

Synchrotron X-ray Tomographic Microscopy of Lithium Ion Batteries

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Realization of high performance lithium ion batteries requires the development of roadmaps for achieving favorable porous electrode microstructure through the selection of active materials, additives, and electrode processing conditions. To develop such roadmaps, a clear understanding of battery microstructure is needed. We report the use of synchrotron radiation x-ray tomographic microscopy (SRXTM) to obtain statistically significant volume 3D reconstructions of lithium ion battery electrodes. We demonstrate the use of SRXTM to quantify directional tortuosity in lithium ion battery electrodes, determine its origins, and assess its impact on lithium ion battery (LIB) performance and safety. Finally, we show that SRXTM can be applied to operando investigations of porous electrodes during electrochemical operation.

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