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Lithium Distribution inside Li-Ion-Batteries, effect of fatigue/aging

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Lithium-ion batteries are part of our everyday life powering innumerable devices. Especially lately the number of applications related to electromobility and energy storage is increasing. Besides higher energy/power density and rate capability this calls for further improvements the life span of Li-ion cells. There are still some processes inside lithium-ion batteries that are not understood completely. Therefore, single cells or even integrated batteries have to be investigated under real operating conditions. Neutrons offer a capability to conduct in operando investigations on standard size Li-ion cells making it possible to follow structural changes, phase transitions or cation exchange reactions even under different environmental conditions [1,2]. The homogeneity of the lithiation states inside different Li-ion cells has been determined by spatially resolved neutron diffraction [3]. Recent studies have shown that the observed inhomogeneity of the lithium concentration is dependent on fatigue and aging [4].

Keywords: Li-ion batteries, fatigue, neutron, diffraction

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