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## **Neutron depth profiling and GD-OES as tools for characterization of Li plating in Si/graphite anodes from Li-ion battery cells**

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The loss of Li inventory is a common aging mechanism in Li-ion batteries. To better understand these underlying reversible and irreversible degradation processes in Si/graphite electrodes, depth-resolved methods need to be used to obtain information on the decomposition products of the lithium-containing electrolyte across the electrode thickness. In this work we present two Post-Mortem analytical methods, which can be used to obtain quantified Li depth profiles to depths bigger than 10  $\mu\text{m}$  from the electrode surface, the neutron depth profiling (NDP) and glow discharge optical emission spectroscopy (GD-OES). The validation of GD-OES using NDP by examining the Si/graphite anodes from cylindrical 21700 cells is presented. These two methods are complementary to each other since they are based on different measurement principles and an improvement for the GD-OES calculations of depth profiles of Li in electrodes has been established. It has been demonstrated that the preferential sputtering can occur on the anode surface during the GD-OES measurements. This phenomenon is caused by the higher sputter rate of Li, as it is mainly present in the Li plated layer or in the solid electrolyte interface (SEI).

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