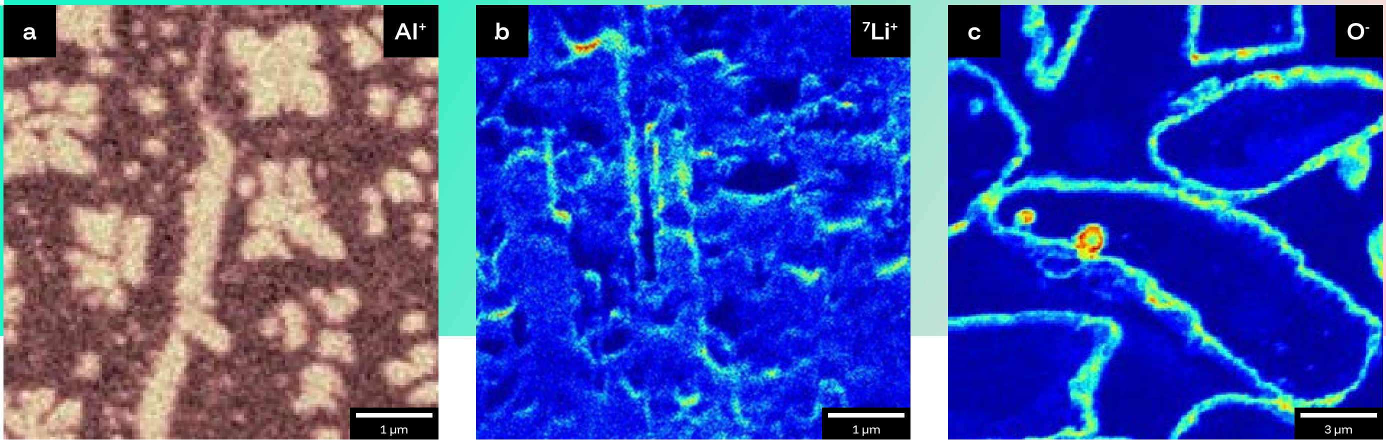
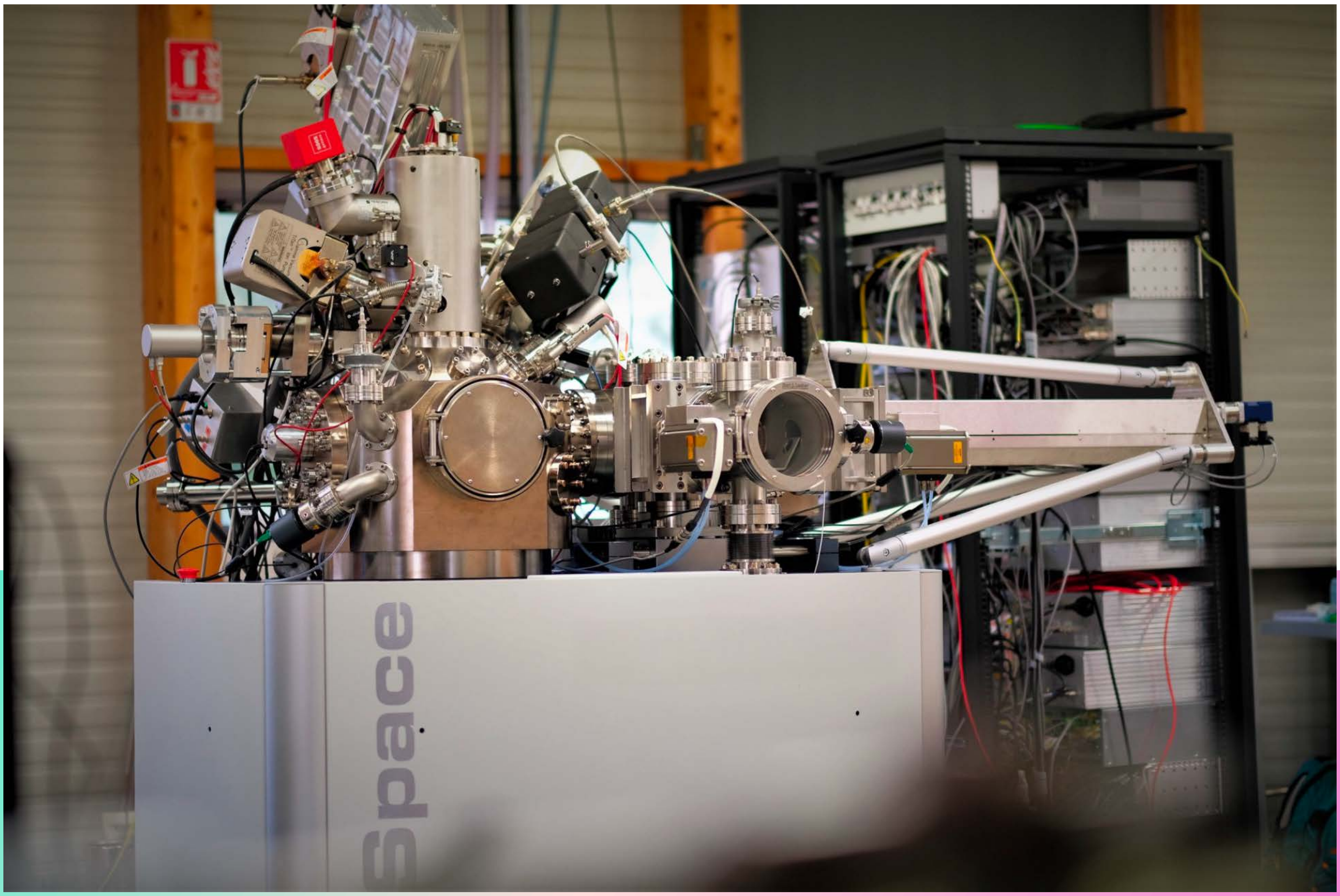
Tescan NanoSpace
WITH TOF-SIMS

