Type:	Poster Exhibition
Short title:	A novel method for application-based classification of lithium-ion cells
Category:	Cell characterization
Field of Research:	Characterization methods
Content of paper:	In large-scale production, lithium-ion battery cells are usually classified only according to the two characteristics of capacity and internal resistance, provided there are no optical defects, geometric tolerance violations, high self-discharge rates or weight overruns. However, since cells are almost exclusively connected in groups (XsYp) in the application, inhomogeneities in the voltage profile must be avoided in addition to these basic characteristics, which can lead to string limitations and temperature deviations without complex balancing. Particularly in dynamic high-performance applications such as automotive traction batteries, this is of utmost importance. Investigations on commercial cells show that there are more sensitive parameters than capacity and internal resistance of a cell, thus being better suited for high-precision matching. In literature and an own series of measurements, the voltage difference at the end of a constant discharge process in the low SOC range proves to be a viable indicator of scattering for previously identically charged and series-connected cells. Based on this phenomenon, an approach for sorting and grading cells at the end of a production line is presented, identifying the voltage profile inhomogeneities arising from the inevitably tolerance-constrained production process. By selecting and integrating stress factors from the application context, a load profile with realistic scattering is created, which is utilized for classification. First tests show a high applicability and accuracy, which exceeds the conventionally used methods. The procedure, which includes cell batch matching and grading for further distribution, is mostly independent of cell chemistry and format and can therefore be used universally for cell classification.

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