV: about 0.2 mm. Crystal in centre is aegirine with lighter grey patches of lamprophyllite and a white grain of strontianite to the right. The matrix is a mixture of albite and cancrinite.

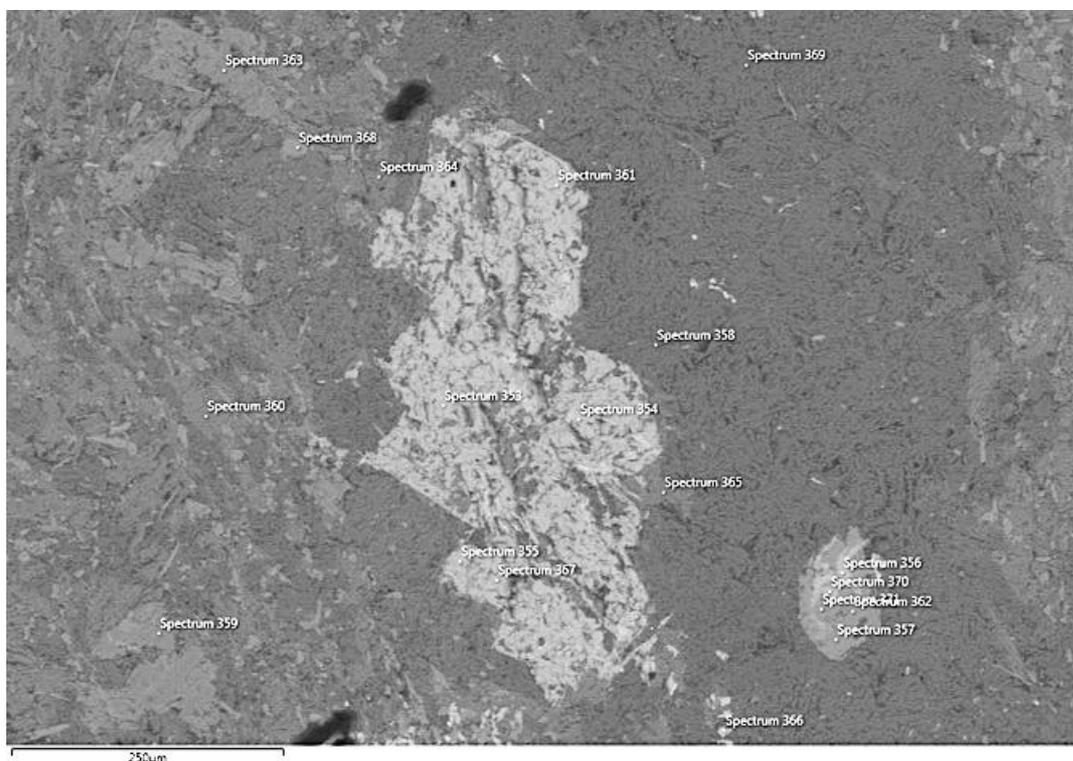


Fig. 10: Sample G409192. FOV: about 1 mm. Brighter, skeletal crystals in the centre are eudialyte. The crystal towards the lower right is aegirine with alteration to lamprophyllite. The darker matrix is mostly cancrinite. Granular material to the left and right is a mixture of aegirine

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(bright), sanidine, albite and nepheline (all darker). There is an irregular patch of pectolite in the lower left.

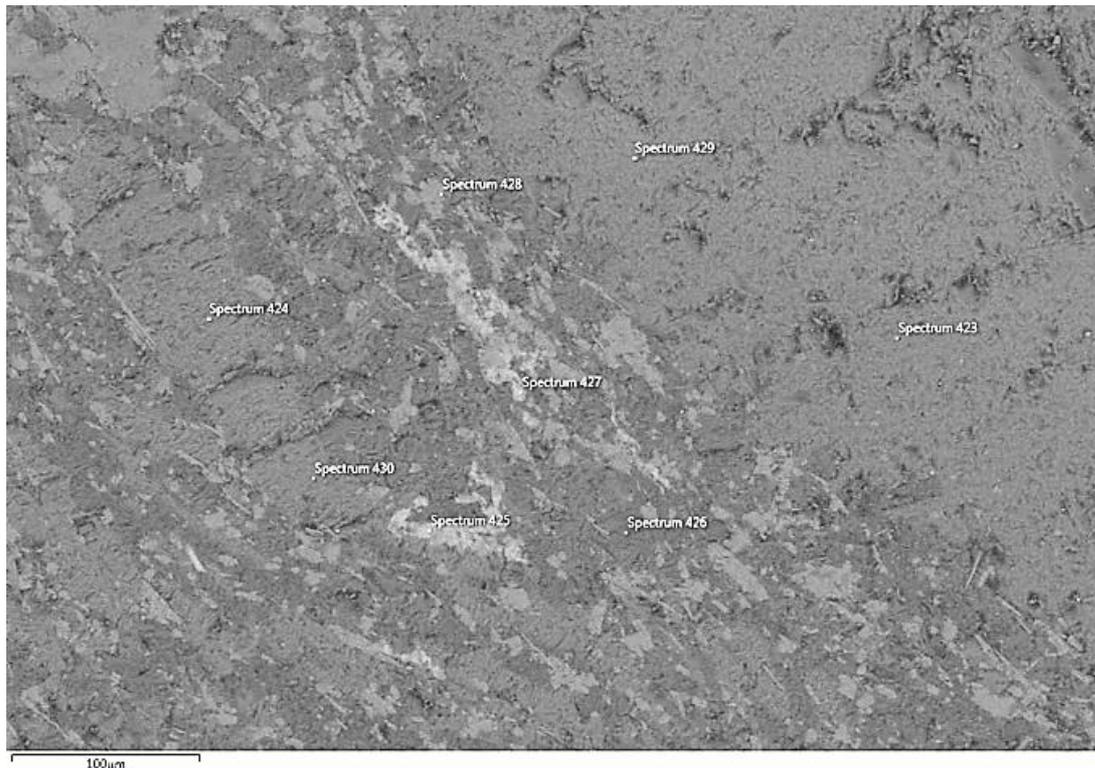
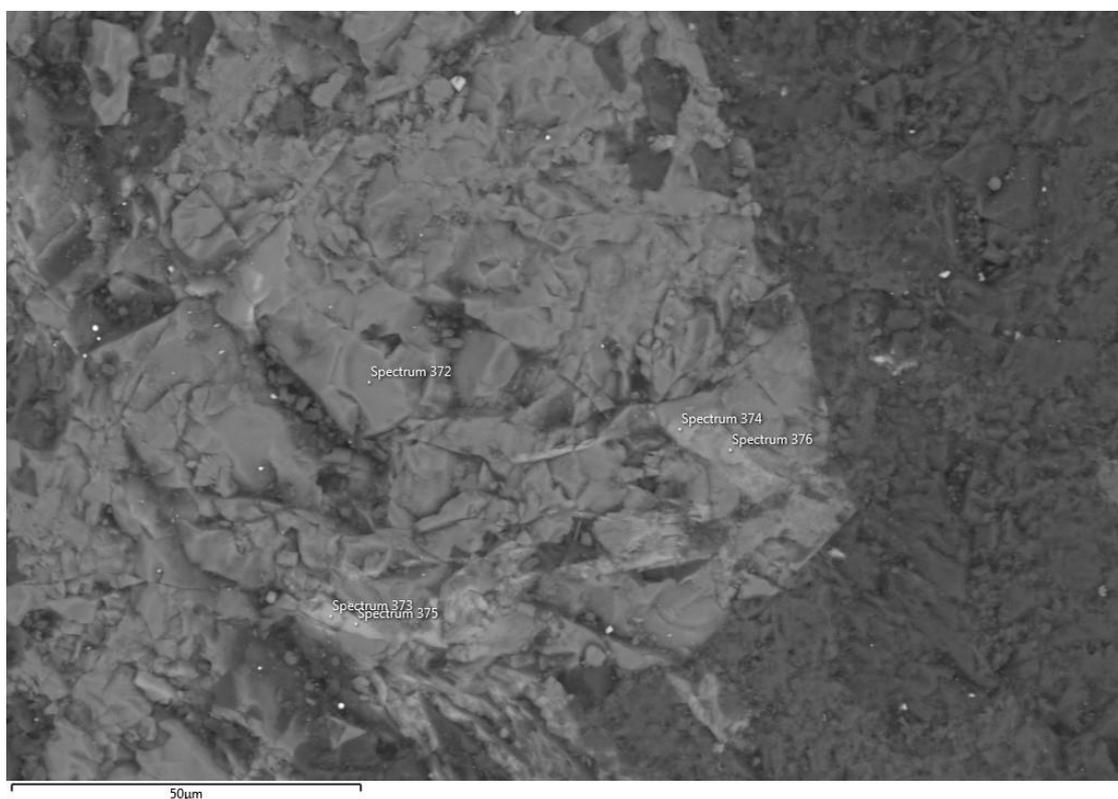


Fig. 11: Sample G409192. FOV: about 0.7 mm. Bright, fine grains of Eudialyte in a granular matrix of aegirine (pale grey), sanidine, albite and nepheline (all darker). There are coarse crystals of sanidine to the right and left.

