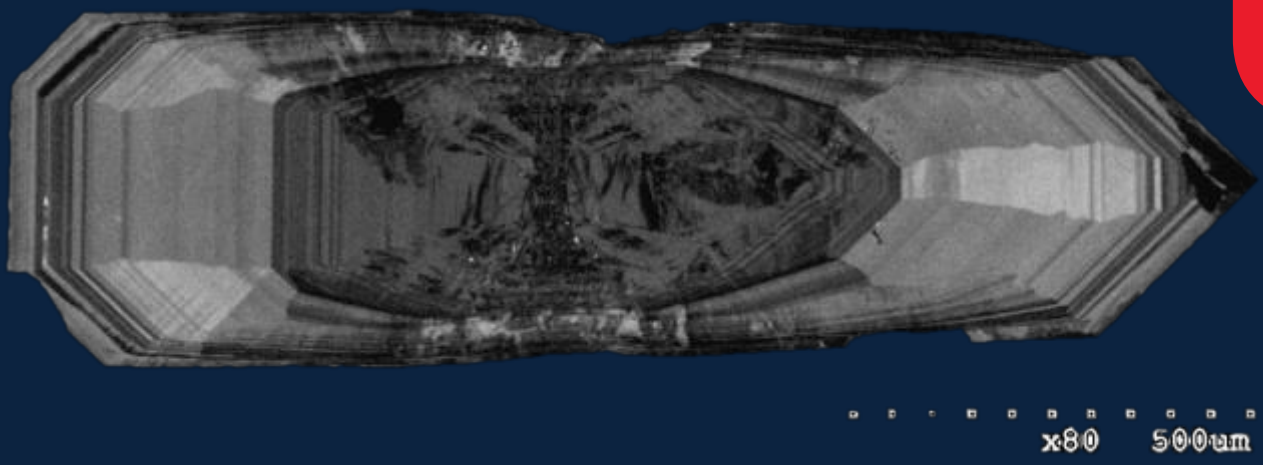


# Hidden Histories in Quartz and Feldspar:
## What I have learnt studying the most abundant minerals on Earth

GEOQUEST SEMINAR SERIES

**Date:** Friday, 4 August 2017 (Week 2)

**Time:** 3:30 – 4:30pm

**Venue:** SEES Map Library, 41.G03a

**Speaker:** Dr Dominique Tanner, University of Wollongong

SEMINAR OVERVIEW

Quartz and feldspar are the most abundant minerals on Earth, yet underrepresented in geochemical databases. Both minerals incorporate trace elements into their crystal lattice, passively recording chemical shifts in their environment (hydrothermal fluids or magma chambers) as they grow. This talk will provide a number of case studies demonstrating how the growth histories of these 'common' minerals can still surprise us.

Plagioclase feldspar and pyroxene were analysed to track magmatic influxes and mixing across 3-km of magmatic stratigraphy in the largest layered mafic intrusion on Earth. The results from this study identified a prospective platinum-rich horizon that was previously overlooked by many workers – because there were no chemical shifts in the plagioclase chemistry. Our work revealed that these chemical signatures were missing from plagioclase because they were overprinted during cooling of the layered mafic intrusion.

New data show how the colour of gem-quality plagioclase feldspar is defined by its chemistry. The unexpected finding of this research is that these gemstones are an unidentified reservoir of copper – so the presence of these gemstones could make or break a large copper deposit.

The chemistry of hydrothermal quartz in ore deposits is rarely studied in great detail. We discovered quartz microcrystals intergrown with sulfide melt from the feeder-zone of a high-sulfidation deposit. Our data show that quartz was deposited as a metastable silica hydrate and evolved to euhedral anhydrous quartz during high-temperature diagenesis. This is the first evidence for non-equilibrium $\delta^{18}O$ fractionation in quartz from a high-temperature environment. Further studies revealed that unlike trace elements, oxygen isotopes are not affected by sector zonation in hydrothermal quartz.

GeoQuEST Research Centre

UNIVERSITY OF WOLLONGONG AUSTRALIA

SMAH.UOW.EDU.AU/GEOQUEST/NEWS-EVENTS

#THISISUOW