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Project Title:

Advanced characterisation of next generation battery materials

Project Description:

International PhD scholarship available on the characterisation of next generation battery materials, in the School of Physics and Astronomy at Queen Mary University of London. This project will advance the performance of next generation ion battery electrodes, synthesized and supplied by Deregallera (a UK company), in terms of energy and power density by performing a series of advanced structural and functional characterisation techniques and modelling. It will involve materials synthesis based on proven commercial methods, which are ultimately an upscalable manufacturing technology using low cost precursors.

We will perform advanced characterisation of their pore structure over 5-6 orders magnitude of lengthscales, coupled with electrochemical tests, using multiple in-situ and operando characterisation tools and theoretical modelling, to fully understand the mechanism and dynamics of ion intercalation-deintercalation and establish structure-performance relations.

This project will use a variety of techniques, such as small and wide angle x-ray scattering, total scattering (x-ray and neutron), in-situ andoperando synchrotron and Raman spectroscopy studies, electron microscopy, as well as a suite of electrochemical and electrical tests.