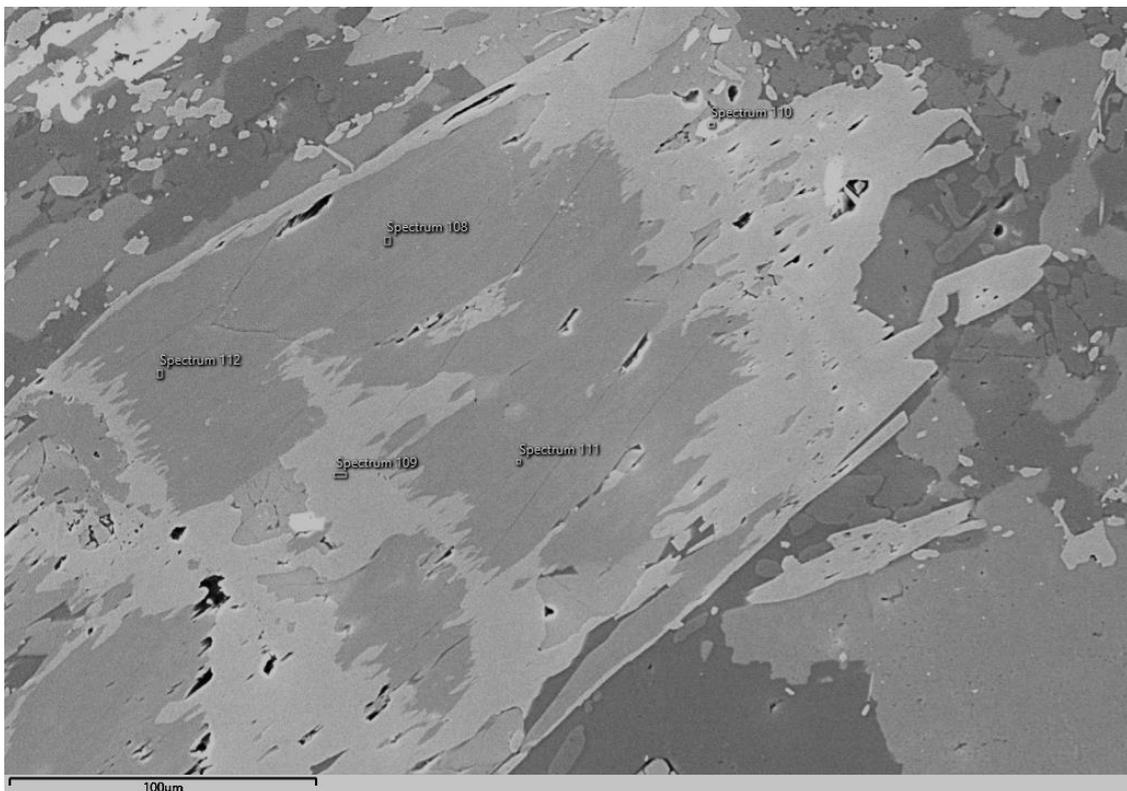


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Fig. 12: Sample G409192. FOV: about 0.2 mm. Large crystal of Eudialyte (left) with small bright inclusions of mosandrite?; cancrinite to the left.



Fig. 13: Sample G409192. FOV: about 0.2 mm. Large crystal of Ferroaugite (upper left) with altering to intergrowths of pectolite, phlogopite and fluorite.



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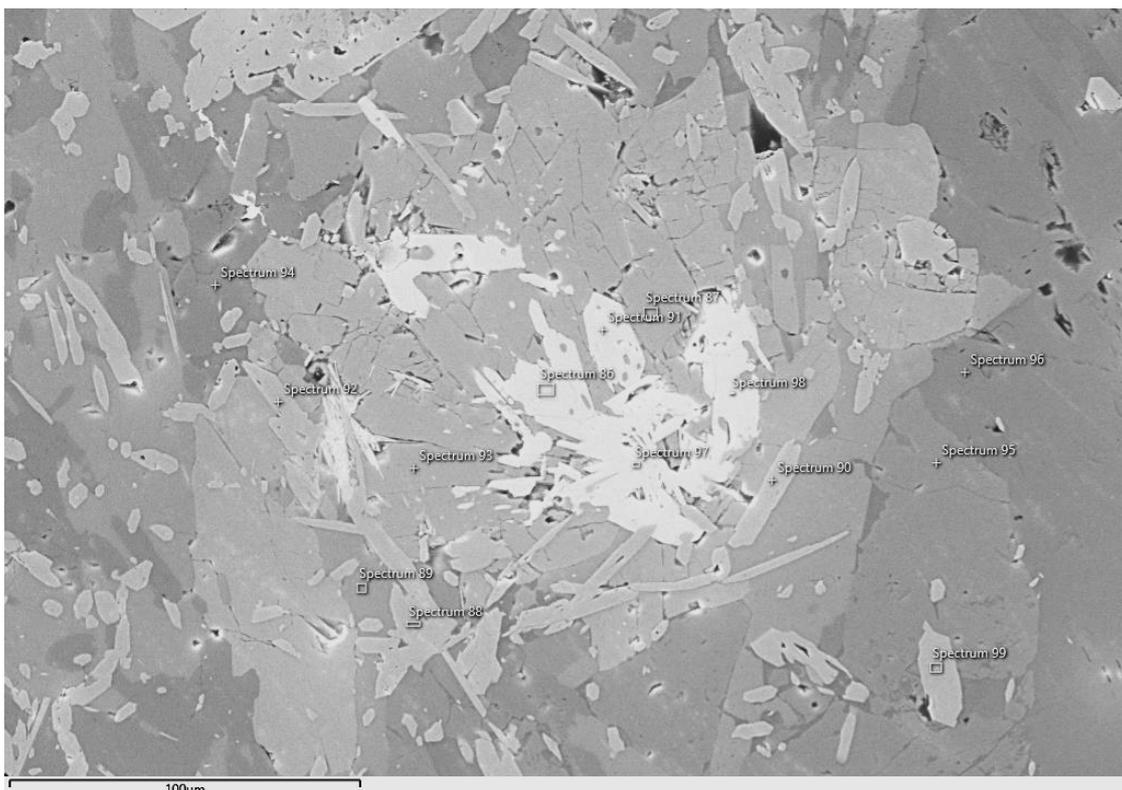


Fig. 16: Sample G409192. FOV: about 0.2 mm. Large aggregate of pectolite, euhedral/poikilitic aggregates of lamprophyllite (bright, centre) and aegirine. Matrix includes sanidine, nepheline, cancrinite and aegirine.

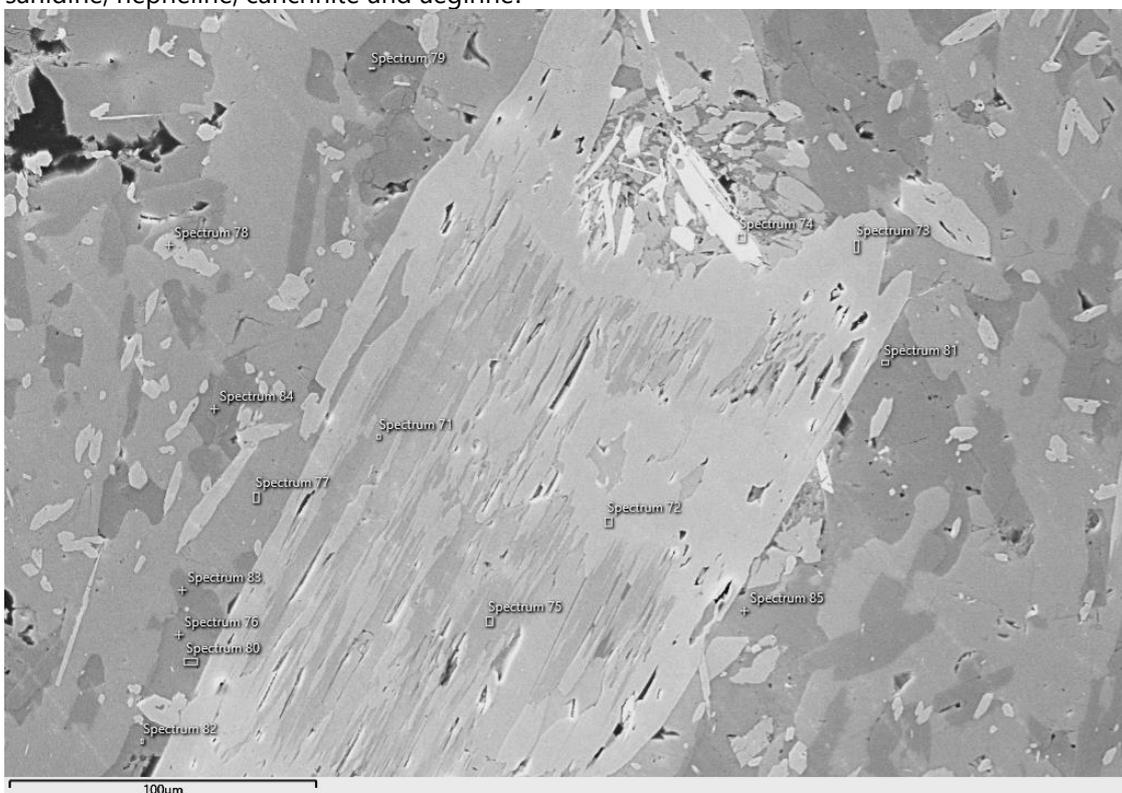


Fig. 17: Sample G409192. FOV: about 0.2 mm. Large crystal of amphibole (medium grey) altering to aegirine (paler grey) with small bright inclusions of lamprophyllite Matrix includes albite, sodalite, cancrinite and aegirine.

