SEM Compatible AFM: EM-AFM

TNI Toronto Nano Instrumentation

About

EM-AFM provides atomic force microscopy imaging and quantitative nanomechanical measurement capabilities inside SEMs. It brings the best of the two technologies together, providing 3D image feedback with high resolution at a high speed, as well as real-time observation of nanoNewton force interactions at the micro-nano and sub-nanometer scales.

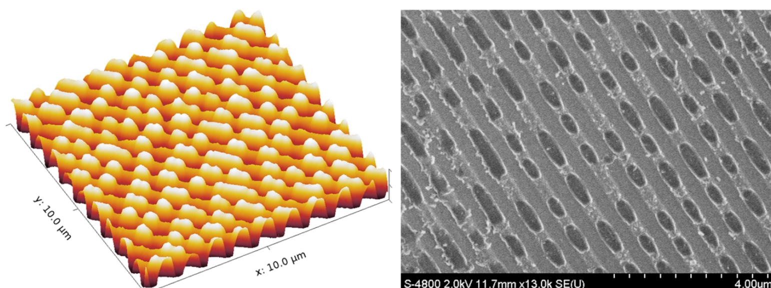
Features

- Simultaneous AFM and SEM imaging
- Full compatibility with mainstream SEM
- Sub-nano resolution topography scan
- In-situ nanoindentation
- Vacuum load-lock compatible
- Fully encoded motions

Specifications

System Overview	system dimensions	100X100X35 mm^3
	SEM load-lock compatible	yes
	usable environment	SEM vacuum, ambient air
	system weight	400 g + SEM/FIB adapter
Coarse Positioner	motion range	15X15X5 mm
	integrated encoder	yes
	closed loop resolution	1 nm
	maximum motion speed	>5 mm/s
	drift rate	<0.5 nm/min
Small Range Scanner	scanning range	35X35X5 µm
	integrated encoder	yes
	closed loop resolution	better than 0.2 nm
	maximum scanning speed	8 µm/s
	drift rate	<2 nm/min
AFM Sensing Head	sensing principle	piezoresistive
	scanning mode	contact
	force resolution	better than 5 nN
	topography resolution	Better than 0.2 nm
	force range	+/- 200 µN

Example Capabilities



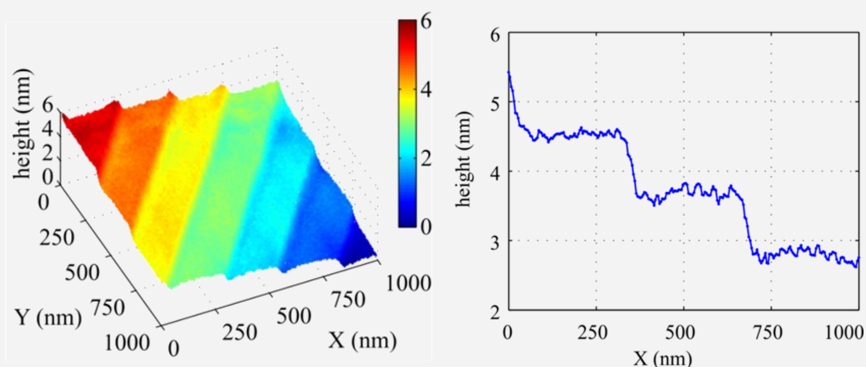
AFM scan of DVD surface

SEM-AFM Image Correlation

SEM imaging has the advantage of high lateral resolution and scan rate. Combined with the 3D topography information provided by AFM imaging, new information is gathered and new insights are revealed.

Sub-Nanometer Imaging Resolution

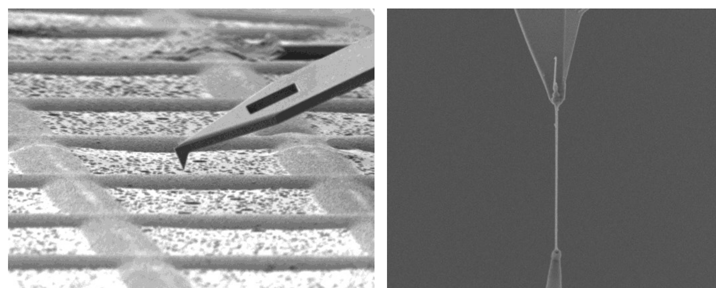
The fully encoded system ensures high topography imaging accuracy without image distortion, and achieves sub-nanometer imaging resolutions.



SiC sample with 0.75 nm step

Nanoindentation/nano tensile testing

Nanomechanical properties of samples can be measured by the instrument through nanoindentation and nano tensile testing. The testing process is visually observed in real time under SEM imaging. The proprietary software provides built-in computational tools for analyzing and displaying the data collected.



Nanoindentation and tensile testing inside SEM

High SEM Compatibility

The compact AFM is compatible with most commercial SEM and FIB, and can be installed/removed within seconds. The system allows small working distance (5 mm), and is compatible with standard SEM analytical techniques (EDS, EBSD, WSD).

For additional information, please visit www.to-nano.com, or contact info@to-nano.com