Characterisation and modelling of the effect of manufacturing processes on battery performance
PhD

Funding: Funded for UK/EU for 4 years
Supervisor: Dr Emma Kendrick and Dr Dhammika Widanalage
Supporting company:
Start Date: 1st October 2018

Project overview

This is a challenging and unique PhD opportunity for a student with a good analytical, electrochemical and materials background interested in applying the knowledge to a rapidly growing area: battery manufacturing. This growth is driven by the need for transport electrification and UK is strengthening this capability through initiatives such as the Faraday Institution and UK Battery Industrialisation Centre.

This PhD project is to investigate the effect of manufacturing upon the performance and properties of the lithium ion batteries. This research area has a strong growth and the successful completion of a PhD will offer several opportunities in battery manufacturing. In particular, the focus will be upon investigating the next generation automotive cell for longevity in a pouch and cylindrical cell format. The effect of the mixing and coating, thixotropic measurements and analysis, rheology, drying parameters, tortuosity and fundamental electrochemical and thermal property dependence upon the performance of the battery will be investigated. The results will feed into parameterisation of predictive models of manufacturing vs performance of lithium ion batteries.

By joining WMG, you will be well situated to perform the experimental research as WMG has access to excellent facilities for battery development and cell manufacturing at its EIC labs. The PhD complements the Faraday Challenge activity and you will also have the opportunity to work and interact with other PhD students working on the Faraday Challenge.

A background and skill set in the following are desired, upon which you will build, to successfully carry out the PhD research: electrochemical testing of materials, electrodes and cells, materials analysis (SEM, XRD, TEM), synchrotron and neutron analytical studies, electrode manufacture, ink mixing and rheological control, drying parameterisation, translation of practical studies to theory of rheology, thixotropy, and drying parameters. Parameterisation of models as a predictive tool for manufacturing and performance characteristics.

Eligibility and desired qualities
We are actively seeking an enthusiastic individual to join the team at WMG, Warwick with the following entry requirements and expectations:

- A 1st or 2.1 undergraduate and/or postgraduate master’s qualification in a science and technology field. e.g. Chemistry, Physics or Engineering
- An understanding and experience in electrochemical and materials analysis
- Enthusiasm to understand the battery technology from the materials through to cell, and the impact manufacturing has on the performance properties
- A passion and enthusiasm to challenge the state of the art in an exciting new technology application space.
**Funding:**

Due to funding regulations this project is open to UK/EU students only.

This position provides an attractive tax-free stipend of £19,908 per annum for 4 years.

To be eligible for this project the successful applicant should have indefinite leave to remain in the UK and have been ordinarily resident here for 3 years prior to the project start-date, apart from occasional or temporary absences. Additional information about this is available on the [EPSRC website](#).

**To apply**

If you would like to be considered for this position or have any questions please complete our [online enquiry form](#).