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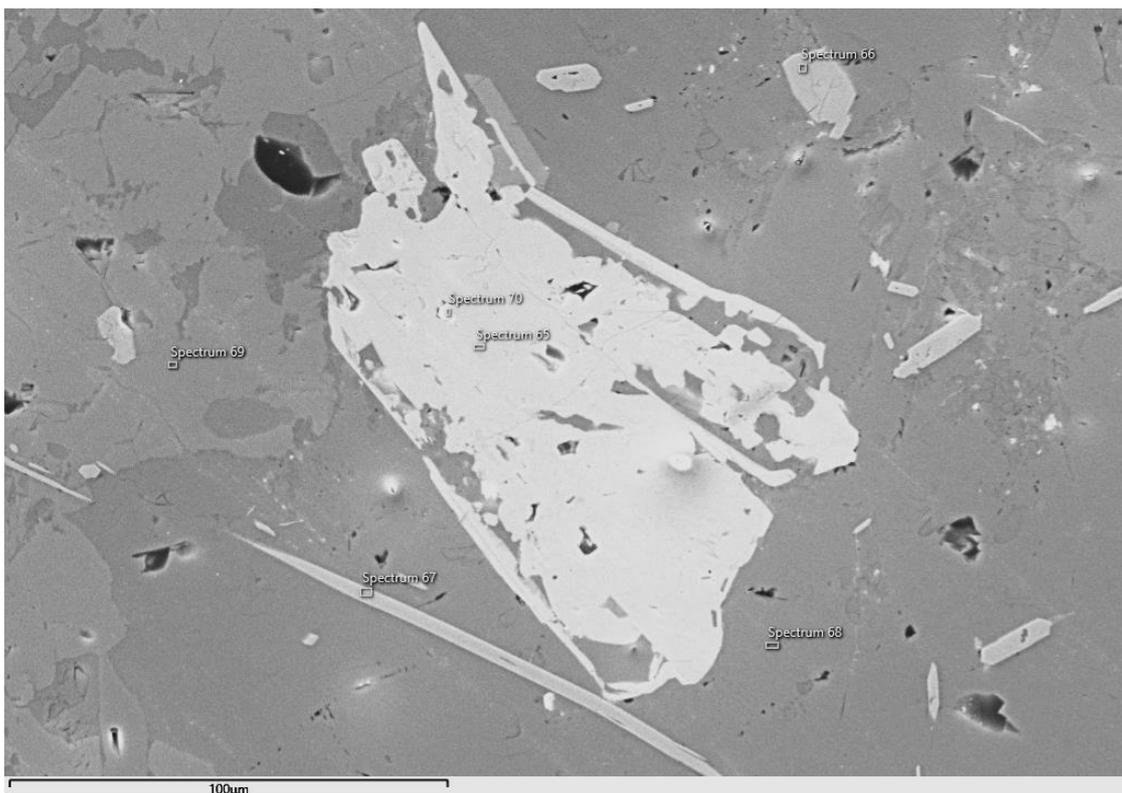


Fig. 18: Sample G409192. FOV: about 0.2 mm. Large crystal of Eudialyte (centre) with small bright inclusions of strontianite?; Matrix includes, nepheline, cancrinite and aegirine...

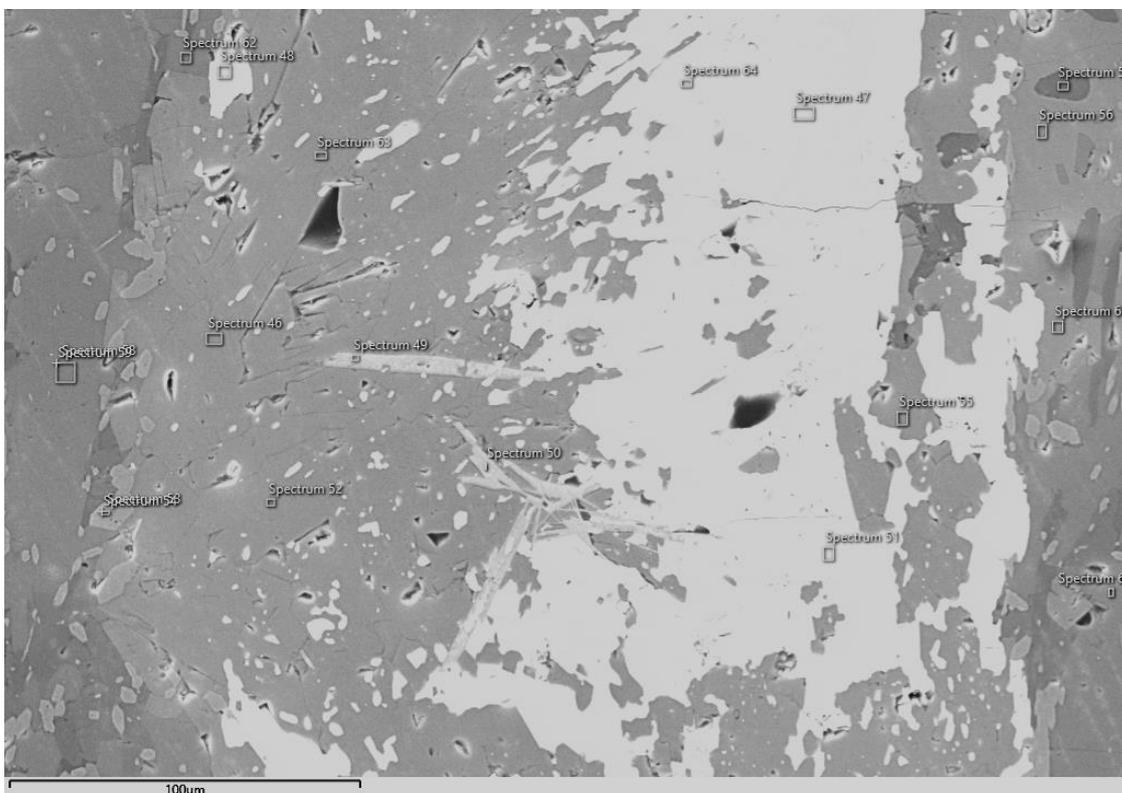


Fig. 19: Sample G409192. FOV: about 0.2 mm. Large aggregate of pectolite left of centre, and fluorstrophite right of centre. Matrix includes sanidine, cancrinite and aegirine.

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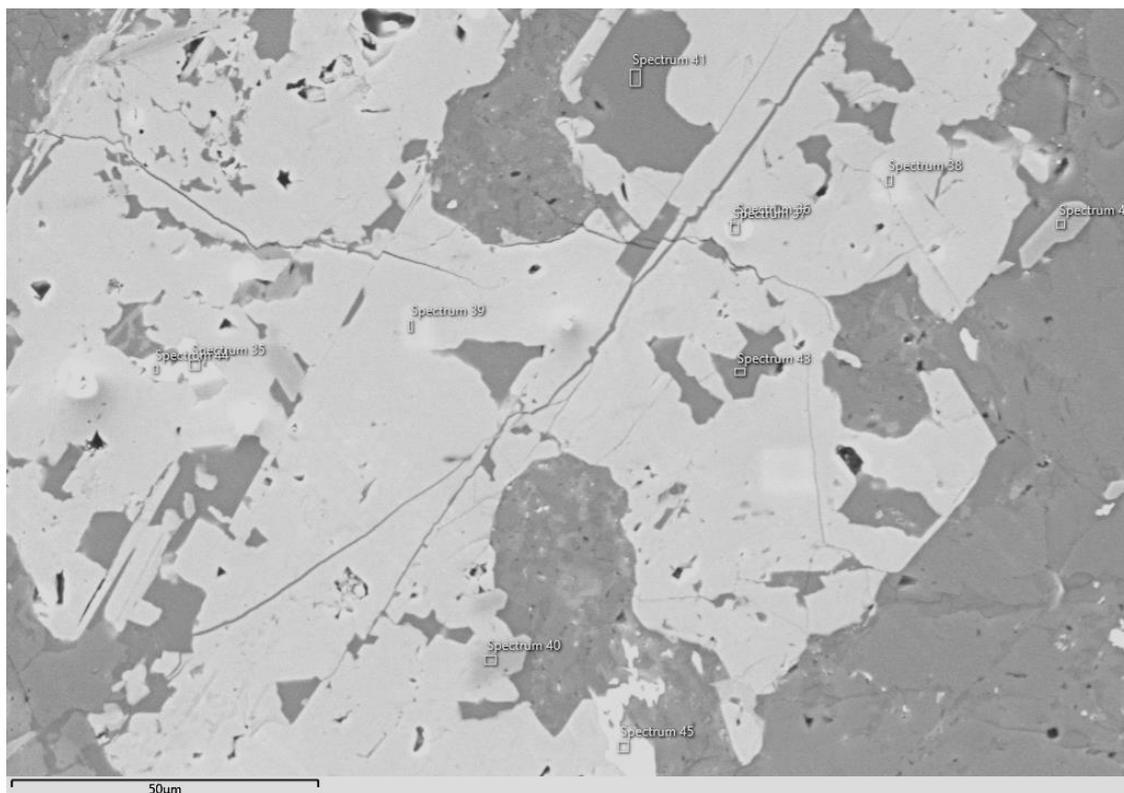


Fig. 20: Sample G409192. FOV: about 0.2 mm. Large crystal of Eudialyte with small bright inclusions of stromianite. Matrix includes albite, cancrinite and aegirine.

