



Two PhD Scholarships in Geochemistry and Petrology of Magmatic Systems

Project Background

Carbonatite intrusions and their hydrothermal systems are key sources of critical minerals, including rare earth elements. Despite their significance, fundamental questions remain about why carbonatite and silicate melts frequently coexist and how they influence the transport and deposition of economically important metals.

The ARC Discovery project “It’s About Time: Critical Minerals in Carbonatite Systems” aims to address these questions by investigating the temporal relationships between carbonatite and silicate melts, as well as their associated hydrothermal systems. State-of-the-art accessory mineral and noble gas dating techniques will offer unprecedented age resolution to better understand the environments in which carbonatites and their mineral deposits formed—both in Australia and globally.

Scholarship Details

This project focuses on two prominent carbonatite locations: Laacher See Volcano (Germany), a Quaternary site providing a modern example of a coevolving carbonatite-silicate system, and Mt. Weld (Western Australia), one of the world’s oldest carbonatites, offering insights into Proterozoic magmatic processes and the stability of accessory minerals over geological timescales.

As a PhD candidate, you will conduct fieldwork at Mt. Weld with industry collaboration and analyse mineral samples using cutting-edge facilities at Curtin University’s John de Laeter Centre and School of Earth and Planetary Sciences—ranked #1 in Australia for Earth Sciences. You will work alongside an expert research team, including Dr. Luc Doucet, Dr. Denis Fougereuse, Prof. Fred Jourdan, and Prof. Axel Schmitt, who will provide supervision and training in advanced analytical techniques such as:

- Geochronology and isotopic studies using large-geometry ion microprobe and noble gas mass spectrometry.
- Geochemical and mineralogical analysis using LA-ICP-MS, SEM, and automated mineralogy.
- Microstructural investigations at atomic scales using ToF-SIMS, EBSD, Raman microscopy, cathodoluminescence imaging, and atom probe tomography.

Scholarship Benefits:

- Stipend: AUD \$37,500 per year, full-time, tax-free, and indexed annually.
- Duration: Three years, subject to satisfactory progress monitored in three milestone reviews.
- Tuition Fee Offset: Full coverage for the scholarship duration.

- International applications accepted: Yes

Who Should Apply?

We are looking for highly motivated candidates with:

- A Bachelor's or Master's degree in Earth Sciences or a related field.
- Strong academic background in igneous petrology, geochemistry, or mineralogy.
- Experience with instrumental analysis and data interpretation, particularly in assessing analytical uncertainties, is desired.
- Preferably, hands-on experience with SEM, electron or ion microprobes, or LA-ICP-MS.
- Proficiency in English (both written and spoken).

How to Apply

For enquiries, contact Prof. Axel Schmitt at axel.schmitt@curtin.edu.au.

To apply, email axel.schmitt@curtin.edu.au by 15 April 2025 with the following documents:

- A comprehensive CV, including academic achievements, research experience, relevant skills, and contact details for two academic references.
- A cover letter detailing your motivation, research interests, and how your background aligns with the project.
- A 1–2 page research proposal outlining your ideas on studying magmatic rocks and their associated ore deposits, with a focus on carbonatites and critical mineral enrichment.

Shortlisted candidates will be then invited to submit an Expression of Interest (EOI) with a draft research proposal.