



Fully funded PhD Opportunity

School of Earth Sciences, University College Dublin

Spodumene pegmatite haloes: characterization, exploration vectoring and ore potential

Applications are invited from suitably qualified candidates for a full-time PhD. The project is funded by iCRAG, the SFI Research Centre in Applied Geosciences.

Project background and description

Spodumene pegmatites provide more than half of global production of lithium, a rare metal essential to fulfil the rapidly growing demand for electric vehicle batteries. Most spodumene pegmatites are surrounded by country rock geochemical halos enriched in lithium and other rare metals. Halos pose a number of scientific questions and their better understanding presents several economic opportunities: they have potential use in exploration for spodumene pegmatites, but also represent loss of lithium from pegmatite. Halo lithium probably occurs mainly in mica, which is not yet an economic lithium source.

Scientifically, this project aims to test the hypothesis that crystallizing spodumene pegmatite magmas expel hydrothermal fluid into country rocks, forming chemical halos comprising a stockwork whose intensity decreases with distance from the pegmatite contact. Economically, the project aims to improve detectability of halos in outcrop, drill core and stream sediments; to facilitate exploration for buried spodumene pegmatites; and contribute to attempts to extract lithium from micas. Research will be based on field sampling and existing samples, from well studied spodumene pegmatites in Ireland and elsewhere, most likely Spain, Portugal and Austria.

The successful candidate will:

- Characterise the mineralogy, chemistry, texture and extent of spodumene pegmatite halo minerals by optical and desktop SEM BSE microscopy, quantitative electron beam mineral recognition and analysis, and LA-ICP-MS chemical mapping, to model halo formation
- Develop a hand-held LIBS (laser induced breakdown spectroscopy) method to detect halos in outcrop and in drill core
- Attempt to detect halo minerals in stream sediment samples
- Explore the possibility of economically extracting lithium from spodumene pegmatite halos
- Engage with pegmatite belt local communities in Ireland and develop digital information resources.

Requirements

Applicants should have a first or upper second class degree in Geology, or similar. Also advantageous, but not essential, are an MSc in geochemistry, and experience in electron beam and LA-ICP-MS analysis, mineral exploration, and geoscientific public engagement.

Award

The successful candidate will be enrolled for a 48-month (Structured) PhD programme. The Fellowship provides University fees and a stipend of €18,500 per annum over four years. Funds for project costs are also provided.

Start date: 1st September 2022 or 1st January 2023.

Further Information

Dr Julian Menuge

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Application Procedure

Please submit a CV including the names of two referees, as well as a cover letter outlining your motivation, to j.f.menuge@ucd.ie

Closing date: Friday 12th August 2022 at 5pm (local) Irish time.