Mineral Resources Tasmania

Laboratory Report

LJN2019-124-1

MINERALOGICAL ANALYSES, AVOCA

An unpublished Mineral Resources Tasmania Report for:

M Latham

By: R.S. Bottrill, and L Unwin

Date: 30 September 2022

Mineral Resources Tasmania
Department of State Growth

Tasmanian Government

SUMMARY

The sample is a fine grained calcareous nodular aggregate, probably formed at low temperature as a concretionary nodular pedogenic calcrete. It contains mostly calcite with trace quartz, kaolinite, mica, greenalite(?) and sepiolite.

INTRODUCTION

One sample of rock was submitted for mineralogical analysis with details shown in Table 1. The main issue is to determine its identity.

Table 1: Sample details.

Reg#	Field No.	Location	Sample Description
G410119	Latham	Avoca	baryte?

SAMPLE PREPARATION

The sample was examined by stereomicroscopy, and analysed for mineralogy. Analyses were done by XRD (X-Ray diffraction), in the Mineral Resources Tasmania (MRT) laboratories, Rosny.

SAMPLE DESCRIPTION

The sample is white, hard and nodular; it appears to be a fine grained calcareous nodular aggregate, with nodules to about 5mm, plus some iron staining (Figs 1 - 2). Surficial cracking suggests it has formed at low temperature as a concretionary nodular calcrete.

Figure 1: Sample as received, showing a nodular structure. Sample G410119. FOV: about 120 mm.

Figure 2: Sample as received, showing surficial cracking. Sample G410119. FOV: about 60 mm.

XRD ANALYSES

The 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, -3º to 145º 2Ø scanning range and 2º - 145º 2Ø measuring range, with a scanning speed of 0.01 to 100º/min, a graphite counter monochromator and a Kß Ni- filter. The analysis software used is the PDXL2 using the ICCD database.

The results are shown in Appendix 1, and indicate mostly calcite, plus trace quartz, kaolinite, mica, a greenalite-type mineral and sepiolite.

PXRF

The samples were analysed for major and trace elements using an Olympus Vanta M Series pXRF. The instrument uses a 4-Watt X-ray tube with application optimized anode material (rhodium Rh and tungsten W): 8-50 kV with a large area Silicon Drift Detector. The instrument uses the built-in Olympus Vanta analysis software version 3.12.34.

The results are shown in Appendix 2, and indicate mostly Ca, with minor Si, Al and Fe, plus traces of K, Mn, Mg and Ti. This is reasonably consistent with the XRD results.

SUMMARY AND DISCUSSION

The sample appears to be a fine grained calcareous nodular aggregate. Surficial cracking suggests it has formed at low temperature as a concretionary nodular pedogenic calcrete. It contains mostly calcite with trace quartz, kaolinite, mica and sepiolite.

R.S. Bottrill — **MINERALOGIST/PETROLOGIST**

T Coyte & L Unwin — **TECHNICAL OFFICERS**

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Appendix 1: Laboratory Report: XRD Analyses

Client: M Latham
Sample Source: Avoca
MRT Job Number: LJN2019-124
Analysis: Approximate Mineralogy
Method: X-Ray Diffraction
Analyst: L Unwin
Lab Manager: R Bottrill
Date: 12/12/2019

Analysis Results – G410119

General information

Analysis date	2020/01/10	XRD	Rigaku Miniflex 600
Job Number	LJN2019-124		
Sample ID	G410119	Operator:	T.Coyte
Comment:	Original RIR Method, Cold HCl Leach to Identify minor phases.		

Analysis results

Phase name	Content (%)	Formula
Calcite	97(±3)	$Ca(CO_3)$
Quartz	<1	SiO_2
Kaolinite-1A	<1	$Al_2Si_2O_5(OH)_4$
Sepiolite	<1	$(Mg,Fe)_4Si_6O_{15}(OH)_2 \cdot 6H_2O$
*Greenalite?	<1	$Fe_3Si_2O_5(OH)_4$
Mica	<1	$KAl_2(Si_3Al)O_{10}(OH,F)_2$

*Greenalite?- mineral from the Kaolin- serpentine group possibly greenalite, could be instead of kaolinite?

Peak overlap may interfere with identifications and quantitative calculations.

