THE FARADAY INSTITUTION ReLiB
REUSE & RECYCLING OF LITHIUM-ION BATTERIES

Visiting Researcher Fellowship (VRF) – Chile or Argentina

Call for applications

Topic: Investigation into the application of Direct Lithium Extraction technologies for recycling batteries

Location: Electrochemical Science and Engineering group at Imperial College London
Duration: up to 6 months, starting between March to September 2024, completing by March 2025.
Expenses including travel, housing costs and associated subsistence costs will be funded according to the VRF grant.
Closing Date: 29th February 2024

Applications open to researchers from Chile and Argentina ONLY.

VRF at Imperial College London

Imperial College is committed to equality of opportunity, to eliminating discrimination and to creating an inclusive working environment for all. We therefore encourage candidates to apply irrespective of age, disability, marriage or civil partnership status, pregnancy or maternity, race, religion and belief, gender identity, sex, or sexual orientation. We are an Athena SWAN Silver Award winner, a Disability Confident Leader and a Stonewall Diversity Champion.

The College is a proud signatory to the San-Francisco Declaration on Research Assessment (DORA), which means that in hiring and promotion decisions, we evaluate applicants on the quality of their work, not the journal impact factor where it is published. For more information, see https://www.imperial.ac.uk/research-and-innovation/about-imperial-research/research-evaluation/

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The project and research team

Lithium-ion batteries (LiBs) are expected to contribute significantly to decarbonisation of our energy and transport systems, however the production scale required can only be met by increased extraction of an array of minerals, some relatively scarce, involving environmental and socio-economic impacts. Lithium is an essential component, is currently sourced from hard rock and brine reserves worldwide.

Brine reserves provide two-thirds of global lithium and are mostly sourced from the so-called “lithium triangle”, spanning the salar brine lakes of Chile, Argentina and Bolivia. Traditional methods for extracting lithium from these reserves harness the drying power of the desert sun and wind to

concentrate the salts in a series of evaporation ponds. These methods are slow and cover a large area of land, while consuming high volumes of fresh water and producing equivalent volumes of waste brine. Direct Lithium Extraction (DLE) methods are a collection of more than thirty different techniques which have been proposed to improve lithium recovery, reducing both the environmental impacts and costs. DLE methods include filtration, electrochemical separation and chemical precipitation reactions.

As lithium is identified as a critical mineral by many countries, studying primary and secondary routes for lithium production is important from both a technological and geopolitical perspective. Assessing the feasibility of methods that enable faster and more cost-effective lithium extraction from a wide range of source brines would be greatly beneficial in guiding research and development efforts and investments. Specifically, as lithium recovery from low-grade brines is currently being explored in the UK, developing process models for DLE to inform life cycle and techno-economic assessment will generate a valuable toolset to assess the feasibility of primary and secondary production routes, with direct applicability to securing robust supply chains for critical materials.

This study is a collaboration between Imperial College London, the University of Birmingham and a researcher from South America, to investigate the extent to which these methods can be applied to low concentration brines, such as those found in geothermal deposits across Europe, and to the solutions recovered from recycling batteries. The study will also compare the relative performance of these methods, as well as their environmental and techno-economic impacts.

Researchers in Chile and Argentina are world-leading experts in lithium extraction technologies and have a direct understanding of their social and environmental complexities. Research groups at Imperial College London and the University of Birmingham will benefit greatly from their expertise in the application and analysis of DLE methods. Establishing links with Latin American countries will directly connect researchers interested in lithium mining with those interested in battery recycling, to exchange ideas from a whole systems perspective.

In return, the Faraday Institution's project on Recycling of Lithium-ion Batteries (ReLiB) is a consortium of world class researchers developing the latest processes for recovery of a wide range of materials from spent batteries. The ReLiB project researchers seek to recover as many materials as possible from spent LiBs and are committed to developing sustainable, environmentally-friendly and cost-effective technologies. Lithium recovery is a key goal of the ReLiB project as it is the most expensive material included in LiBs, with its recovery being crucial to the profitability of recycling operations. The proposed project will enable collaboration across different work streams of the ReLiB project, combining information from the lab with system-level modelling to inform sustainable practices in battery recycling.

This VRF grant is funded by the Faraday Institution, the UK's independent institute for electrochemical energy storage research and skills development. The Faraday Institution vision is to bring together scientists and industry partners on research projects to reduce battery cost, weight, and volume; to improve performance and reliability (The Faraday Institution - Powering Britain's Battery Revolution).

The aim of these VRF grants is to help to build links between UK and Argentina/Chile research groups. To this end, the project will cover expenses (including travel, housing costs and associated subsistence costs) for a visiting researcher from Chile/Argentina.

To apply, please send your resume (2 pages) and cover letter (500 words) to Dr. Jacqueline Edge at j.edge@imperial.ac.uk quoting VRF FI Grant in any correspondence.

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