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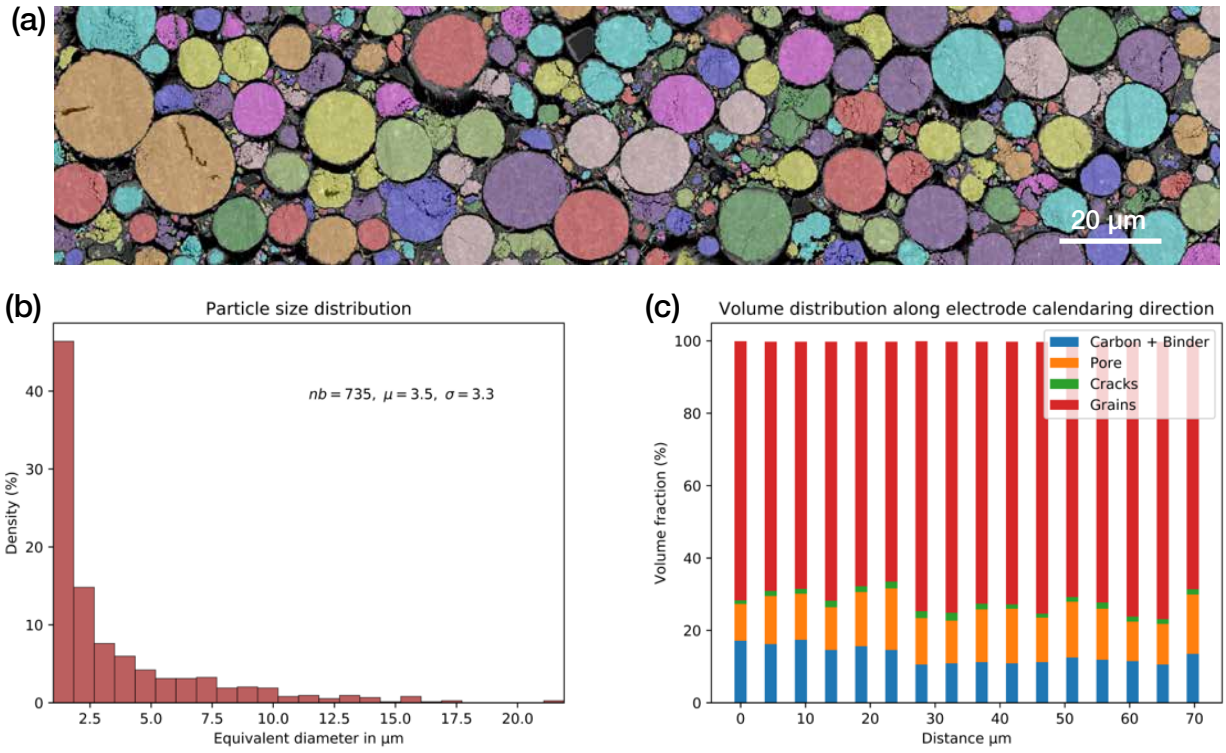
Structural quantification of Li-ion battery electrodes via SEM image analysis

Avizo2D Software easily extracts accurate quantitative information

In-depth understanding of battery electrode microstructures is critical for the battery manufacturing process evaluation, battery performance analysis, and new product development. Analysis of the battery electrode structure via SEM on an electrode cross-section view is a widely accepted method in the battery industry. Structural characteristics such as volume fraction, particle size, particle cracking, binder and carbon distribution are critical for analysis. However, the quantitative extraction of those structural parameters requires complex image processing and analysis steps by an experienced scientist.

By using Thermo Scientific™ Avizo2D Software, you can easily transform imaging data into answers without being an image processing expert. Below is an example of four phase detection (grain, pores, carbon and binder, cracks) and quantitative analysis on a NMC cathode cross-section with Avizo2D Software. Using the pre-set workflow in Avizo2D Software, you can quickly obtain quantitative data for investigating the structure-performance correlation of this electrode. This technique is expected to be widely accepted for both existing electrode manufacturing process validation and new electrode architecture development.



(a) SEM image of NMC cathode cross-section prepared via Thermo Scientific Helios™ PFIB DualBeam. Color indicates different particles. (b) Particle size distribution analysis. (c) Phase volume distribution along electrode calendaring direction. *Data collection courtesy of Ron Kelley, Thermo Fisher Scientific. Sample provided by Prof. Shirley Y. Meng, University of California, San Diego.*

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