

## Effect of fast charging on Lithium plating and SEI growth

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Metallic lithium deposition (Plating) and continuous Solid Electrolyte Interface (SEI) growth are two dominant degradation mechanisms in Lithium-ion battery electrodes. Especially in fast-charging applications, the identification and prediction of those complex electrochemical processes is crucial for the development of efficient and long-lasting batteries as well as suitable charging protocols [1]. Thereby, especially the interplay between SEI growth and Li-Plating over the lifetime of the battery is not yet properly understood.

The present work employs a model-based approach to study the aging phenomena on the surface of graphitic anode materials during high-current cell operation. For this purpose, a combined surface model is formulated, which couples the aforementioned anode aging mechanisms and is able to relate them to the local conditions at the graphite surface. The coupled description is based on models for lithium plating [2] and SEI growth [3] recently developed in our group. Furthermore, the model is implemented in the electrochemical simulation framework BEST [4,5] for 3D micro-structure resolved simulations, which will allow us to correlate electrode microstructure with degradation processes, especially for fast charging applications.

### References:

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