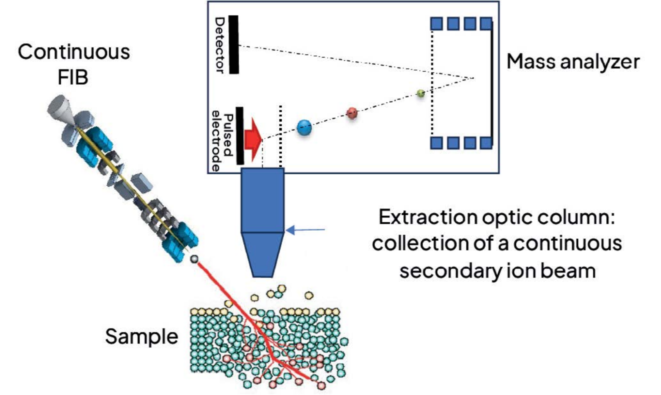
Expand your analytical capabilities to include characterizing the lightest chemical elements and the chemistry of samples at the nanoscale.

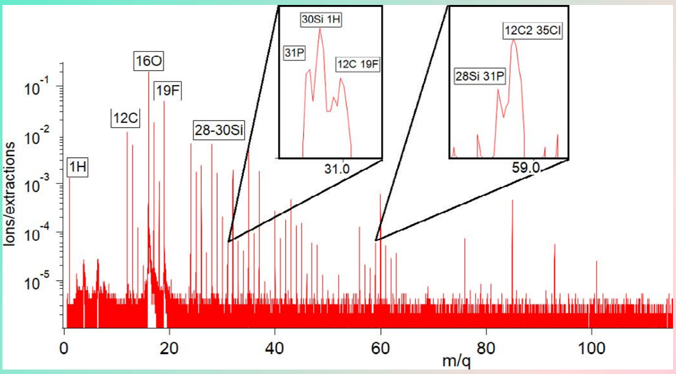


Figures: TOF-SIMS chemical mapping of Al in Ni-based superalloy **(a)**, distribution of Li in lithium-ion battery cross section **(b)**, distribution of O in unicellular algae **(c)**



Being in an Ultra-High Vacuum (UHV) environment allows accurate surface analysis using SIMS. The surface adsorption of atmosphere contaminants is strongly activated by the interaction of the ion (or electron) beam with the surface and alters the surface analysis results. Therefore, accurate and reliable surface analysis requires the contamination free environment provided by NanoSpace.
NanoSpace is equipped with an Orthogonal acceleration Time of Flight (OTOF) mass spectrometer in a unique configuration for chemical analysis, enabling 3D nanoscale chemical mapping of materials. The Secondary Ion Mass Spectrometry (SIMS) analysis is performed by the combination of a new secondary ion extraction column called ExOTOF and an OTOF (Orthogonal acceleration Time Of Flight) analyzer.





Mass spectra of isotopes detected in negative ion mode allowing the discrimination between 31P and 30Si1H in a phosphorus doped silicon structure.

Key Benefits

Navigate safely and precisely to locate features of interest at the nanoscale using non-destructive, high resolution SEM imaging with its wide range of detection capabilities and intuitive Wide Field navigation.

Perform sub-surface elemental, molecular, and isotopic materials characterization by applying ToF-SIMS analysis to a FIB-prepared cross section or lamella surface, without breaking the chamber vacuum.

Carry out comprehensive nano and microcharacterization for all materials classes and correlate the data by combining ToF-SIMS with other analytical capabilities (SEM, EDS, AUGER, etc.) within the same FIB-SEM system.

Select the ToF-SIMS hardware and FIB system platform that meets the requirements for your intended field of application to achieve the optimum spatial resolution, surface sensitivity, and molecule fragmentation level.

Enhance the ToF-SIMS signal significantly through utilization of different combinations of FIB sources (Oxygen, Gold clusters, Cesium,...).

Obtain the best ToF-SIMS results, even from beamsensitive, vacuum-sensitive, and by cooling the samples during analysis.

	Ga^+ FIB	Plasma FIB (e.g., Xe)
Lateral resolution	< 30 nm	< 60 nm
Depth resolution	< 3 nm	≤ 1 nm
Detection limit	< 1 ppm	
Mass resolution (on ITO)	> 9,500	
Mass range	1 - 500 *	

* From 500 to 1,500, decrease of specs.