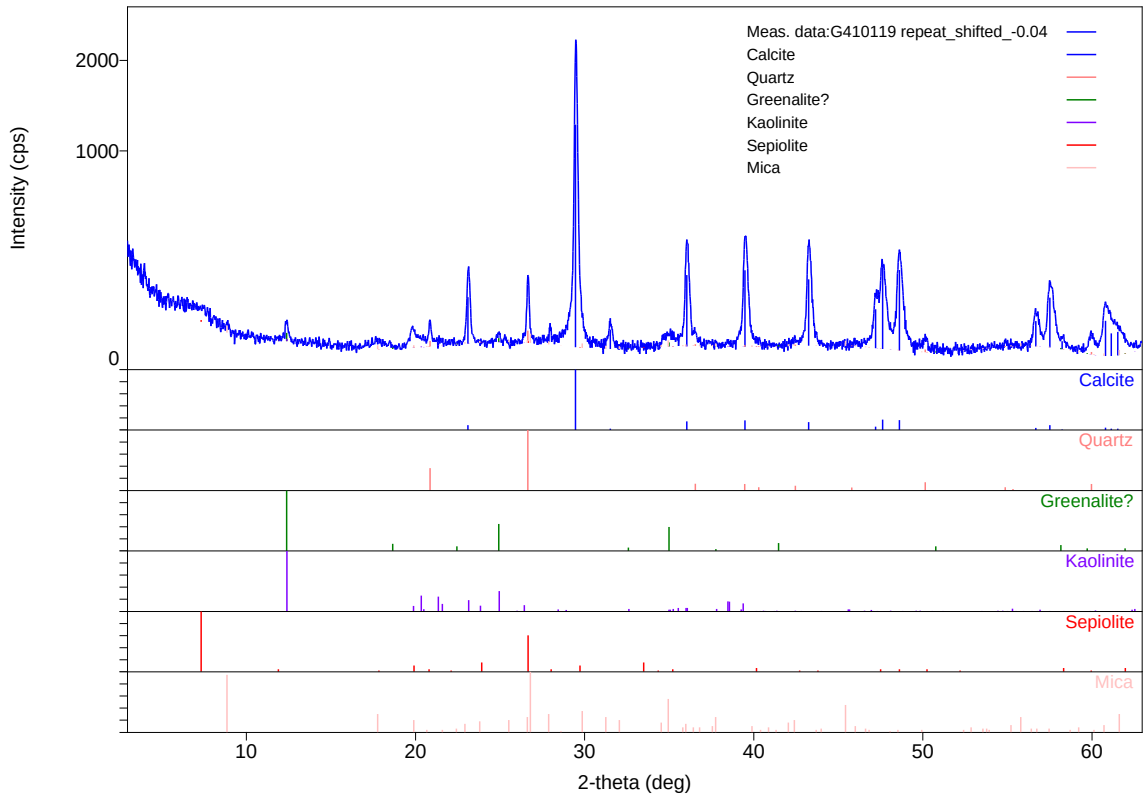
Amorphous minerals and minerals present in trace amounts may not be detected.

Peak List

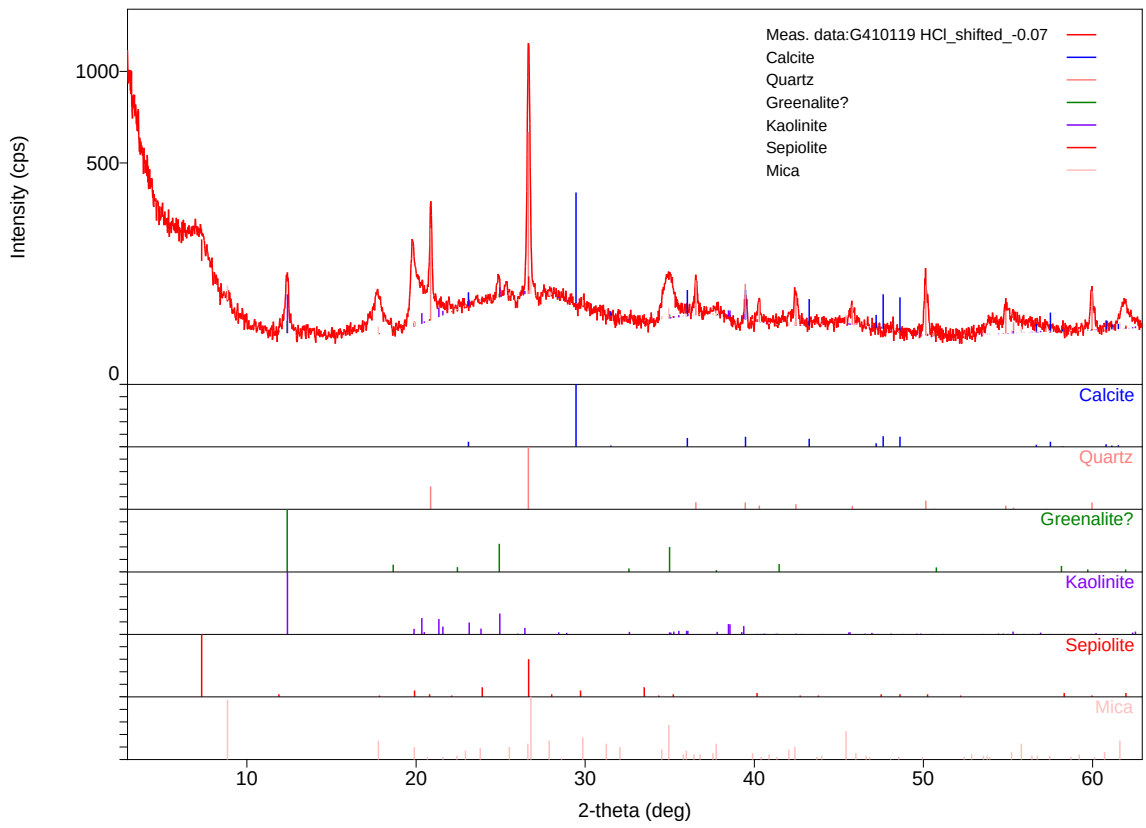
No.	d(ang.)	Phase name	Rel. int
26	12.0(3)	Sepiolite(0,1,1),Mica(0,0,2)	27.69
27	7.134(9)	Greenalite?(0,0,1),Kaolinite(0,0,1)	1.49
28	5.00(2)	Sepiolite(0,5,1),Mica(0,0,4)	2.36
29	4.482(3)	Kaolinite(0,2,0),Sepiolite(0,6,0),Mica(1,1,-1)	3.95

