

Mechanistic Studies of Electrochemical Energy Storage Materials via Operando X-ray Imaging

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Lithium-sulfur batteries have been extensively studied as one of the most promising candidates to replace current lithium-ion batteries, because lithium metal anode and sulfur cathode have high theoretical capacities (1,672 mAh/g for sulfur cathode, and 3,860 mAh/g for lithium metal anode). However, the reaction mechanisms of sulfur cathode and lithium metal anode are very complex and have not been fully understood. This presentation will focus on investigating the reaction mechanism of post Li-ion batteries (S cathode & Li metal anode) with operando synchrotron X-ray techniques. Operando X-ray microscopy was performed to study the evolution of morphology of the sulfur and lithium metal while operating the battery. Direct observation of dissolution and formation of sulfur and lithium metal during operating the battery, and their dependency on cycling parameters, can bring us new insights to understand the reaction mechanism.