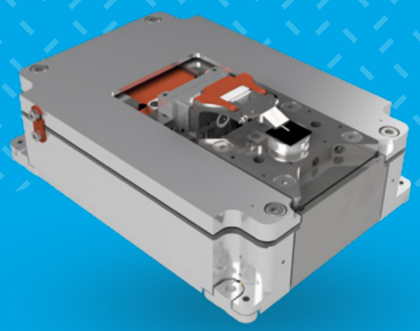
NenoVision

Next level of imaging

LiteScope AFM-in-SEM

Measurement modes

- Correlative multimodal sample analysis
- In-situ sample characterization
- Precise localization of the region of interest



LiteScope is a **cutting-edge plug and play solution** that enables **in-situ AFM-in-SEM** measurement and offers a **wide range** of possible **application techniques**.

The compact design and a state-of-the-art digital signal processing unit enable to analysis a broad range of **mechanical, electrical and magnetic properties of a sample**.

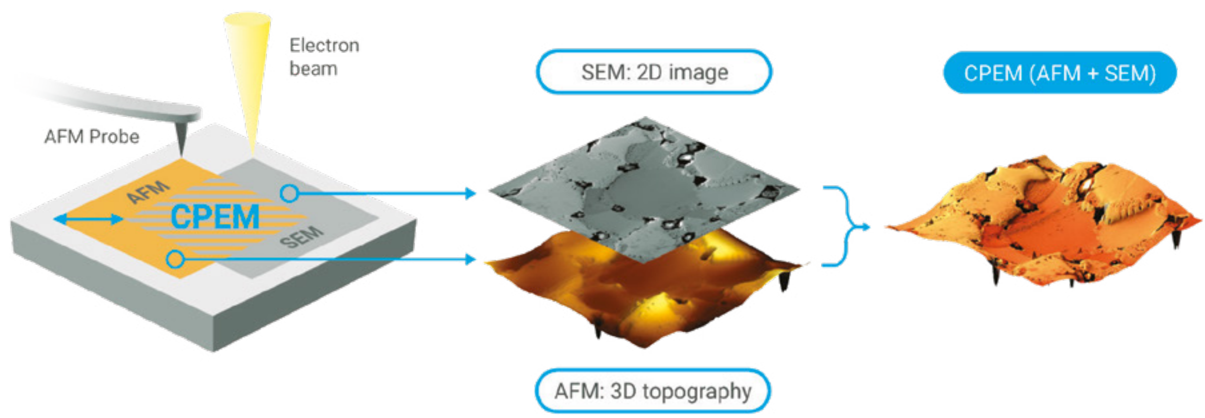
Available measurement modes

- **Correlative:** CPEM+
- **Mechanical:** AFM Topography, Energy Dissipation, Phase Imaging, Nanoindentation
- **Electrical:** C-AFM, KPFM, EFM, STM
- **Magnetic:** MFM
- **Electro-mechanical:** PFM
- **Spectroscopy modes:** F-z curves, I-V curves

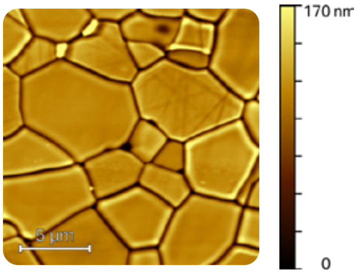
CORRELATIVE MODES

Correlative Probe and Electron Microscopy (CPEM)

The **state-of-the-art technology CPEM** enables **simultaneous detection and acquisition of AFM and SEM signals** at the same time and in the same place. The obtained data can be **directly correlated and result into 3D image** that extends the SEM images with the AFM measurement techniques. The unique scanning system enables very accurate **multi-modal image correlation**.

