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## Non-uniform capacity fading in lithium-ion batteries revealed by spatially-resolved diffraction of neutrons and synchrotron radiation

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Cycling stability and capacity fading of Li-ion batteries are highly relevant for their application. A plenty of mechanisms directly leading to the capacity losses upon cycling are known, e.g. formation of passivation layers, losses of cyclable lithium etc. Typical Li-ion cells are characterized by non-uniform distributions of current, temperature and gradients in electrolyte and lithium concentrations, thus leading to heterogeneities in cell fatigue behavior. In the current contribution an example of non-uniform aging behavior will be shown based on the lithium-concentration in fully charged graphite anodes of cylinder-type Li-ion batteries with different number of cycles, which is directly correlated to the remaining capacity. Combined spatially-resolved diffraction studies unambiguously revealed development of heterogeneous Li distribution over the whole stripe of the negative electrode in charged state.

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