The effect of rapid charging modes on materials within li-ion cells
PhD

**Funding:** EPSRC funded for 3.5 years (UK student)
**Supervisors:** Dr Rohit Bhagat
**Start Date:** As soon as possible

**Project overview**
An exciting opportunity to work as part of our Electrochemical Engineering research group at WMG, University of Warwick, for the duration of your PhD.

Rechargeable Li-ion cells are used in a wide variety of applications with typical lifetimes of two years for the consumer electronics industry. Currently, we are seeing the applications for Li-ion cells become more demanding in terms of power requirement (electric vehicle and aerospace) with desired lifetimes of 10 years. In order to achieve these targets, a better understanding of the performance and materials relationships is needed. However, there is a high complexity of the underlying materials and electrochemical processes that contribute to ageing which require investigation.

This project will primarily focus on investigation of electrodes and their constituent materials when subjected to fast-charging protocols. You will use materials analysis techniques on a range of Li-ion cells used in various rapid-charging scenarios. Post-mortem analysis would include various X-ray techniques (X-ray diffraction, X-ray photoelectric spectroscopy and X ray tomography) and microscopy (scanning electron microscopy and transmission electronic microscopy) techniques, offering an insight into the morphological changes occurring in the cell materials. You will also likely be exposed to electrochemical analysis methods (electrochemical impedance spectroscopy and incremental charge analysis) which offer an insight into the kinetics and thermodynamics of the cells under investigation.

**Entry requirements**
Applicants should an upper second (2.1) honours degree or equivalent, in a relevant discipline such as Chemical/Material Science/Physical Science or an Engineering-based discipline. Experience of electrochemistry or an MSc in a relevant subject is highly desirable.

For funding requirements the applicant should be eligible as a UK student. A stipend of £14,296 will be paid per annum for 3.5 years.

Recruitment to the project is subject to available funding for the project at the time of recruitment.

**To apply**
To apply please complete our [online enquiry form](#) and upload your CV.