Contribution ID: **54** Type: **Poster**

Heterogeneity of Lithium Distribution in the Graphite Anode of 21700-Type Cylindrical Li-Ion Cells during Degradation

Friday 6 December 2024 13:45 (3 hours)

The electrochemical cycling of lithium-ion batteries proceeds through an active exchange of lithium ions and electrons between the cathode and anode materials. Besides material properties, such exchange is facilitated by cell parameters like electrode dimensions and geometry, current density, temperature, pressure, reaction rate, etc. Such parameters are neither uniformly distributed nor static in general and, therefore, serve as stabilizing factors of heterogeneous states in Li-ion batteries typically reflected in the lithium concentration distribution in the electrodes [1].
In previous studies, it was shown that with cell aging, the distribution of the lithium-ions in the graphite anode of 18650-type lithium-ion batteries changes [2]. In this contribution, the heterogeneity of a fresh and aged 21700-type Li-ion battery was investigated using multiple diffraction techniques with both synchrotron and neutron radiation. Measurements were completed using lab-based measurements like SEM, incremental capacity analysis, etc. The results have shown an interesting lithium distribution after cell aging, leading to the question of how the cell format influences the cell aging behavior.

1. Senyshyn, A., et al., Homogeneity of lithium distribution in cylinder-type Li-ion batteries. Scientific Reports, 2015. 5(1): p. 18380.
2. Mühlbauer, M.J., et al., Inhomogeneous distribution of lithium and electrolyte in aged Li-ion cylindrical cells. Journal of Power Sources, 2020. 475: p. 228690.

Primary author: PETZ, Dominik

Co-authors: SENYSHYN, ANATOLIY; REBELO-KORNMEIER, Joana; MÜLLER-BUSCHBAUM, Peter (TU München, Physik-Department, LS Funktionelle Materialien)

Presenter: PETZ, Dominik

Session Classification: Poster Session

Track Classification: Structure Research