**The influence of the binder amount on the Solid Electrolyte Interphase**

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The Solid Electrolyte Interphase (SEI) is of utmost importance to not only the performance but also to the safety and lifetime of the lithium ion battery (LIB). Electrolyte components react at the negative electrode surface during the first charge/discharge cycles and form a thin (3‑10 nm) layer of decomposition products.[1] This layer, the SEI, is permeable for Li ions, but passivates the electrode surface and inhibits further electrolyte decomposition.[2] After many years of intensive research, however, the SEI is still not understood in all details.[3]

For the purpose of SEI quantification, X-Ray Photoelectron Spectroscopy (XPS) is a well-established technique, since it provides information on a depth scale of up to 10 nm. Furthermore, it cannot only be used to acquire information about the elemental and chemical surface composition but also the thickness and homogeneity of the SEI layer.[1,2]

The binder in composite LIB electrodes covers roughly 20% of the surface. So far, it is still unknown, if and how the binder amount and type (*e.g.* polyvinylidene difluoride or carboxymethylcellulose) affects the quantification of the SEI components by XPS. This study aims to improve the reliability of XPS quantifications by determining the binder-induced systematic error of the measurements. Additionally, the reactivity of the binder and the surface structure of the electrode is assessed. For this, negative graphite-based electrodes with 2, 4 and 6%wt. of two different state-of-the-art binders are produced. These electrodes are used in LiNi0.6Mn0.2Co0.2O2||graphite - based coin cells (2032). XPS analysis is carried out after electrochemical formation.

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**References**

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