

# EXTRACTING PETROCHRONOLOGICAL INFORMATION FROM LOW SAMPLE VOLUMES

MINEX CRC PROGRAM 3

## National Drilling Initiative

### PHD PROJECT

Curtin University

### PREREQUISITES AND INTERESTS

A 2.1 or first class Honours degree or Masters in Earth Sciences or related discipline, with interests in isotope geology, geochronology, metamorphic geology, mineral exploration and mass spectrometry.

### PRIMARY SUPERVISOR

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### PARTICIPATING ORGANISATIONS



Geological Survey of  
Western Australia

### RESEARCH PROJECT

Extracting meaningful thermobarometric and geochronological information from low volumes of coherent materials obtained during drilling is challenging. The traditional equilibrium thermodynamic approach whereby an equilibrium volume (typically larger than a thin section) is hampered by the nature of materials retrieved. To establish these constraints a new approach whereby individual mineral thermometry and barometry coupled with the direct geochronological investigation of metamorphic minerals needs to be developed. Recent advances in inclusion (zircon, quartz) thermobarometry using Raman Spectroscopy is a potentially significant in this area. However, it is yet to be tested on materials retrieved from drill core. This information can potentially be supplemented by laser based geochronological techniques ( $Rb\leftarrow Sr$  in mica and  $Lu-Hf$  in garnet) from the same chips allowing a robust petrochronological history for these samples to be achieved. This project will focus on the development of these techniques and apply them to selected case study areas in collaboration with the sponsoring organisations.

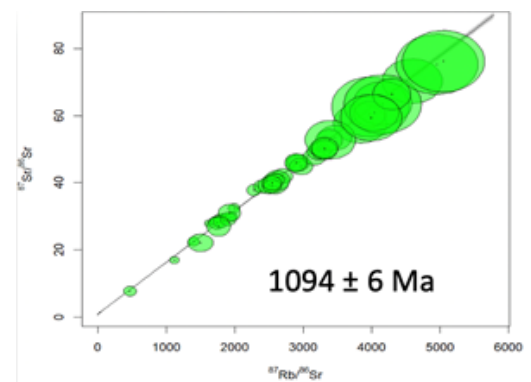
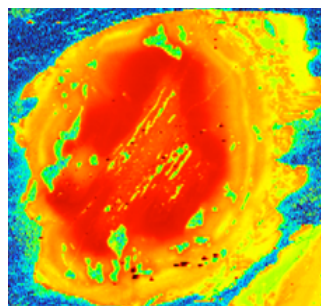


Figure 5: (left) Laser ablation Y map of garnet from drill core, note the different generations of quartz inclusion in the core and the rim. (right) An  $Rb-Sr$  isochron derived from LA-ICP-MS analyses of biotite grains that form the foliation that wraps the garnet.