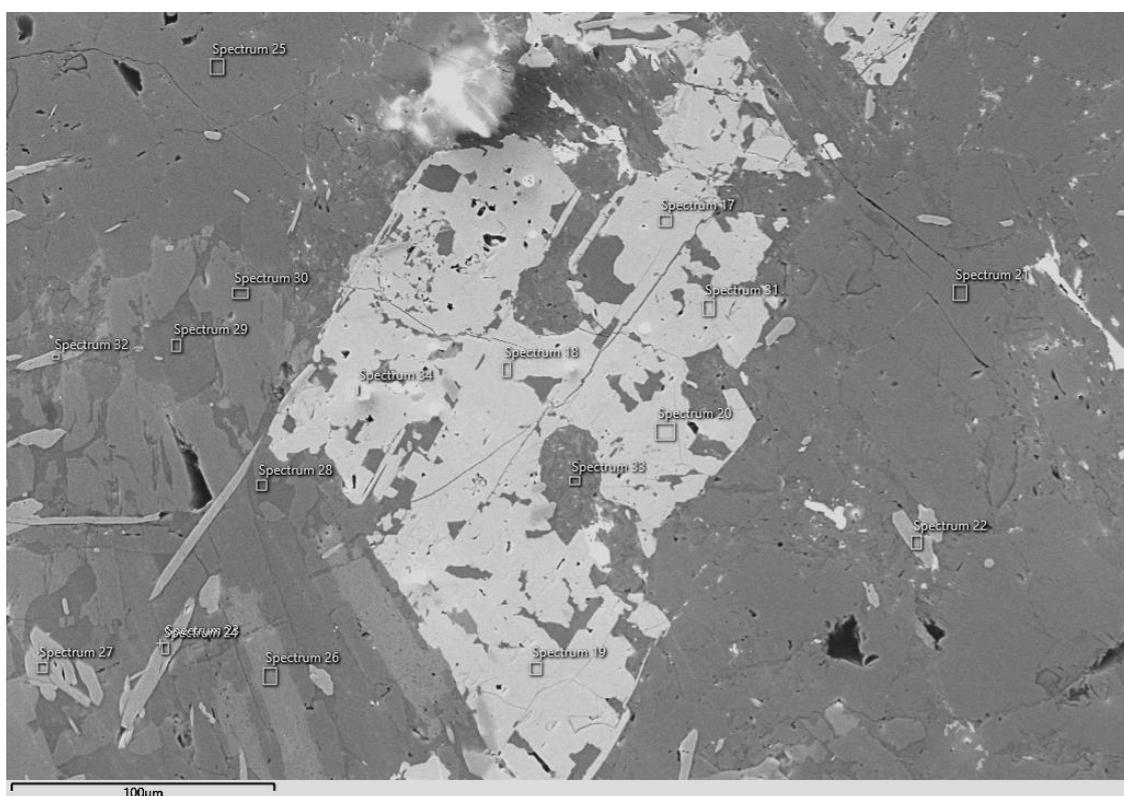


Fig. 21: Sample G409192. FOV: about 0.2 mm. Large crystal of Eudialyte with small bright inclusions of stromianite. Matrix includes albite, sanidine, cancrinite and aegirine.

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MINERALOGY SUMMARY

The main **feldspar**, as both large phenocrysts and comprising much of the matrix (<0.2 mm), is **sanidine**: about 89 - 97 mol % Kf with very minor Na. **Albite** is also common in the matrix and is about 98 – 100 mol. % Ab, with trace K and essentially no Ca.

The **pyroxenes** are mostly groundmass **aegirine**: $\text{NaFeSi}_2\text{O}_6$, ranging: $(\text{Na}_{0.7-1.0} \text{Ca}_{0-0.2}) (\text{Fe}_{0.7-0.9} \text{Al}_{0.1-0.2} \text{Mg}_{0-0.1}) \text{Si}_2\text{O}_6$. **Ferro Augite** and/or **Hedenbergite**, with a composition: $(\text{Ca}_{0.9} \text{Na}_{0.1}) (\text{Fe}_{0.5} \text{Mg}_{0.4}) \text{Si}_2\text{O}_6$ occurs as small phenocrysts <2 mm.

Much of the matrix, especially the felsic enclaves, comprises fine **feldspathoids**, <0.2 mm. The main feldspathoid is $(\text{Na}_{4.4-6.3} \text{Ca}_{0-0.2} \text{K}_{0.1-0.5}) (\text{Al}_{6.0-6.6}) \text{Si}_{6.6-8.0} \text{O}_{24} (\text{SO}_4)_{0.4-1.2}$. It is most consistent with a cancrinite group mineral, probably in-between **cancrinite** $(\text{Na,Ca},\square)_8 (\text{Al}_6 \text{Si}_6 \text{O}_{24}) (\text{CO}_3, \text{SO}_4)_2 \cdot 2\text{H}_2\text{O}$ and **vishnevite** $(\text{Na,K})_8 (\text{Al}_6 \text{Si}_6 \text{O}_{24}) (\text{SO}_4, \text{CO}_3) \cdot 2\text{H}_2\text{O}$, and probably is mostly closest to the former, where $S < 1$; where $S > 1$ it is probably vishnevite; S averages 0.7. Hydroxycancrinite $(\text{Na}_8 (\text{Al}_6 \text{Si}_6 \text{O}_{24}) (\text{OH})_2 \cdot 2\text{H}_2\text{O})$ is another possibility, but the carbonate and hydroxide contents are unknown.

Nepheline $(\text{KNa}_3 (\text{Al}_4 \text{Si}_4 \text{O}_{16}))$ is another feldspathoid and is of a typical composition: $(\text{Na}_{2.3-3.0} \text{K}_{0.8-1.1}) [\text{Al}_{3.9-4.1} \text{Si}_{4.2-4.6} \text{O}_{16}]$.

Sodalite, is another matrix phase feldspathoid and analyses average: $\text{Na}_{3.7} (\text{Si}_{3.1} \text{Al}_{3.1}) \text{O}_{12} (\text{Cl}_{0.9} \text{S}_{0.05})$, a typical composition.

Pectolite $(\text{NaCa}_2 (\text{Si}_3 \text{O}_8)_2 (\text{OH}))$ occurs in small subhedral aggregates (~0.1 mm) with abundant inclusions and is about $\text{Na}_{0.6-0.9} \text{Ca}_{1.6-1.9} \text{Mn}_{0.1} [\text{Si}_{3.2-3.4} \text{O}_8 (\text{OH})]$. The poorly balanced formula may be due to undetected Li, which can occur in minerals of this group.

Strontianite is relatively pure SrCO_3 , and mostly occurs as very fine anhedral grains (~10 microns) in or with eudialyte.

Fluorstrophite, a rare apatite-group mineral, nominally: $\text{CaSr}_4 (\text{PO}_4) \text{F}$, these analyses indicate some variation: $\text{Ca}_{1-2} \text{Sr}_{3-4} (\text{PO}_4) \text{F}$. It occurs as small aggregates with pectolite, to about 0.5 mm.

The **Eudialyte** group mineral has the composition: $(\text{Na}_{7-12} \text{Ca}_{5-8}) (\text{Mn}_{1.7-2.5} \text{Fe}_{0-0.5} \text{Al}_{0-1}) \text{Si}_{27-33} (\text{Zr}_{2.6-3.2} \text{Ti}_{0.2-1.2} \text{Ce}_{0-0.2} \text{Pb}_{0-0.5}) \text{Cl}_{0.5-0.7} \text{O}_{90}$. This fits the rare species **Manganoeudialyte**: $\text{Na}_{14} \text{Ca}_6 \text{Mn}_3 \text{Zr}_3 [\text{Si}_{26} \text{O}_{72} (\text{OH})_2] (\text{H}_2\text{O}, \text{Cl}, \text{O}, \text{OH})_6$. It occurs mostly in the cancrinite-nepheline rich patches as euhedral crystals to about 1 mm.

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Lamprophyllite, $(\text{Na}_3\text{Sr}_2\text{Ti}_3(\text{Si}_2\text{O}_7)_2(\text{F}, \text{O}, \text{OH})_2)$ occurs as small aggregates of euhedral, poikilitic grains (<0.1mm) replacing aegirine, and is: $(\text{Na}_{1.8-2.4} \text{Ca}_{0.1} \text{Mg}_{0.1} \text{Mn}_{0.2} \text{Fe}_{0.1-0.2}) (\text{Sr}_{1.1-1.7} \text{Ba}_{0-0.1} \text{K}_{0.0-0.5}) (\text{Ti}_{2.9-3.1} \text{Nb}_{0-0.1} \text{W}_{0-0.3}) [\text{Al}_{0-0.6} \text{Si}_{4.1-4.6} \text{O}_{16}] (\text{F}_{0.9-1.5} \text{O}, \text{OH})$

Amphibole: F-rich Magnesio-Arfvedsonite occurs as microphenocrysts (<1 mm) altering to aegirine and is: $(\text{Na}_{0.6} \text{K}_{0.4}) (\text{Na}_{1.9} \text{Ca}_{0.1}) (\text{Mg}_{2.9} \text{Fe}^{2+}_{1.0} \text{Fe}^{3+}_{0.3} \text{Ti}_{0.2} \text{Mn}_{0.1} \text{Al}_{0.2}) \text{Si}_8\text{O}_{22} (\text{F}, \text{OH})_2$

Fluor-Phlogopite: found only as very fine grains in altered augite rims with fluorite : $\text{K}(\text{Mg}_{2.4} \text{Fe}_{0.4} \text{Mn}_{0.1} \text{Al}_{0.1})(\text{Si}_{3.3} \text{Al}_{0.7})_{10}(\text{F}, \text{OH})$

There are some small patches of fibrous Ca-Ti-REE-Si minerals, possibly Ca-poor **Mosandrite?** $(\text{Ca}_3\text{REE})[(\text{H}_2\text{O})_2\text{Ca}_{0.5}\square_{0.5}]\text{Ti}(\text{Si}_2\text{O}_7)_2(\text{OH})_2(\text{H}_2\text{O})_2$. The analyses average: $(\text{Ca}_{1.2} \text{REE}_{0.9} \text{Th}_{0.1} \text{Zn}_{0.1} \text{Al}_{0.4} \text{Na}_{0.2} \text{K}_{0.1}) [(\text{H}_2\text{O})_2 \square] (\text{Ti}, \text{Nb}_{0.1}) (\text{Si}_2\text{O}_7)_2(\text{Cl}_{0.1} \text{F}_{0.2} \text{OH})_2(\text{H}_2\text{O})_2$

XRF

The sample was analysed for trace elements on a pressed pellet, and major elements on a pressed powder, in a Bruker ASX58 XRF, with proprietary Bruker software and a series of commercial standards. The results are shown in Appendix 3.

The alkali-silica plot is shown in Fig. 22. The analysis seems consistent with the mineralogy of the rock, being high in K and Fe^{3+} , moderate in Al, Ca, Mg and Na and relatively low in Si and Ti. The high Sr is consistent with the Sr-rich minerals strontianite, fluorstrophite, eudialyte and lamprophyllite. The rock is also Ba-rich but curiously no specific Ba minerals were found, and Ba was only found as a trace in one mineral (lamprophyllite). Sanidine did not contain significant Ba. The rock is relatively low in the elements Ti, Zr, Nb and REE.

