Contribution ID: **38** Type: **Poster**

In-depth Soft-XAS Analysis of the Electrochemical Performance of Fully Optimized Graphite‖LNMO Li-Ion Cells

Wednesday, November 29, 2023 5:50 PM (2h 10m)

Besides the efforts to further increase the overall battery performance, the sustainability aspect is gaining more and more importance. From that perspective, aqueous processed cobalt-free $LiNi_{0.5}Mn_{1.5}O_4$ (LNMO) positive electrodes represent a promising candidate –not least as they enable a higher energy density compared to cobalt-free LFP. As presented in previous publications, there have been already a lot of efforts made to optimize the LNMO active material and its electrochemical performance.[1–3] In the work presented here, we combined the previously optimized LNMO, the specially developed aqueous processing, and an optimized electrolyte composition to achieve the best performing aqueous processed graphite‖LNMO Li-ion Cells reported so far. More specifically, to understand how the applied surface modification and the electrolyte additives protect the LNMO active material during cycling and also storage, soft-XAS is a very powerful technique that enables the simultaneous characterization of the electrode surface (including the cathode‖electrolyte interface, CEI) and the bulk material. The results provide an answer to the question why the protection mechanism differs for the cycling and storage tests, which is rather unexpected, in fact.

[1] G. Gabrielli, P. Axmann, M. Wohlfahrt-Mehrens, J. Electrochem. Soc. 2016, 163, A470–A476.
[2] M. Kuenzel, D. Bresser, T. Diemant, D. V. Carvalho, G. T. Kim, R. J. Behm, S. Passerini, ChemSusChem 2018, 11, 562–573.
[3] A. Kazzazi, D. Bresser, M. Kuenzel, M. Hekmatfar, J. Schnaidt, Z. Jusys, T. Diemant, R. J. Behm, M. Copley, K. Maranski, J. Cookson, I. de Meatza, P. Axmann, M. Wohlfahrt-Mehrens, S. Passerini, J. Power Sources 2021, 482, 228975.

Primary authors: BINDER, Markus; BOEHLER, Timo Florian (Helmholtz Institute Ulm (HIU)); REZVANI, Javid; DIEMANT, Thomas; AXMANN, Peter; BRESSER, Dominic (Karlsruhe Institute of Technology (KIT))

Session Classification: Happy Hour and Poster Session