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Take your multi-modal materials characterization further with the latest plasma FIB-SEM by TESCAN

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Abstract

The recent developments of new materials and manufacturing technologies are imposing new requirements on materials characterization. Acquiring complete information about material microstructure and its relation to mechanical or physical properties often requires a multi-scale characterization approach involving multiple analytical techniques.

TESCAN FIB-SEM solutions can combine high-resolution SEM imaging with a broad range of microanalytical techniques, including EDS, WDS, EBSD, Raman [1], or TOF-SIMS.

TESCAN is pioneering the Xe plasma FIB technology for enabling high throughput, large area ion milling of cross-sections, up to 1 mm, as well as routine milling and polishing operations for sample preparation. Xe plasma FIB creates minimal damage of the sample structure and the inert nature of xenon ions means also that contamination-free microsample preparation can be achieved, making the Xe plasma FIB an ideal candidate for investigation of sensitive materials like aluminum [2] or Li-ion batteries [3], without the risk of changing microstructural or mechanical properties.

The most recent technology meets in TESCAN AMBER X combining the field-free UHR-SEM optics with the Xe plasma focused ion beam (FIB) to provide high throughput, large area 2D cross sectioning, and 3D multi-modal characterization capability for advanced materials research.

[1] S. Mangum, et al., Ultramicroscopy 188, 48–51 (2018)

[2] Y. Xiao, et al., Scripta Materialia (2016)

[3] T. Sui, B.Song, et al. Nano Energy, 17, 254-260 (2015)

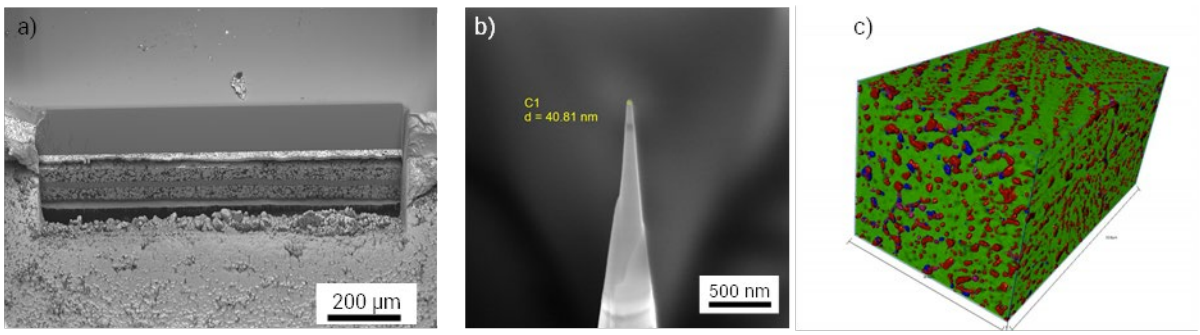

Figure 1 Highlight of the Plasma FIB-SEM characterization techniques: a) 1 mm wide cross-section of a Li-ion battery electrode. b) Contamination-free sample preparation for atom probe tomography, prepared by inert Xe ions beam, c) visualization of the 3D elemental distribution of alloyed steel prepared by additive manufacturing.