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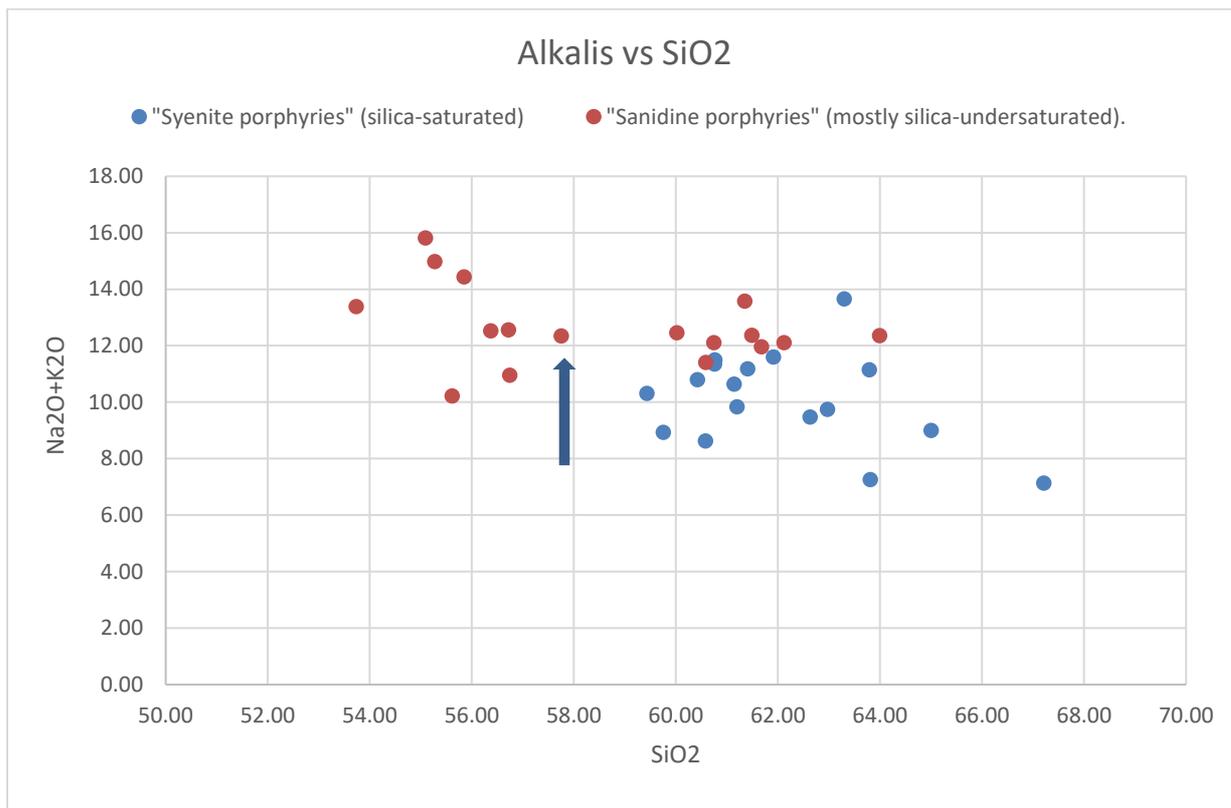


Fig. 22 Plot of alkalis vs silica for analysed Cygnet intrusives, from unpublished MRT data. Sample G409192 is arrowed.

SUMMARY AND DISCUSSION

The rock is porphyritic phonolite with coarse sanidine phenocrysts in a matrix of mostly fine grained sanidine, albite, sodalite and aegirine, with some felsic patches rich in cancrinite-vishnevite and nepheline with traces of manganoeudialyte. There are also small amphibole phenocrysts (magnesian arfvedsonite) altering to aegirine and some sparse augite phenocrysts. Other minerals found include strontianite (mostly within manganoeudialyte), a possible mosandrite-like mineral, pectolite, lamprophyllite, phlogopite, fluorite and fluorstrophite. The rock is alkaline, despite a moderate silica content, and is enriched in Ba, Sr and probably F, Cl and S (the last three elements are enriched in many of the silicates). A tinguaitite is defined as a phonolite with alkali feldspar, nepheline and aegirine, so that name is suitable.

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The feldspathoidal segregation are enigmatic and are possibly highly altered zeolitic amygdules? The late alteration of the amphiboles to aegirine and presence other alkaline minerals is also enigmatic, perhaps due to a late influx of fluid rich in Na, K, Sr, Ca, S, F and Cl. This alteration seems atypical for most alkaline intrusives at Cygnet, but a nearby dyke, described as garnet trachyte (Ford, 1983, 1989, Everard et al, 2004, Bottrill, et al. 2014), also has unusual assemblages with spessartine, epidote, pyrite, cancrinite and marialite, and is rich in Pb and Zn. Ford (1983, 1989) thought the unusual chemistry may relate to wall rock assimilation. Its possible that assimilation of evaporites could cause some of the unusual alteration within this dyke?

No common datable minerals like zircon, rutile, epidote, titanite or monazite were detected, but some of the Zr, Ti and REE bearing minerals like eudialyte, fluorstrophite and mosandrite are potentially suitable for U-Pb geochronology. The mosandrite-like mineral contains detectable U and Th.

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This and other data collected in MRT laboratories may enter the MRT databases but every attempt will be made to ensure it remains closed file and not be available externally, unless at your request.

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Appendix 1: Laboratory Report –SEM analytical conditions

Hitachi SU-70 analytical field emission SEM

- Installed February 2011
- Schottky thermal field emission source
- ultra-high resolution (1.0 nm @ 15kV, 1.6 nm @ 1kV for SE imaging)
- high vacuum operation only (i.e. no variable pressure in chamber)
- Hitachi in-chamber and in-lens scintillation detectors, Super ExB filter, beam deceleration
- Hitachi in-chamber 5-segment solid state BSE detector, retractable
- in-column Faraday cup with picoammeter for beam current measurement
- anticontamination cold plate, liquid nitrogen cooled
- 5 axis motorised fully eucentric stage, XYZ range 110x110x40mm
- Oxford Aztec EDS/EBSD system with
 - X-Max 80 SDD EDS, MnKa 125 eV resolution, elements B-U, large area hyperspectral mapping, standardless and standards-based quantification, feature analysis
 - HKL NordlysNano EBSD camera & foreshatter detector system, HKL & Channel 5 software packages, Synergy EDS/EBSD integration, HKL, ICSD & American Mineralogist phase databases
- NEW June 2017: Gatan ChromaCL2 colour cathodoluminescence imaging system with integrated BSE detector, Digital Micrograph 3 software, automated mosaic acquisition, simultaneous acquisition of SE, iBSE and colour CL images.

Label:	am 179
Element List Type:	Current Spectrum
Processing Option:	All Elements
Specimen Coating:	On
Beam Calibration Element Coating:	Off
Coating Element:	Carbon
Coating Thickness:	20 nm
Coating Density:	2.25 g/cm ³
Automatic Line Selection:	Disabled
Normalization:	Enabled
Thresholding:	Sigma level = 1
Detector Window Correction:	Enabled
Deconvolution Elements:	None
Selected Standards:	Minerals_15kV_2017-10-20 [User]
Pulse Pile Up Correction:	Succeeded
Detector file:	X-Max 3
Efficiency:	File based

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Appendix 2: Laboratory Report –SEM Analyses

Client: R Bottrill

Sample Location: Cygnet

Job Number: LJN2019-092-1, Sample: G409192

Analyses: Mineral chemistry

Methods: SEM-EDS

Analyst: R Bottrill

Lab Manager: R Bottrill

Date: 8/8/2019

Table 1: Albite

(relative atomic proportions, 5 cations) Ca??

Project Path	Label	O	Na	Al	Si	K	Ca
Ca??RSB-2019-08-07/G409192/Site 5	426	7.8	0.8	1.1	3.1	0.0	0.0
RSB-2019-08-07/G409192/Site 3	385-Ab	7.8	1.0	1.0	3.0	0.0	0.0
RSB-2019-08-07/G409192/Site 3	392-ab	8.7	1.0	1.0	2.9	0.0	0.0
RSB-2019-08-07/G409192/Site 4	416	7.1	0.7	1.0	3.1	0.1	0.0
RSB-2019-08-07/G409192/Site 3	391-ab	8.5	0.9	1.1	3.1	0.0	0.0
2020-09-30/G409192 CYGNET/Site 1	28	8.6	1.1	1.2	2.6	0.0	0.0
2020-09-30/G409192 CYGNET/Site 2	41	9.1	1.2	1.3	2.5	0.0	0.0
2020-09-30/G409192 CYGNET/Site 2	43	9.0	1.1	1.3	2.6	0.0	0.0
2020-09-30/G409192 CYGNET/Site 5	83	8.2	0.9	1.0	3.0	0.0	0.0
2020-09-30/G409192 CYGNET/Site 5	84	8.2	0.9	1.0	3.0	0.0	0.0
	AVE.	8.3	1.0	1.1	2.9	0.0	0.0

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Table 2: Pyroxenes: Aegirine
(relative atomic proportions, 4 cations)