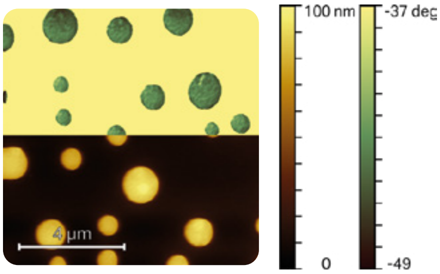


MECHANICAL MODES



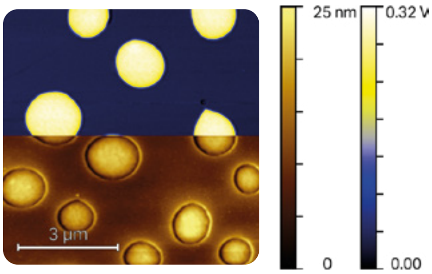
Atomic Force Microscopy (AFM)

AFM allows **high-resolution topography** measurements of a wide range of samples. Different types of self-sensing probes can be used. Measurements can be made in contact or tapping mode.



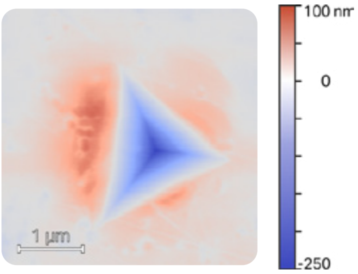
Phase Imaging

Phase imaging is a technique used to map variations in surface properties such as **elasticity, adhesion, and friction**. It works as one-pass a technique which detects the phase between the probe driving signal and probe oscillation signal while maintaining the constant amplitude of the oscillations.



Energy Dissipation

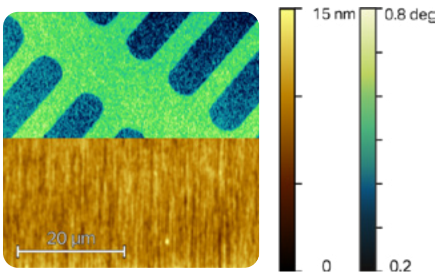
Energy dissipation provides imaging of the **local elastic properties** of the material. This method measures the energy dissipated by the tip–sample interaction in tapping mode during the scanning.



Nanoindentation

A widely used method for **quantitative material hardness characterization**. LiteScope's dedicated nanoindentation module from Alemnis enables local hardness and elasticity measurement with supreme control over experiment conditions inside SEM.

ELECTRO-MECHANICAL MODES



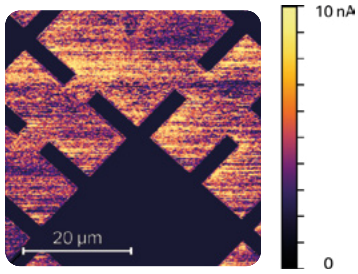
Piezoresponse Force Microscopy (PFM)

PFM allows imaging of **piezoelectric material domains**. This method measures the mechanical response of the material to the applied alternating voltage together with topography.

ELECTRICICAL MODES

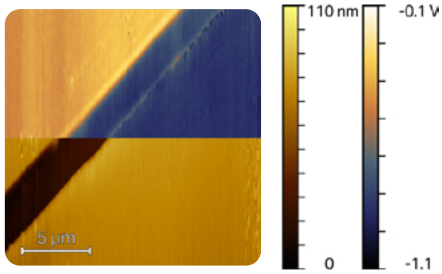
Conductive AFM (C-AFM)

Conductive AFM provides a high-resolution **local conductivity map** of the sample. A bias voltage is applied between the tip, and the sample and the tip-sample current flow is measured during contact AFM topography measurement.



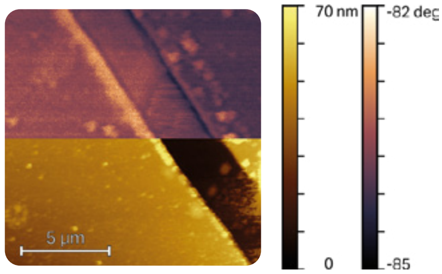
Kelvin Probe Force Microscopy (KPFM)

KPFM is a two-pass technique, estimating the **local distribution of surface potentials**. In the first-pass the topography is measured, while in the second-pass the electrical interaction between the tip and the sample charcterize local surface potential.



