Mineral Resources Tasmania

Laboratory Report

LJN2020-013

MINERALOGICAL ANALYSES, CONCRETION, GRETNA

An unpublished Mineral Resources Tasmania Report for:

J Everard

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Mineral Resources Tasmania
Department of State Growth

Tasmanian Government

SUMMARY

The sample was analysed and contains about 40% calcite in a plagioclase-rich, clay-poor arkose. The original plagioclase feldspar may have been altered to albite, calcite and zeolites during diagenesis.

INTRODUCTION

Large, elongate, log-like, grey geological structures, to a metre or more in length, and tens of cm's wide, occur in well-cemented Triassic sandstone in large road cuts on the Lyell Highway, near Greta (Figs. 1, 2). One of these was recently sampled and submitted for mineralogical analysis with details shown in Table 1. The main issue is to determine the mineralogy and nature of the structure.

Table 1: Sample details.

Reg. No	Location	Description
G407700	SE of Gretna	Concretion or log?

SAMPLE PREPARATION

The sample was split into representative subsamples and 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 a grey, unlaminated, hard, cemented sandstone, with grains to about 0.5mm diameter. There is a sparry look to it, probably due to sparry calcite. (Fig 3).

Figure 1: Log-like structure in sandstone, Gretna. FOV: about 1.6m.

Figure 2: Log-like structure in sandstone, showing cross-section, Gretna. FOV: about 1.6m.

Figure 3: Sample G407700, FOV: 20cm.

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, -3^{o} to 145^{o} 2Ø scanning range and 2^{o} - 145^{o} 2Ø measuring range, with a scanning speed of 0.01 to 100^{o}/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, plagioclase, quartz and K-feldspar, with trace mica, zeolite and chlorite.

SUMMARY AND DISCUSSION

The sample appears to be a calcite-rich arkose, and is probably a calcite concretion formed in Triassic sandstone. The calcite in the concretion may have formed by diagenetic alteration of calcic plagioclase, forming albite, zeolite and calcite. Quartz and K-feldspar are subordinate to plagioclase.

R.S. Bottrill

MINERALOGIST/PETROLOGIST

T Coyte

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Appendix 1: Laboratory Report: XRD Analyses

Client: MRT
Sample Source: Gretna
MRT Job Number: LJN2020-013
Analysis: Approximate Mineralogy
Method: X-Ray Diffraction
Analyst: T Coyte
Lab Manager: R Bottrill
Date: 13/2/2019

Analysis Results – G407700

General information

Analysis date	12/2/2020	XRD	Rigaku Miniflex 600
Job Number	LJN2020-013		
Sample ID	G407700	Operator:	T.Coyte
Comment:	Original RIR Method		

Analysis results

Phase name	Content (%)	Formula
Calcite	42(±10)	$CaCO_3$
Plagioclase	25(±8)	$NaAlSi_3O_8$
Quartz	17(±5)	SiO_2
Potassium Feldspar	11(±4)	$KAlSi_3O_8$
Mica	3(±2)	$KAl_2(AlSi_3O_{10})(OH)_2$
Zeolite	2(±1)	$CaAl_2Si_4O_{12}4H_2O$
Chlorite	1(±1)	$(Mg_5Al)(Si,Al)_4O_{10}(OH)_8$

Peak overlap may interfere with identifications and quantitative calculations.

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

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Phase data pattern