Project Path	Label	Na	Mg	Al	Si	P	K	Ca	Ti	V	Mn	Fe
RSB-2019-08-07/G409192/Site 1	368-aeg	0.8	0.1	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.7
RSB-2019-08-07/G409192/Site 1	371-aeg	1.0	0.0	0.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
RSB-2019-08-07/G409192/Site 1	357	0.9	0.0	0.1	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.9
RSB-2019-08-07/G409192/Site 4	419	0.9	0.0	0.1	2.1	0.0	0.0	0.0	0.1	0.0	0.0	0.8
RSB-2019-08-07/G409192/Site 4	413	0.8	0.0	0.2	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.9
RSB-2019-08-07/G409192/Site 3	379-aeg	0.9	0.0	0.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
RSB-2019-08-07/G409192/Site 3	380aeg	0.8	0.0	0.1	2.1	0.0	0.0	0.1	0.0	0.0	0.0	0.9
RSB-2019-08-07/G409192/Site 4	397	1.1	0.0	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.7
RSB-2019-08-07/G409192/Site 4	403-aeg	1.0	0.0	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.7
RSB-2019-08-07/G409192/Site 1	362-	0.9	0.1	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.8
RSB-2019-08-07/G409192/Site 4	398	0.8	0.1	0.1	2.1	0.0	0.0	0.1	0.1	0.0	0.0	0.8
RSB-2019-08-07/G409192/Site 4	415	0.9	0.0	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.9
RSB-2019-08-07/G409192/Site 4	407	0.8	0.1	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.8
RSB-2019-08-07/G409192/Site 4	422	0.6	0.0	0.1	2.1	0.0	0.0	0.2	0.0	0.0	0.0	0.9
2020-09-30/G409192 CYGNET/Site 1	22	0.9	0.0	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.9
2020-09-30/G409192 CYGNET/Site 1	23	1.0	0.0	0.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
2020-09-30/G409192 CYGNET/Site 1	24	0.9	0.0	0.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
2020-09-30/G409192 CYGNET/Site 1	27	0.9	0.0	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.9
2020-09-30/G409192 CYGNET/Site 1	32	0.8	0.0	0.1	2.0	0.0	0.0	0.2	0.1	0.0	0.0	0.8
2020-09-30/G409192 CYGNET/Site 2	40	0.9	0.1	0.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
2020-09-30/G409192 CYGNET/Site 2	42	0.9	0.0	0.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
2020-09-30/G409192 CYGNET/Site 3	53	0.9	0.0	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.8
2020-09-30/G409192 CYGNET/Site 3	54	0.9	0.0	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.9
2020-09-30/G409192 CYGNET/Site 4	66	0.9	0.0	0.0	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.8
2020-09-30/G409192 CYGNET/Site 4	67	1.0	0.0	0.1	1.9	0.0	0.0	0.1	0.1	0.0	0.0	0.8
2020-09-30/G409192 CYGNET/Site 5	72	0.9	0.0	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.8

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2020-09-30/G409192 CYGNET/Site 5	73	0.9	0.1	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.8
2020-09-30/G409192 CYGNET/Site 5	78	0.9	0.1	0.1	2.0	0.0	0.0	0.1	0.0	0.0	0.0	0.7
2020-09-30/G409192 CYGNET/Site 6	88	0.9	0.0	0.1	2.0	0.0	0.0	0.1	0.0	0.0	0.0	0.9
2020-09-30/G409192 CYGNET/Site 6	90	0.9	0.1	0.1	2.0	0.0	0.0	0.1	0.0	0.0	0.0	0.8
2020-09-30/G409192 CYGNET/Site 6	92	0.9	0.1	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.8
2020-09-30/G409192 CYGNET/Site 6	99	0.9	0.0	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.9
2020-09-30/G409192 CYGNET/Site 7	104	0.9	0.1	0.1	2.0	0.0	0.0	0.1	0.0	0.0	0.0	0.9
2020-09-30/G409192 CYGNET/Site 8	109	0.9	0.1	0.1	2.0	0.0	0.0	0.1	0.1	0.0	0.0	0.7
AVE.		0.89	0.04	0.08	2.02	-	0.01	0.07	0.05	-	0.01	0.83

Table 3: Pyroxenes: Ferro Augite

(relative atomic proportions, 4 cations)

Project Path	Label	O	Na	Mg	Al	Si	K	Ca	Ti	V	Mn	Fe
2020-09-30/G409192 CYGNET/Site 9	113	6.00	0.11	0.43	0.04	1.95	0.00	0.89	0.01	0.00	0.04	0.54

Table 4: Amphibole: Magnesio-Arfvedsonite

(relative atomic proportions, 8 Si)

Label	NOM Si	O	F	Na	Mg	Al	Si	K	Ca	Ti	V	Mn	Fe
75	8	22.5	1.0	2.6	2.4	0.2	8.0	0.3	0.1	0.1	0.0	0.1	1.6
108	8	22.9	0.9	2.5	3.2	0.1	8.0	0.4	0.1	0.2	0.0	0.1	1.1
111	8	22.7	0.9	2.5	2.9	0.1	8.0	0.4	0.1	0.2	0.0	0.1	1.2
112	8	22.8	1.1	2.5	3.2	0.1	8.0	0.3	0.1	0.2	0.0	0.1	1.1
AVE.		22.7	0.98	2.52	2.90	0.15	8.00	0.35	0.08	0.15	0.00	0.10	1.28

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Table 5: Cancrinite group
(relative atomic proportions, 20 cations)

Project Path	Label	O	F	Cl	S	Na	Mg	Al	Si	P	K	Ca	Fe	Sr
RSB-2019-08-07/G409192/Site 3	390-canc	37.8	0.0	0.0	0.7	6.2	0.0	6.5	6.9	0.0	0.1	0.1	0.0	0.1
RSB-2019-08-07/G409192/Site 4	400	36.7	0.0	0.0	0.6	6.2	0.0	6.6	7.0	0.0	0.1	0.1	0.0	0.2
RSB-2019-08-07/G409192/Site 3	384-canc	35.6	0.0	0.0	1.1	6.0	0.0	6.7	6.9	0.0	0.3	0.0	0.0	0.0
RSB-2019-08-07/G409192/Site 4	411	35.2	0.0	0.0	0.5	6.0	0.0	6.6	7.3	0.0	0.1	0.1	0.0	0.0
RSB-2019-08-07/G409192/Site 3	387-canc	31.6	0.0	0.0	0.9	5.3	0.0	6.7	7.5	0.0	0.3	0.1	0.0	0.0
RSB-2019-08-07/G409192/Site 1	358	29.1	0.0	0.0	0.5	6.0	0.1	6.3	7.2	0.0	0.2	0.1	0.1	0.0
RSB-2019-08-07/G409192/Site 1	369-	29.9	0.0	0.2	0.4	6.4	0.0	6.1	7.1	0.0	0.2	0.1	0.0	0.0
RSB-2019-08-07/G409192/Site 3	386-	33.8	0.0	0.0	0.5	5.2	0.0	6.3	8.2	0.0	0.1	0.2	0.0	0.0
RSB-2019-08-07/G409192/Site 3	383-canc	30.1	0.0	0.0	1.2	4.7	0.0	6.9	7.8	0.0	0.6	0.0	0.1	0.0
RSB-2019-08-07/G409192/Site 3	388-canc	33.8	0.0	0.0	1.3	5.2	0.0	7.0	7.6	0.0	0.3	0.0	0.0	0.0
2020-09-30/G409192 CYGNET/Site 1	29	31.5	0.0	0.0	0.5	7.2	0.0	6.1	6.5	0.0	0.1	0.1	0.0	0.0
2020-09-30/G409192 CYGNET/Site 1	33	32.8	0.0	0.0	0.5	6.5	0.0	6.3	6.7	0.0	0.1	0.4	0.0	0.0
2020-09-30/G409192 CYGNET/Site 3	57	32.6	0.0	0.0	1.0	7.2	0.0	6.2	6.2	0.0	0.4	0.0	0.0	0.0
2020-09-30/G409192 CYGNET/Site 4	68	32.9	0.0	0.0	0.6	7.0	0.0	6.3	6.6	0.0	0.1	0.1	0.0	0.1
2020-09-30/G409192 CYGNET/Site 5	79	35.5	0.0	0.0	1.3	6.1	0.0	6.7	7.0	0.0	0.1	0.0	0.0	0.0
2020-09-30/G409192 CYGNET/Site 5	80	29.4	0.0	0.5	0.7	7.0	0.0	6.1	6.1	0.0	0.7	0.0	0.1	0.0
2020-09-30/G409192 CYGNET/Site 5	81	30.9	0.0	0.0	0.6	7.1	0.0	6.2	6.4	0.0	0.1	0.1	0.1	0.0
2020-09-30/G409192 CYGNET/Site 5	82	33.5	0.0	0.0	0.5	6.5	0.0	6.2	7.0	0.0	0.1	0.1	0.1	0.0
2020-09-30/G409192 CYGNET/Site 5	85	37.0	0.0	0.0	0.5	5.4	0.0	6.3	7.9	0.0	0.3	0.1	0.1	0.0
2020-09-30/G409192 CYGNET/Site 6	96	38.0	0.0	0.0	0.6	5.7	0.0	6.7	7.4	0.0	0.1	0.1	0.0	0.0
2020-09-30/G409192 CYGNET/Site 1	21	31.0	0.0	0.0	0.6	7.4	0.0	6.1	6.3	0.0	0.0	0.1	0.0	0.1
2020-09-30/G409192 CYGNET/Site 1	25	31.0	0.0	0.0	0.5	7.3	0.0	6.1	6.4	0.0	0.1	0.1	0.0	0.1
	AVE.	33.2	0.0	0.0	0.7	6.3	0.0	6.4	7.0	0.0	0.2	0.1	0.0	0.0

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Table 6: Eudialytes
(relative atomic proportions, 52 cations)

