

Popular Abstract

Lithium-ion batteries (LiB) are witnessing an increasing demand for electric vehicles. It provides a sustainable energy storage solution that is more efficient and eco-friendly than the fossil fuels. Batteries work on the principal of transferring ions and electrons back and forth and this reaction can be characterized through various factors one such being tortuosity. Similar to most energy storage solutions LiBs deteriorate over time. This affects the performance and life time of the batteries. Therefore it is crucial to study this mechanism in order to produce a more efficient and long lasting solution.

One of the methods to study the mechanism is through analysing the changes in the materials. This technique visualises the mechanisms helps track the evolution of the materials. This project aims to develop a technique called the Broad Ion Beam (BIB) to cross-section battery materials and then image the surface through Scanning Electron Microscopy (SEM) and then analyse the surface and measure tortuosity. The results from this technique are then used to analyse two different cells and also compare the differences observed with ageing. It was found that particle cracking and delamination was prominent with ageing. The tortuosity also consequently reduced with ageing. The Li plating was also observed. The results also need to be compared against electrochemical measurements to correlate with the physical quantification.