

Nano-Scale Characterisation Of Li Ion Migration Phenomena In Battery Materials

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Lithium ion batteries is an example of technology that has become literally omnipresent in our lives: mobile telephones, computers, biomedical devices, children's toys, cars and drones are powered by these. However, a common feature of Li-ion batteries that remains the source of concern to engineers and users alike is capacity fading that occurs throughout a battery's life, manifesting itself in the gradual reduction in performance. The origins of this phenomenon are closely linked with the physical, electro-chemical and mechanical processes that accompany charge cycling. In this talk I shall touch upon several approaches that have been recently developed and applied to the study of these systems:

- Combined X-ray and neutron diffraction refinement of the crystal structure of Li-conductive solid electrolyte
- Direct nano-scale mapping of Li ion distributions in charged and discharged battery cathodes using FIB-SEM TOF-SIMS ([dx.doi.org/10.1016/j.nanoen.2015.08.013](https://doi.org/10.1016/j.nanoen.2015.08.013))
- Observation of cycling-induced fragmentation of battery cathodes by FIB serial tomography ([dx.doi.org/10.1039/C5TA04151A](https://doi.org/10.1039/C5TA04151A))