Thermal Performance of Automotive Lithium ion Batteries
EngD

Funding: £20,277 (for UK/EU nationals) which includes a £4,000 industrial top up, for 4 years
Supervisors: Mr. Mark Ellis, Dr Rohit Bhagat and Professor David Greenwood
Supporting company: Millbrook
Start Date: 1st October 2018

Project overview
This is a fantastic opportunity to work with WMG, University of Warwick, the foremost UK facility for battery innovation, research and development, in association with Millbrook, the leading UK vehicle testing facility for the design, engineering and development of automotive and test technology propulsion systems, with a customer base ranging across the automotive, transport, petrochemical and defence industries.

This studentship focuses on investigating the thermal behaviour of Lithium-ion batteries packs. This will involve understanding automotive thermal management systems for batteries and then investigating them on individual lithium ion cells to understand the effect of the thermal load over time. This would be achieved through electrical characterisation during test and then disassembly and materials characterisation post-test. This would then extend into safety testing of automotive batteries at higher temperatures which would include thermal propagation

Key objectives:
- Explore different thermal fluid systems for real automotive packs
- Build prototype systems to investigate the various cooling systems at an individual cell level.
- Conduct battery system performance tests under different thermal conditions and see how these change over time.
- Investigate cell to cell thermal propagation to better understand how modules fail.
- Disassemble the cells tested and investigate the cell components using SEM, XRD and other characterisation tools.

As an Engineering Doctorate, this project has a unique relationship between research and industry, with an emphasis on innovation and addressing real world issues, with time split between both organisations. You will have full access to state-of-the-art facilities in WMG’s Energy Innovation Centre and Millbrook.

Since becoming part of the Spectris group, Millbrook has made significant investment in advanced low emission vehicle technology. Millbrook’s battery and propulsion systems test capabilities will bring new technologies to market sooner for the full range of hybrid and battery electric vehicle powertrains. Currently under construction and due in Q4 2018 are 12 new battery test beds, each with the capability to test complete automotive battery packs up to 1100V, 1400A, 750kW over a wide temperature range: from -40°C to +90°C, with further battery test facilities expansion under review for 2019-2020. Please see the Millbrook website for more information.

Entry requirements

Qualifications

Candidates should have a minimum of an upper second (2.1) honours degree (or equivalent) in a relevant subject electrical, materials or mechanical engineering. Previous experience of
working on this type of research in an industrial or academic setting is highly desirable, but also welcome applicants from adjacent sectors with relevant skills.

**Funding:**

Due to funding regulations, the applicant should be a UK/EU student.

This position provides a 4 year tax free stipend (for UK/EU nationals) plus a £4,000 industrial top up, totalling £20,277.

**To apply:**

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