„Advanced Battery Power Conference 2022 “
29-30 March 2022, in Münster, Germany

Shorttitle: **Investigation of mechanical stress and lithium distribution**
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Previous to the integration of li-ion batteries in different applications, the batterie cells have to be fully characterized to assess their ability to deliver the desired power and energy over the cell's lifetime. Here, one of the major challenges is to achieve this characterization within a short test time and with high prediction and accuracy. On this account, accelerated aging tests are conducted, which use, among others, high charge and discharge currents. While cycling cells with accelerated aging tests, the distribution of lithium was observed to become inhomogeneous with increasing test cycles. This inhomogeneity entails a reversible capacity loss reaching the voltage limits earlier, and, while keeping on cycling, can be a precursor for lithium plating. In the end, this leads to a significant and undesired overestimation of the cell's aging.

In previous studies, an inhomogenization of the lithium distribution was observed for compressed cells (10.1016/j.est.2020.101529), and those with limited space (10.1016/j.jpowsour.2013.09.143), at lower and higher SOC levels with a strong pressure gradient. The negative effect on the capacity was shown to be reversible (10.1016/j.est.2019.01.004.). In another study of an uncompressed cell, no such inhomogenization was observed (10.1016/j.jpowsour.2013.03.045, 10.1016/j.est.2020.101529).

This poster motivates a thorough investigation of the impact of mechanical compression on the lithium distribution within the cell, and thus, on the recoverable capacity of cells for accelerated aging tests. We used a self-designed holder for the compression of a pouch NMC cell, with which different types of mechanical stress are investigated by varying the spring constants and off-set forces. The inhomogeneities are assessed by evaluating peak sharpness of differential voltage analyses. In this manner, we fill the scientific gap between fully constrained and unconstrained cells and give insights in the origin of those inhomogeneities and how they can be avoided.