30	4.2618(13)	Quartz(1,0,0)	1.24
31	3.8436(14)	Calcite(0,1,2),Kaolinite(0,2,-1)	8.18
32	3.565(3)	Greenalite?(0,0,2),Kaolinite(0,0,2)	0.53
33	3.3427(10)	Quartz(1,0,1),Mica(0,0,6)	5.48
34	3.191(2)	Sepiolite(1,3,3)	0.73
35	3.0304(3)	Calcite(1,0,4),Sepiolite(1,7,1)	100.00
36	2.834(3)	Calcite(0,0,6),Kaolinite(0,2,-2)	1.86
37	2.561(7)	Greenalite?(1,1,1),Kaolinite(1,-3,0),Mica(1,1,6)	2.29
38	2.4912(5)	Calcite(1,1,0),Kaolinite(1,-3,-1),Sepiolite(2,1,1),Mica(1,3,-3)	17.88
39	2.2816(4)	Calcite(1,1,3),Quartz(1,0,2),Kaolinite(1,3,1),Sepiolite(1,10,2),Mica(0,4,0)	21.18
40	2.0914(4)	Calcite(2,0,2),Sepiolite(1,0,6),Mica(2,2,3)	18.87
41	1.9239(3)	Calcite(0,2,4),Kaolinite(1,3,2)	15.00
42	1.90997(15)	Calcite(0,1,8),Kaolinite(1,1,3),Mica(2,0,-8)	10.62
43	1.87333(9)	Calcite(1,1,6),Kaolinite(0,4,2),Sepiolite(2,6,4)	19.43
44	1.8178(6)	Quartz(1,1,2)	0.70
45	1.6234(3)	Calcite(2,1,1),Kaolinite(1,-5,1)	4.49
46	1.60112(17)	Calcite(1,2,2),Kaolinite(0,4,3)	12.73
47	1.5811(17)	Calcite(1,0,10),Kaolinite(1,3,-4),Mica(3,1,-6)	0.23
48	1.5416(4)	Quartz(2,1,1),Kaolinite(2,-2,-4)	1.44
49	1.52261(14)	Calcite(2,1,4),Kaolinite(3,-1,-3),Sepiolite(3,1,4),Mica(2,4,-7)	15.53

Phase data pattern



Phase data pattern – Cold HCl Leach



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Appendix 2: Laboratory Report: pXRF analyses

Client: M Latham
Sample Source: Avoca
MRT Job Number: LJN 2019-124
Analysis: Chemistry
Method: Portable X-Ray Fluorescence
Analyst: R Bottrill
Lab Manager: R Bottrill
Date: 8 April 2019

LJN2016-124-G410115-pxrf-8022020	g410119	g410119	g410119	g410119
	8/01/2020	8/01/2020	8/01/2020	8/01/2020
SiO2	11.9	11.3	17.4	12.4
TiO2	0.4	0.3	0.3	0.3
Al2O3	6.6	6.7	9.2	6.7
Fe2O3	2.6	2.0	1.4	2.8
MnO	0.2	0.1	0.1	0.2
CaO	35.8	43.3	37.8	41.0
K2O	0.6	0.7	1.4	0.8
P2O5	0.0	0.0	0.0	0.0
S	0.0	0.0	0.0	0.0
total	58.1	64.4	67.6	64.3