

Path-Dependent Ageing of Lithium-ion Batteries and Implications on the Ageing Assessment of Accelerated Ageing Tests



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Invited for this month's cover is the group of Andreas Jossen from the Technical University of Munich. The cover picture shows an illustration of the path-dependent ageing of lithium-ion batteries. Read the full text of the Research Article at 10.1002/batt.202300313.

What is the most significant result of this study?

The results of our experimental study show that lithium-ion batteries (LIBs) can show a sequential as well as a historical path dependency in ageing, especially if continuous cycling profiles are applied. Furthermore, our results indicate that inhomogeneous lithium distribution (ILD) is causal for this path-dependent ageing as well as the recovery effects observed in the study. We conclude that a scalar state of health determined through capacity or resistance measurement is insufficient to capture the current age of LIBs.

What was the biggest surprise (on the way to the results presented in this paper)?

We were surprised by the amount of capacity recovery (in some cases, nearly 50% of the capacity lost during cyclization), which can be observed when the cells rest after continuous cycling. Such recovery effects are known from LFP-based systems, where ILD can arise since the flat potential curve of LFP doesn't have such a balancing force compared to NMC or NCA-based systems with a steeper potential curve.

Is there someone you'd like to give credit or acknowledgement to?

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