Laser breakdown of lithium batteries

Can a lithium-ion battery cathode be measured using laser-induced breakdown spectroscopy?
LIBS measurement can detect a decomposition product of electrolyte, LiF. Lithium distribution of the cathode is acquired by laboratory-scale measurement. A method to obtain the quantitative lithium distribution of a lithium-ion battery cathode using laser-induced breakdown spectroscopy (LIBS) measurements is proposed.

Does laser-induced breakdown spectroscopy affect lithium distribution?
Within this study, laser-induced breakdown spectroscopy (LIBS) was applied quantitatively as a powerful analytical tool in order to study chemical degradation mechanisms and the impact of 3D electrode architectures on lithium distribution.

Can laser-induced breakdown spectroscopy detect lithium concentration in electrochemically cycled NMC cathodes?
Furthermore, laser-induced breakdown spectroscopy (LIBS) was used for post-mortem analysis of lithium concentration in electrochemically cycled NMC cathodes based on calibration studies with electrodes at different State-of-Charges.

Does laser processing increase lithium ion diffusion cell kinetics?
Previous studies have shown that laser processing of three-dimensional (3D) micro-features in electrodes increases the active surface area and therefore the lithium-ion diffusion cell kinetics. Within this study, NMC cathodes were prepared by tape-casting and subsequent ultrafast laser-structuring.

How to measure lithium distribution of lithium ion battery cathode?
Quantitative lithium distribution of Li-ion battery cathode by LIBS. Calibration curve is improved by performing LIBS measurements in 1000Pa argon. LIBS measurement can detect a decomposition product of electrolyte,LiF. Lithium distribution of the cathode is acquired by laboratory-scale measurement.

Can elemental depth-profiling be used to describe lithium distribution in a 3D battery?
Elemental mapping and elemental depth-profiling were applied for characterizing the electrode as a function of cell lifetime and architecture. For the first time,it was demonstrated that LIBScan be used to quantitatively describe lithium distribution in a 3D battery with specific design parameters.

Furthermore, laser-induced breakdown spectroscopy (LIBS) was used in a first experimental attempt to analyze the lithium distribution in unstructured NMC cathodes at different state-of-charges (SOC).

In their study, the research team introduced a novel application of micro-laser-induced breakdown spectroscopy (micro-LIBS) imaging. This technique holds the potential to ...

A R T I C L E I N F O Keywords: Pre-overcharge Laser-induced plasma spectroscopy (LIPS) Lithium-ion

battery Nickel-rich cathode State-of-Charge (SOC) Opto-chemical sensor A B S T R A C T Using the ...

DOI: 10.1149/2.0981514JES Corpus ID: 102211730; Laser-Induced Breakdown Spectroscopy of Laser-Structured Li(NiMnCo)O2 Electrodes for Lithium-Ion Batteries @article{Smyrek2016LaserInducedBS, title={Laser-Induced Breakdown Spectroscopy of Laser-Structured Li(NiMnCo)O2 Electrodes for Lithium-Ion Batteries}, author={Peter Smyrek and ...

Laser-induced breakdown spectroscopy (LIBS) is a valuable tool for the solid-state elemental analysis of battery materials. Key advantages include a high sensitivity ...

DOI: 10.1021/ACSAEM.1C01386 Corpus ID: 237717728; Calibration-Free Quantitative Analysis of Lithium-Ion Battery (LiB) Electrode Materials Using Laser-Induced Breakdown Spectroscopy (LIBS)

Laser-induced breakdown spectroscopy (LIBS) was used to characterize the ejecta released by lithium-ion (Li-ion) cells at thermal runaway conditions. ... Fujieda S., et al. "Quantitative Lithium Mapping of Lithium-Ion Battery Cathode Using Laser-Induced Breakdown Spectroscopy". J. Power Sources. 2018, 399: 186-191. doi: 10.1016/J.Jpowsour ...

Laser-induced breakdown spectroscopy (LIBS) is applied post-mortem for quantitatively studying the lithium concentration profiles within the entire structured and unstructured graphite ...

Quantitative lithium mapping of lithium-ion battery cathode using laser-induced breakdown spectroscopy. Susumu Imashuku, Hiroyuki Taguchi, Toru ... XAS is the conventional method to quantitatively display the reaction distribution of a cathode material used in a lithium-ion battery. Additionally, LIBS can detect the precipitating decomposition ...

Lithium-ion batteries require a further increase in cell life-time and a significant improvement in cycle stability for the use as energy storage system in high energy and high power applications such as for stationary devices and electric vehicles. Previous studies have shown that laser processing of three-dimensional (3D) micro-features in ...

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