Application Note B-XRI1001

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XRI1001 - CT observation of a laminated battery cell by X-ray microscopy

Introduction

Batteries are made of diverse materials. Non-uniformity, impurities, and defects within the battery structure negatively affect the performance, stability, and durability of the product. As batteries are repeatedly charged and discharged, their quality degrades due to changes in the internal structure. Therefore, to evaluate a battery's internal structure, a non-destructive observation technique is needed. By using an X-ray microscope, which can observe transparently the internal area of a sample, the micron structure within a laminated battery cell can be observed in a non-destructive manner. The structure can be visualized in 3D as well by using the CT (Computed Tomography) technique.

Measurements and results

A CT measurement was performed using the nano3DX X-ray microscope on a 10 mm wide single-layer lithium ion battery cell laminated with aluminum (Figures 1 and 2). As a result, the active materials and carbon particles within the battery cell were clearly rendered. Structural changes during charging and discharging can also be observed in a non-destructive manner by attaching an electrode to the laminated cell.

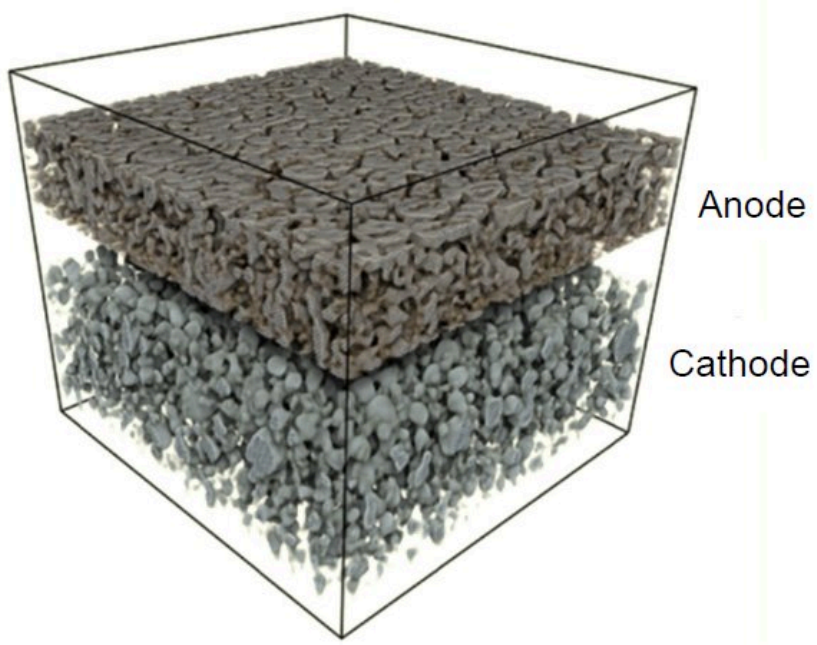

Figure 1: X-ray CT 3D rendering image 1.08 µm/voxel

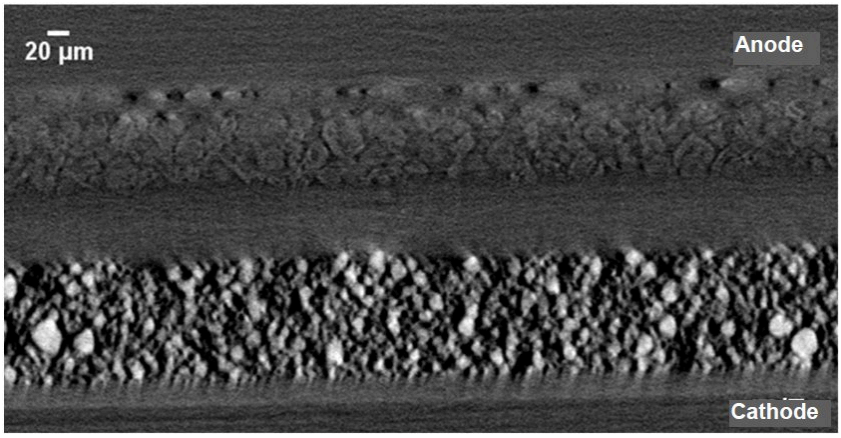

Figure 2: X-ray CT Tomography image 1.08 µm/voxel voxel

Samples provided by: Consortium for Lithium Ion Battery Technology and Evaluation Center (LIBTEC)

Related products

nano3DX

Ultrahigh-resolution nanotomography using parallel beam g
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