Contribution ID: **4** Type: **Poster**

A Small Amount of Sodium Difluoro(oxalate)borate Additive Induces Anion-Derived Interphases for Sodium-Ion Batteries

Friday 6 December 2024 13:45 (3 hours)

In sodium-ion batteries (SIBs), the properties of the electrode-electrolyte interphases (EEIs) formed on the electrode surface, dominate the Na+ de-solvation process and Na+ (de)intercalation behavior, thereby influencing the battery performance. Currently, both high-concentration electrolytes and localized high-concentration electrolytes facilitate the formation of anion-derived and inorganic-rich interfacial chemistry, leading to excellent electrochemical performance. However, the expensive lithium salt and/or fluorinated diluent imposes a major concern. Herein, a small amount additive of 0.5 wt% sodium difluoro(oxalate)borate (NaDFOB) is introduced into 1 mol L–1 NaClO4/propylene carbonate electrolyte to construct a robust inorganic-rich EEIs via an anion preferential adsorption-decomposition mechanism. Results reveal that the DFOB–anion has a lower adsorption energy than the other components, which will be preferentially adsorbed in the inner Helmholtz plane (IHP) with the closer proximity to two electrode surfaces and thus being firstly decomposed to form inorganic-rich interphases, thereby effectively suppressing side reactions. Consequently, both Na-ion half-cells and full-cells using this electrolyte deliver excellent cycling performance. This strategy that regulates the interphase chemistry on the electrode surface through an anion preferential adsorption-decomposition strategy, provides a promising avenue for developing long-term cycling SIBs.

Primary authors: XIA, Lan (Technische Universität München); Prof. MÜLLER-BUSCHBAUM, Peter (Technische Universität München); QIU, Qian (Ningbo University)

Presenter: XIA, Lan (Technische Universität München)

Session Classification: Poster Session

Track Classification: Material Science