Special Issue

Electrocrystallization in Rechargeable Batteries

Message from the Guest Editors

Electrochemically induced phase transformations play an important role in the properties and functional behavior of the final material. Therefore, nucleation and growth in rechargeable batteries deserve special attention from both scientific and practical points of view. Electrocrystallization can take place at the solid–liquid and solid–solid interfaces, where electron transfer is coupled to phase transitions. These processes occur in the active electrode materials, during electrodeposition on the metal anode, or as a formation stage of battery components prior to cell assembly. To shed light on electrocrystallization in secondary batteries, scientific knowledge on nucleation and growth phenomena in well-known traditional electrochemical systems is transferred to conditions closely related to rechargeable battery operation. However, challenges in battery systems, including side reactions, capacitive/pseudocapacitive effects, lack of appropriate visualization techniques, misleading theoretical modelling, etc., limit accurate data interpretation and the linking of nucleation and growth parameters with battery functions.

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