

PhD Position in Li-ion Battery Research
McMaster University

3D Correlative Imaging of Li-ion Batteries

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Recruiting a PhD student in Materials Engineering, Materials Science, Chemistry, or related field with interests in energy materials, advanced characterization techniques, and image analysis

Application Deadline: June 30, 2022

The Research Project: The focus of this research is to investigate the evolving architecture and degradation of novel Li-ion batteries containing a SiO porous cellular anode. The main benefit of the Si-based anode in place of graphite is a theoretical 10x increase in capacity. However, under many operating conditions a volume expansion up to 300 % will occur that limits battery lifetime and induces the formation of capacity-reducing Li-rich phases.

This PhD develop a correlative 3D imaging methodology that would enable direct observation of structure evolution on Li-ion battery material with Si-based anodes. By combining 3D X-ray tomography, NMR spectroscopy, and Focused Ion Beam tomography, the goal is to observe the evolving battery structure during its operation and to identify linkages between the battery's initial structure, phase formation, and battery degradation.

For these experiments, state-of-the art microscopy infrastructure at McMaster University will be utilized. There is also the potential of performing experiments at the Canadian Light Source.

Candidate Profile: The successful candidate will have a university degree in Materials Engineering, Materials Science, Chemistry, or related field with demonstrated experience in: energy materials, experimental materials science (especially technique development); advanced characterization techniques; and image processing / image analysis for materials characterization.

Please send an email to: philliab@mcmaster.ca. In the subject line, please include the acronym: 3D-Li-PhD.