

CCS1100

Cylindrical Battery In-Situ Volume Swelling Testing System



Significance of Volume Swelling Testing for Cylindrical Battery

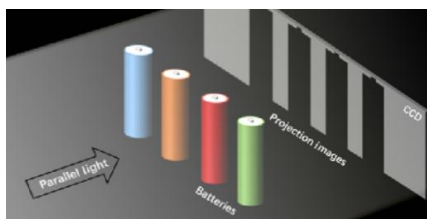
Significance: During the charge and discharge processes of lithium-ion batteries, as lithium ions intercalate and deintercalate into the positive and negative electrode materials, the cell undergoes reversible expansion and contraction. Concurrently, various side reactions occur, such as particle fracture, SEI membrane rupture, cell deformation, lithium plating, gas evolution, etc., resulting in irreversible deformation.

Limitations of Existing Methods: Currently, there are several methods available to characterize the expansion of cylindrical batteries, such as vernier calipers, coordinate measuring machines, pressure films, strain gauges, and imaging analysis techniques (including CT scanning, neutron imaging, X-ray, ultrasound, etc.). However, these methods suffer from low accuracy, inability to conduct in-situ testing, and inability to accurately and comprehensively describe the expansion behavior of cylindrical batteries.

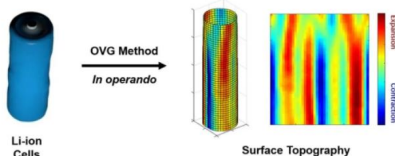
Application scenarios: material evaluation, evaluation of the modification results of silicon anode, high-nickel ternary, lithium-rich manganese-based and other materials used in cylindrical batteries; structural evaluation, evaluation of cylindrical battery core structures of different sizes, rolled core structures, and shell rupture risk assessment; Working condition evaluation, evaluation of working conditions at different temperatures, charge/discharge rate, storage, etc.



Product Features

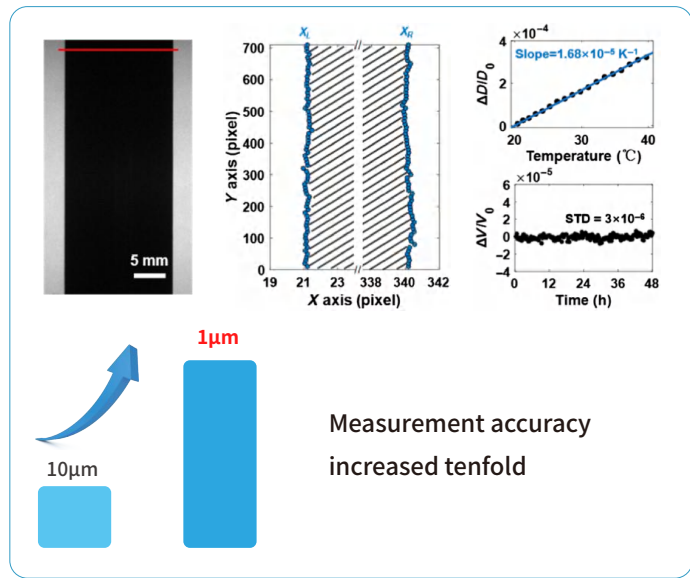


- ▶ Optical Imaging + 3D Reconstruction + Real-time Online Monitoring
- ▶ Non-contact, Non-destructive
- ▶ High-throughput testing, suitable for mass production

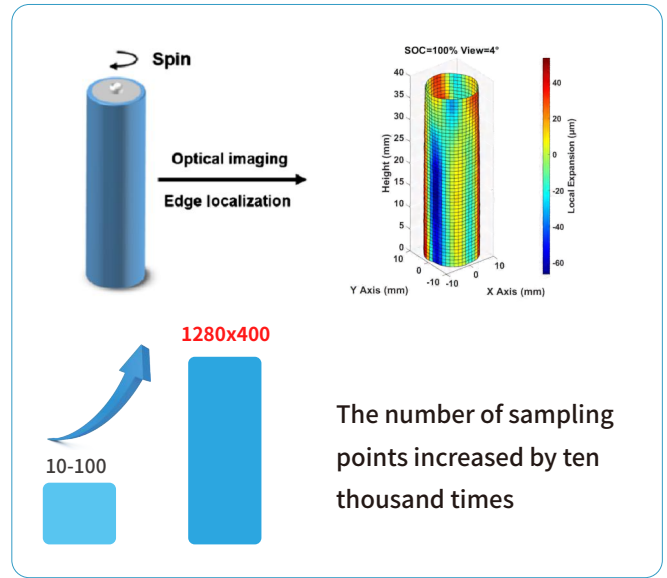


Real time reconstruction of battery surface morphology and calculation of volume deformation during charge and discharge processes. Combining voltage and current data to detect and predict battery health condition from a higher dimension.

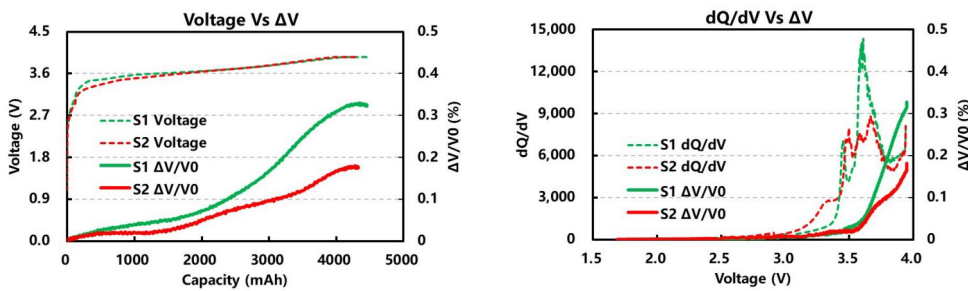
➤ **High-precision Detection Technology**



➤ **Rotational 3D Reconstruction Technology**



 **Application Case: Swelling Testing of cells with Different Silicon Contents**





21700 Cell parameters: Sample 1-15%SiC ; Sample 2-10%SiC

The volume swelling curve during formation shows that as the silicon content increases, the volume swelling during formation process increases, and the peak corresponding to lithium intercalation on the differential capacity curve becomes higher.

 **Model Specifications Table**

CCS1100				
Compatible Cell	Channel Number	Optical Detection Resolution	Weight	Size(W×D×H)
Cylindrical Cell	1	0.1μm	50kg	500x230x360 mm

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