

## EPSRC Centre for Doctoral Training in Sustainable Materials and Manufacturing

**Title:** [Novel extraction and responsible sourcing of lithium from unconventional brine and hard rock resources](#)

**Supporting Company:** [Cornish Lithium Ltd](#)

**Location:** Penryn Campus, University of Exeter, TR10 9TA

**Primary Supervisor:** [Dr Rob Fitzpatrick](#)

**Secondary Supervisors:** TBC but likely to include [Prof. Frances Wall](#), [Dr Rich Crane](#), [Dr Weiguo Xie](#)

### Project Description

***The collaboration with the named project partner is subject to contract. Please note full details of the project partner's contribution and involvement with the project is still to be confirmed and may change during the course of contract negotiations. Full details will be confirmed at offer stage.***

How can the UK thrive as we move into a world dominated by Li batteries? How will the UK find, develop & secure the necessary resources to do so? You can be at the forefront in answering these questions by developing brand-new routes for direct extraction of lithium from UK brines and hard-rock sources. In doing so, you will help Cornish Lithium Ltd. (CLL) to become a world-leader in environmentally-responsible extraction of lithium and become one of the world-experts in lithium extraction technologies.

Driven by the worldwide transition towards a low carbon future powered by renewable and green energy (and significantly by the move towards electric vehicles), global demand for lithium for use within batteries is predicted to increase from 217,000 tonnes LCE in 2017 (Lithium Carbonate Equivalent; Reuters) to 785,000 tonnes LCE by 2025 (Roskill). To be able to meet this demand, the Li industry must rapidly identify and develop new sources of lithium in addition to more traditional mining projects. In this dynamic and fast paced industry, it is imperative that the extractive technologies must also evolve and develop to account for the diverse range of new potential sources of Li.

Cornish Lithium Ltd. (CLL) are at the forefront of exploration for new and unconventional lithium (Li) deposits within the UK & Europe. Based in South West England, they are looking to define and explore the potential of Li contained in solution within geothermal brines, and in primary and secondary hard rock sources including granites, and legacy wastes from mining and bulk extractive industries. This may also extend to technologies which have applications in battery recycling.

You will build on your pre-existing skillset to help Cornish Lithium evaluate the potential for responsible lithium extraction from brine and hard rock sources in SW England. Through this programme, you will develop expertise in scientific research and engineering with a commercial focus. To do this, you will work with CLL and experts from the Universities of Exeter, Warwick and Cranfield to complete a portfolio of project work which will likely include:

- Developing novel, energy-efficient and environmentally responsible extraction techniques for lithium and other technology metals from geothermal brines.
- Exploring the environmental impacts of potential re-injection of geothermal brines once lithium has been extracted.
- Developing a theoretical model for extraction potential at different pressure-temperature conditions i.e. model the effects that increased temperature has on reaction rates and explore the potential economic benefits of utilising the geothermal heat and energy contained within the brines during processing.
- Consolidating knowledge on processing of legacy deposits for lithium in UK / Europe, then designing and carrying out laboratory tests to delineate which techniques are most suitable for CLL.
- Evaluating the opportunities for responsible sourcing of lithium & other critical battery and technology metals within the UK.
- Completing life cycle analyses to investigate the circular economy around decarbonisation and responsible sourcing of lithium.