Project Path	Label	F	Cl	Na	Mg	Al	Si	K	Ca	Ti	Mn	Fe	Sr	Zr	Nb	Ce	Nd	Pb
RSB-2019-08-07/G409192/Site 4	393eud	0.0	0.6	10.3	0.0	0.0	28.1	0.2	5.5	0.5	1.7	0.0	2.5	3.1	0.0	0.2	0.0	0.0
RSB-2019-08-07/G409192/Site 2	372-eud	0.0	0.7	6.8	0.0	0.0	29.9	0.1	6.6	0.3	2.0	0.0	2.4	3.2	0.0	0.2	0.1	0.3
RSB-2019-08-07/G409192/Site 4	401eud	0.0	0.5	9.2	0.0	0.0	27.7	0.3	5.9	0.7	2.2	0.0	2.6	3.1	0.0	0.2	0.0	0.2
RSB-2019-08-07/G409192/Site 1	367-eud	1.6	0.6	10.7	0.0	0.0	27.0	0.2	5.9	0.5	1.8	0.0	2.5	2.9	0.0	0.0	0.1	0.3
RSB-2019-08-07/G409192/Site1	354	0.0	0.6	8.4	0.2	0.0	28.4	0.2	6.6	0.2	2.0	0.0	2.3	3.0	0.3	0.0	0.0	0.4
RSB-2019-08-07/G409192/Site4	402-eud	0.0	0.5	6.3	0.0	1.0	29.7	0.7	6.1	0.2	2.5	0.0	2.7	2.7	0.0	0.2	0.0	0.0
RSB-2019-08-07/G409192/Site1	361-eud	0.0	0.6	9.7	0.0	0.5	26.7	0.3	6.5	0.4	2.1	0.0	2.7	2.9	0.0	0.0	0.0	0.3
RSB-2019-08-07/G409192/Site1	353-	0.0	0.6	12.0	0.0	0.0	27.3	0.3	6.2	0.5	1.8	0.5	0.0	2.9	0.0	0.1	0.0	0.3
RSB-2019-08-07/G409192/Site4	412	0.0	0.6	9.0	0.0	0.0	28.5	0.5	6.7	0.8	2.6	0.0	0.0	3.2	0.3	0.1	0.0	0.3
RSB-2019-08-07/G409192/Site5	427	0.0	0.6	8.2	0.0	0.0	30.7	0.1	7.1	0.4	1.8	0.3	0.0	2.9	0.0	0.0	0.0	0.5
RSB-2019-08-07/G409192/Site5	425	0.0	0.5	4.6	0.0	0.4	32.9	0.3	7.6	1.2	1.7	0.2	0.0	2.6	0.0	0.0	0.0	0.5
RSB-2019-08-07/G409192/Site1	355	0.0	0.6	9.5	0.4	0.0	27.7	0.3	7.6	0.7	2.4	0.0	0.0	3.1	0.0	0.0	0.0	0.4
2020-09-30/G409192 CYGNET/Site 1	17	0.0	0.5	8.6	0.1	0.0	27.7	0.2	6.5	0.3	2.2	0.0	2.2	3.1	0.5	0.1	0.0	0.4
2020-09-30/G409192 CYGNET/Site 1	18	0.0	0.5	10.3	0.0	0.0	27.4	0.2	6.2	0.3	1.8	0.0	1.9	3.0	0.2	0.1	0.1	0.4
2020-09-30/G409192 CYGNET/Site 1	19	0.0	0.5	11.0	0.0	0.0	27.2	0.1	6.2	0.5	1.6	0.0	1.9	2.9	0.0	0.1	0.0	0.4
2020-09-30/G409192 CYGNET/Site 1	20	0.0	0.4	10.6	0.0	0.0	26.3	0.3	6.3	0.4	2.2	0.0	2.3	3.1	0.4	0.0	0.0	0.3
2020-09-30/G409192 CYGNET/Site 1	31	0.0	0.5	9.7	0.1	0.6	27.1	0.2	6.3	0.3	1.8	0.0	2.0	3.0	0.3	0.1	0.1	0.4
2020-09-30/G409192 CYGNET/Site 1	34	0.0	0.5	10.1	0.0	0.0	26.8	0.2	6.3	0.5	2.0	0.0	2.3	3.1	0.3	0.0	0.0	0.4
2020-09-30/G409192 CYGNET/Site 2	36	0.0	0.6	9.5	0.0	0.0	27.6	0.2	6.5	0.5	2.0	0.0	2.2	3.1	0.0	0.1	0.0	0.4
2020-09-30/G409192 CYGNET/Site 2	37	0.0	0.6	8.5	0.0	0.4	27.6	0.4	7.0	0.7	2.1	0.0	2.1	2.9	0.0	0.0	0.0	0.4
2020-09-30/G409192 CYGNET/Site 2	38	0.0	0.6	8.9	0.0	0.2	28.0	0.1	6.5	0.3	1.9	0.0	2.1	3.1	0.4	0.2	0.0	0.4
2020-09-30/G409192 CYGNET/Site 2	39	0.0	0.5	9.1	0.0	0.0	28.1	0.2	6.5	0.4	1.7	0.0	2.0	3.1	0.2	0.0	0.1	0.4
2020-09-30/G409192 CYGNET/Site 4	65	0.0	0.6	9.8	0.0	0.0	27.6	0.1	6.3	0.4	1.8	0.0	2.0	3.1	0.2	0.2	0.0	0.3
	AVE.	0.07	0.56	9.17	0.03	0.13	28.09	0.25	6.47	0.49	1.99	0.05	1.78	2.99	0.13	0.08	0.02	0.33

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Table 7: Fluorstrophite

(relative atomic proportions, 8 cations)

Project Path	Label	O	F	Cl	Na	Si	P	K	Ca	V	Sr	La	Ce
2020-09-30/G409192 CYGNET/Site 3	47	11.3	1.1	0.0	0.0	0.0	3.1	0.0	2.0	0.0	2.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 3	48	10.9	0.9	0.0	0.1	0.1	3.0	0.0	1.0	0.0	3.7	0.0	0.1
2020-09-30/G409192 CYGNET/Site 3	51	11.2	1.1	0.0	0.1	0.0	3.1	0.0	1.9	0.0	2.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 3	64	11.3	1.1	0.0	0.0	0.0	3.1	0.0	1.5	0.0	3.4	0.0	0.0
	AVE.	11.20	1.03	0.00	0.03	0.02	3.10	0.00	1.56	0.00	3.25	0.01	0.02

Table 8: Kspar: Sanidine

(relative atomic proportions, 8 cations)

Project Path	Label	O	Na	Al	Si	K	Ca	Fe
RSB-2019-08-07/G409192/Site 1	365	5.9	0.1	1.0	2.9	1.0	0.0	0.0
RSB-2019-08-07/G409192/Site 4	418	6.1	0.0	1.0	3.0	1.0	0.0	0.0
RSB-2019-08-07/G409192/Site 1	360	6.7	0.1	1.0	2.9	1.0	0.0	0.0
RSB-2019-08-07/G409192/Site 5	430	7.0	0.1	1.0	3.0	0.8	0.0	0.0
RSB-2019-08-07/G409192/Site 5	429	7.3	0.1	1.0	3.0	0.8	0.0	0.0
RSB-2019-08-07/G409192/Site 5	423	7.0	0.1	1.0	3.0	0.8	0.0	0.0
RSB-2019-08-07/G409192/Site 5	424	7.0	0.1	1.0	3.0	0.9	0.0	0.0
RSB-2019-08-07/G409192/Site 4	404	9.2	0.0	1.0	3.0	0.9	0.0	0.0
RSB-2019-08-07/G409192/Site 1	364	7.9	0.1	1.0	3.0	0.9	0.0	0.0
RSB-2019-08-07/G409192/Site 4	399	7.8	0.1	1.0	3.0	0.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 1	26	8.1	0.1	1.0	3.0	0.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 3	58	8.1	0.0	1.0	3.0	0.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 3	59	8.1	0.1	1.0	3.0	0.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 3	60	8.0	0.1	1.0	3.0	0.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 3	62	8.0	0.1	1.0	3.0	0.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 5	77	8.0	0.1	1.0	3.0	0.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 6	89	8.1	0.1	1.0	3.0	0.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 7	101	8.1	0.1	1.0	3.0	0.9	0.0	0.0
	AVE.	7.58	0.07	1.02	2.98	0.91	0.00	0.01

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Table 9: Lamprophyllite

(relative atomic proportions, 12 cations)

Project Path	Label	F	Cl	Na	Mg	Al	Si	K	Ca	Ti	V	Mn	Fe	Sr	Ba
RSB-2019-08-07/G409192/Site 3	389-lamp	1.2	0.0	2.2	0.1	0.1	4.4	0.1	0.1	3.2	0.1	0.2	0.2	1.4	0.1
RSB-2019-08-07/G409192/Site 1	356	0.9	0.0	2.4	0.1	0.1	4.1	0.1	0.1	3.2	0.0	0.2	0.1	1.4	0.1
RSB-2019-08-07/G409192/Site 1	370-	1.1	0.0	2.4	0.1	0.1	4.3	0.1	0.1	2.9	0.1	0.2	0.1	1.6	0.1
RSB-2019-08-07/G409192/Site 3	381-lamp	1.5	0.0	2.4	0.1	0.0	4.4	0.1	0.1	3.0	0.0	0.2	0.1	1.7	0.0
RSB-2019-08-07/G409192/Site 3	378-lamp	1.1	0.0	2.2	0.1	0.1	4.4	0.1	0.1	3.1	0.0	0.2	0.1	1.6	0.0
2020-09-30/G409192 CYGNET/Site 5	74	0.0	0.0	2.9	0.0	0.0	4.1	0.1	0.1	2.8	0.0	0.2	0.1	1.6	0.1
2020-09-30/G409192 CYGNET/Site 6	86	0.0	0.0	2.8	0.0	0.0	4.1	0.0	0.1	3.0	0.0	0.3	0.1	1.6	0.0
2020-09-30/G409192 CYGNET/Site 6	91	1.2	0.0	2.7	0.1	0.0	4.2	0.0	0.1	2.9	0.0	0.3	0.1	1.6	0.0
2020-09-30/G409192 CYGNET/Site 6	97	1.4	0.0	2.7	0.1	0.1	4.2	0.0	0.1	2.9	0.0	0.2	0.0	1.6	0.0
2020-09-30/G409192 CYGNET/Site 6	98	1.3	0.0	2.8	0.0	0.0	4.1	0.0	0.1	2.9	0.0	0.2	0.1	1.7	0.0
2020-09-30/G409192 CYGNET/Site 7	100	1.2	0.0	2.8	0.0	0.0	4.1	0.1	0.1	2.9	0.0	0.2	0.0	1.7	0.1
2020-09-30/G409192 CYGNET/Site 8	110	1.1	0.0	2.8	0.0	0.0	4.2	0.0	0.2	2.9	0.0	0.2	0.1	1.6	0.0
	AVE.	1.00	0.00	2.59	0.04	0.04	4.22	0.07	0.11	2.96	0.02	0.23	0.10	1.58	0.04

