Cover Profile
doi.org/10.1002/batt.202200483

Chemistry Europe
European Chemical Societies Publishing

www.batteries-supercaps.org

A Combined XPS and Computational Study of the Chemical Reduction of BMP-TFSI by Lithium


Dr. K. Forster-Tonigold


Dr. F. Buchner


Dr. J. Bansmann


Prof. Dr. R. J. Behm


Prof. Dr. A. Groß

Invited for this month's cover picture is the work of Prof. Groß' and Prof. Behm's groups at the Helmholtz Institute Ulm (HIU) Electrochemical Energy Storage and Ulm University. The cover picture shows the model study on the chemical reactions of the ionic liquid BMP-TFSI with Li atoms. The combined study of XPS experiments and DFT calculations identified various initial products in the solid-electrolyte interphase formation. Read the full text of the Research Article at 10.1002/batt.202200307.

What is the most significant result of this study?

We obtained detailed information on initial SEI components in batteries. Kinetically and thermodynamically controlled product formation is observed.

What are the main challenges in the broad area of your research and how do you address them in your research?

Battery operation often fails due to hindered ion migration through the interphase between electrode and electrolyte. In order to improve the cyclability of batteries, knowledge about the exact nature of that interphase formed due to decomposition of the electrolyte at the electrode is an indispensable prerequisite. Yet, the complexity of battery systems excludes the applicability of many valuable analytical methods. In our joint research project, we try to tackle this issue by choosing well defined model systems representing the basic components of batteries. Combing experiment and electronic structure calculations allows us to obtain deep insights into fundamental processes occurring in electrochemical systems. Our research at the Helmholtz Institute Ulm and the Institute of Theoretical Chemistry at Ulm University is embedded into research activities of the POLiS Cluster of Excellence funded by the German Research Foundation and CELEST (Center for Electrochemical Energy Storage Ulm-Karlsruhe).