

Operando Visualization of Electrochemical Reactions in Rechargeable Batteries

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Although lithium-ion batteries (LIBs) have been used as the most dominant energy storages for portable electronic devices such as laptops and electrical vehicles for the past decades, still they cannot meet the demands for high energy density as the technologies are developed. Therefore, it is very urgent to develop new battery system to replace current LIBs. However, the reaction mechanisms of most next-generation battery systems are very complicated and complex, so it is required to understand how they work during the charge/discharge for further development.

This presentation will focus on investigating the reaction mechanism of post Li-ion batteries with *operando* synchrotron X-ray techniques. For example, Li anode has been extensively studied because they have high theoretical specific capacity (3,860 mAh/g). However, the reaction mechanism of Li metal anode is very complex and has not been fully understood. *Operando* X-ray microscopy was performed to study the evolution of morphology of Li while operating the battery. Direct observation of dissolution and formation of Li during operating the battery can bring us new insights to understand the reaction mechanism.