Table 10: Nepheline

(relative atomic proportions, 12 cations)

Project Path	Label	O	F	Na	Al	Si	K	Ca	Fe
RSB-2019-08-07/G409192/Site 4	396	12.4	0.2	2.3	3.9	4.6	1.1	0.1	0.1
RSB-2019-08-07/G409192/Site 4	417	17.5	0.0	3.0	3.9	4.2	0.8	0.0	0.0
RSB-2019-08-07/G409192/Site 4	410	13.5	0.0	2.3	4.1	4.6	1.0	0.0	0.0
RSB-2019-08-07/G409192/Site 4	420	14.6	0.0	2.6	4.0	4.5	0.8	0.0	0.1
RSB-2019-08-07/G409192/Site 4	395	11.3	0.0	2.4	4.1	4.5	1.1	0.0	0.0
2020-09-30/G409192 CYGNET/Site 1	30	16.8	0.0	3.0	4.0	4.2	0.8	0.0	0.0
2020-09-30/G409192 CYGNET/Site 4	69	16.5	0.0	3.0	4.0	4.1	0.9	0.0	0.0
2020-09-30/G409192 CYGNET/Site 6	95	16.7	0.0	2.9	4.0	4.2	0.8	0.0	0.0
	AVE.	14.92	0.02	2.68	4.01	4.36	0.92	0.01	0.03

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Table 11: Pectolite
(relative atomic proportions, 6 cations)

Project Path	Label	O	Na	Mg	Al	Si	K	Ca	Mn	Fe
RSB-2019-08-07/G409192/Site 1	363	8.9	0.9	0.0	0.0	3.3	0.0	1.6	0.1	0.1
RSB-2019-08-07/G409192/Site 4	405	9.6	0.7	0.0	0.0	3.4	0.0	1.8	0.1	0.0
RSB-2019-08-07/G409192/Site 4	414	9.1	0.7	0.0	0.0	3.4	0.0	1.7	0.1	0.0
RSB-2019-08-07/G409192/Site 4	394	8.6	0.7	0.0	0.0	3.4	0.0	1.7	0.1	0.0
RSB-2019-08-07/G409192/Site 1	359-	8.6	0.8	0.0	0.0	3.2	0.0	1.8	0.1	0.0
RSB-2019-08-07/G409192/Site 4	406	8.9	0.8	0.0	0.0	3.2	0.0	1.9	0.1	0.0
RSB-2019-08-07/G409192/Site 4	408	7.9	0.7	0.0	0.1	3.2	0.0	1.9	0.1	0.0
2020-09-30/G409192 CYGNET/Site 3	46	9.3	1.0	0.0	0.0	3.0	0.0	1.9	0.1	0.0
2020-09-30/G409192 CYGNET/Site 3	52	9.3	1.0	0.0	0.0	3.0	0.0	1.9	0.1	0.0
2020-09-30/G409192 CYGNET/Site 3	55	9.4	1.0	0.0	0.0	3.0	0.0	1.9	0.1	0.0
2020-09-30/G409192 CYGNET/Site 3	56	9.3	1.0	0.0	0.0	3.0	0.0	1.7	0.2	0.0
2020-09-30/G409192 CYGNET/Site 3	61	9.4	1.0	0.0	0.0	3.0	0.0	1.9	0.1	0.0
2020-09-30/G409192 CYGNET/Site 3	63	9.4	1.0	0.0	0.0	3.0	0.0	1.9	0.1	0.0
2020-09-30/G409192 CYGNET/Site 5	71	9.3	1.0	0.0	0.0	3.0	0.0	1.8	0.1	0.0
2020-09-30/G409192 CYGNET/Site 6	87	9.3	1.0	0.0	0.0	3.0	0.0	1.8	0.1	0.1
2020-09-30/G409192 CYGNET/Site 6	93	9.3	1.0	0.0	0.0	3.0	0.0	1.8	0.1	0.1
2020-09-30/G409192 CYGNET/Site 9	115	9.3	1.0	0.0	0.0	3.0	0.0	2.0	0.1	0.0
2020-09-30/G409192 CYGNET/Site 9	116	9.5	1.0	0.2	0.0	3.0	0.0	1.6	0.1	0.1
	AVE.	9.13	0.90	0.01	0.01	3.13	0.01	1.81	0.11	0.04

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Table 12: Phlogopite

(relative atomic proportions, 8 cations)

Project Path	Label	O	F	Cl	Na	Mg	Al	Si	K	Ca	Ti	V	Mn	Fe
2020-09-30/G409192 CYGNET/Site 9	118	11.5	1.0	0.0	0.0	2.4	0.8	3.3	1.0	0.0	0.0	0.0	0.1	0.4

Table 13: Sodalite

(relative atomic proportions, 20 cations)

Project Path	Label	O	F	Cl	S	Na	Al	Si	K	Ca	Fe
2020-09-30/G409192 CYGNET/Site 5	76	25.9	0.0	2.0	0.1	6.7	6.5	6.7	0.0	0.0	0.1
2020-09-30/G409192 CYGNET/Site 7	106	25.0	0.0	1.8	0.1	7.7	6.2	6.0	0.0	0.0	0.1
2020-09-30/G409192 CYGNET/Site 7	107	25.1	0.0	1.8	0.1	7.7	6.1	6.1	0.0	0.0	0.1
	AVE.	25.37	0.00	1.86	0.09	7.38	6.27	6.26	0.00	0.00	0.09

Table 14: Strontianite

(relative atomic proportions, 1 cations)

Project Path	Label	O	Si	K	Ca	Mn	Fe	Zn	Sr	Ba	Ce	Pb
RSB-2019-08-07/G409192/Site 3	382	4.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
RSB-2019-08-07/G409192/Site 3	377	3.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
2020-09-30/G409192 CYGNET/Site 2	35	2.7	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
2020-09-30/G409192 CYGNET/Site 2	44	2.7	0.0	0.0	0.1	0.0	0.0	0.0	0.9	0.0	0.0	0.0
2020-09-30/G409192 CYGNET/Site 2	45	2.7	0.0	0.0	0.1	0.0	0.0	0.0	0.9	0.0	0.0	0.0
2020-09-30/G409192 CYGNET/Site 4	70	2.7	0.1	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0
	AVE.	3.03	0.01	0.00	0.03	0.00	0.00	0.00	0.95	0.00	0.00	0.00

Table 15: Ca-Ti-REE-Si minerals (Mosandrite?)

(relative atomic proportions, 24 cations)

Project Path	Label	F	Cl	Na	Mg	Al	Si	K	Ca	Ti	Mn	Zn	Sr	Nb	La	Ce	Pr	Nd	Th	U
RSB-2019-08-07/G409192/ Site 2	375	0.0	0.4	0.0	0.3	0.4	13.8	0.3	1.9	3.5	0.0	0.4	0.0	0.0	0.7	1.3	0.0	0.3	0.8	0.2
RSB-2019-08-07/G409192 /Site 2	376	0.0	0.4	0.0	0.1	1.1	13.5	0.5	1.8	3.2	0.3	0.4	0.0	0.0	0.6	1.3	0.0	0.4	0.3	0.2
RSB-2019-08-07/G409192 /Site 2	373	0.0	0.4	0.0	0.2	0.4	13.5	0.4	2.0	3.7	0.0	0.3	0.0	0.0	0.7	1.3	0.0	0.4	0.8	0.2
RSB-2019-08-07/G409192/ Site 2	374	0.0	0.5	0.0	0.2	0.8	13.0	0.4	2.4	3.6	0.4	0.3	0.0	0.0	0.7	1.5	0.0	0.4	0.3	0.2
2020-09-30/G409192 CYGNET/ Site 3	49	1.7	0.1	0.6	0.2	0.2	11.5	0.1	5.7	3.0	0.0	0.0	0.4	0.0	0.6	1.2	0.2	0.3	0.0	0.1
2020-09-30/G409192 CYGNET/ Site 7	102	2.0	0.2	2.2	0.0	3.3	10.5	0.4	3.7	1.6	0.0	0.0	0.0	0.5	0.4	1.0	0.0	0.3	0.1	0.0
2020-09-30/G409192 CYGNET/ Site 7	103	0.0	0.3	0.0	0.0	1.3	10.7	0.2	5.1	2.7	0.0	0.0	0.0	0.8	0.8	1.8	0.0	0.4	0.1	0.0
2020-09-30/G409192 CYGNET/ Site 7	105	0.0	0.3	0.9	0.1	1.3	10.2	0.3	4.8	2.4	0.0	0.0	0.0	0.8	0.6	1.8	0.2	0.5	0.1	0.0
	AVE.	0.46	0.33	0.47	0.15	1.09	12.10	0.34	3.43	2.95	0.09	0.17	0.06	0.27	0.65	1.41	0.05	0.38	0.30	0.10

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Appendix 3: XRF analyses (From Tiger)

Rocktype	Sanidine tinguaite
Lab Job No.	
Field No	Kc1
	wt%
SiO ₂	57.75
TiO ₂	0.1
Al ₂ O ₃	18.8
Fe ₂ O ₃	6.05
FeO	0.84
MnO	0.25
MgO	1.01
CaO	2.35
Na ₂ O	3.33
K ₂ O	9.02
P ₂ O ₅	
H ₂ O+	
H ₂ O-	0.42
S	
CO ₂	
TOTAL	100.2

CYGNET	Langdons Pt
Lab. No.	970371
Reg No.	C108025
	ppm
Ag	<1
As	<20
Au	~0.005
Ba	3100
Bi	<5
Ce	97
Co	9
Cr	<5
Cu	<5
Ga	30
La	56
Mo	<5
Nb	10
Nd	31
Ni	8
Pb	56
Rb	145
Sc	<9
Sn	<9
Sr	3700
Th	45
U	<10
V	110
W	<10
Y	21
Zn	105
Zr	150