



Contribution ID: 121

Type: Talk

SEI growth influences at Li-Ion cells caused by formation, cycling and lamination revealed using NDP

Tuesday, 10 December 2019 17:45 (15 minutes)

In this study the influence of an established electrode-separator lamination technique on the formation of solid-electrolyte-interface (SEI) in graphite anodes is investigated. As we have shown previously, the lamination technique is beneficial for the capacity aging in graphite/LiNi_{1/3}Mn_{1/3}Co_{1/3}O₂ (NMC) cells. Here, the non-destructive and highly lithium-sensitive Neutron Depth Profiling method (NDP) is used to quantify directly accumulations of lithium in the SEI. Due to the high collimated neutron flux of 3×10^9 ncm⁻²s⁻¹ even traces of lithium can be detected as a function of depth. The anodes were extracted from the graphite/NMC cells, washed and subsequently examined post mortem in fully discharged state. The impact of the charge-discharge cycling speed as well as the lamination process on the SEI formation was studied via comparing lithium accumulation in laminated and non-laminated anodes at several accelerated formation (0.1C, 1C, 2C) and cycling rates (1C, 2C). Here NDP reveals homogeneous lithium accumulations as function of depth with lithium situated at the surface of the graphite particles thus forming the SEI. The SEI was found to grow logarithmically with cycle number starting with the main formation in the first two cycles. Furthermore, the measurements indicate that the lamination technique hampers the formation of SEI within the anodes in the first charge/discharge cycles.

Primary author: Mr FRANKENBERGER, Martin (University of Applied Sciences Landshut)

Co-authors: TRUNK, Markus; Dr SEIDLMEYER, Stefan; Dr GILLES, Ralph (Heinz Maier-Leibnitz Zentrum); Prof. PETTINGER, Karl-Heinz (University of Applied Sciences Landshut)

Presenter: Mr FRANKENBERGER, Martin (University of Applied Sciences Landshut)

Session Classification: Materials Science

Track Classification: Materials Science