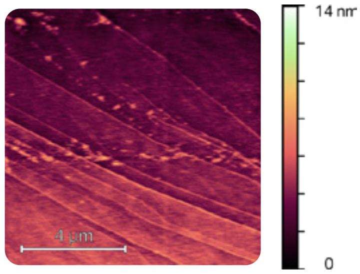
Electrostatic Force Microscopy (EFM)

EFM maps **electrical properties of a sample** surface by detecting the electrostatic force between the surface and a biased AFM tip which provides useful, qualitative information on electric field gradients of a sample surface.



Scanning Tunneling Microscopy (STM)

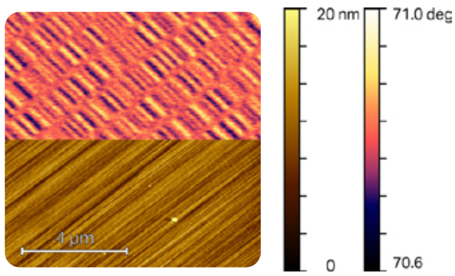
STM allows researchers to map the **conductivity of a sample's surface atom by atom** with an ultra-high resolution providing a threedimensional profile of a surface. It enables researchers to examine many characteristics, including roughness and surface defects.



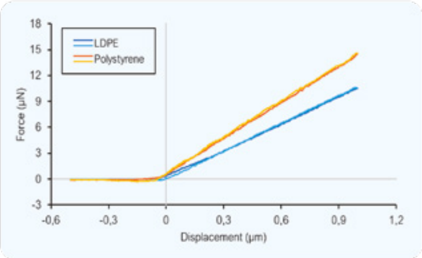
MAGNETIC MODES

Magnetic Force Microscopy (MFM)

MFM enables **high-resolution imaging of the magnetic properties** of different materials. Using a probe with a magnetic coating on the tip side of the cantilever, the AFM system can qualitatively measure the magnetic field gradients above the sample surface.

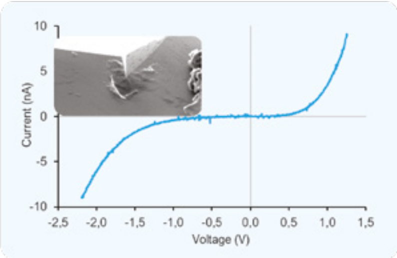


SPECTROSCOPY MODES



F-z curves

F-z spectroscopy is a valuable tool for precise local sample characterization. Spectroscopy is used for many purposes such as sample **stiffness analysis**, detailed **surface-tip force progress** or **local elasticity/plasticity determination**.



I-V curves

I-V curves give detailed information about the **electrical properties** of the sample. The AFM-in-SEM configuration provides precise tip navigation and other possibilities for experiment design.

Available probes

- **Akiyama sensor:** AFM Topography, Energy Dissipation
- **PRS/A:** AFM Topography, Phase Imaging, F-z curves
- **NenoProbe Electric:** AFM Topography, Phase Imaging, C-AFM, KPFM, EFM, PFM, I-V curves
- **NenoProbe Magnetic:** AFM Topography, MFM
- **Berkovich tip:** Nanoindentation

Optimized measurement workflow

LiteScope assures complete control of your **in-situ measurements** via the **online-based NenoView** software. It offers a wide range of features that assure **time-efficient and easy work** with the **AFM-in-SEM**:

- intuitive **UI adaptable** to customer's needs
- **AI-driven** topographic correction
- Method-based **automated probe tuning**
- Single-click operations **eliminating repetitive tasks**
- Schematics of **device configuration**
- control via inbuilt **scripting** features

Need something else?

Discuss custom solutions at **application@nenovision.com**

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