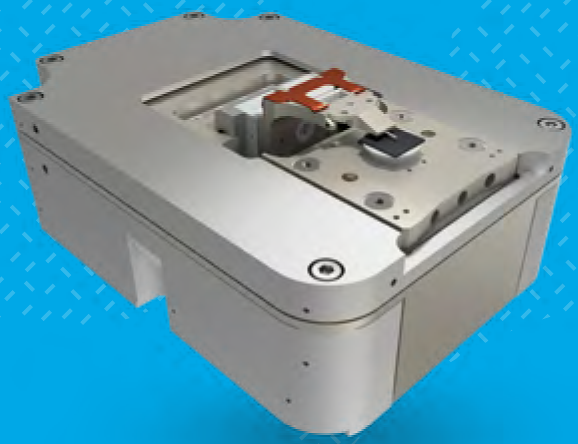
NenoVision

LiteScope™

Compact AFM Specially Designed for SEM

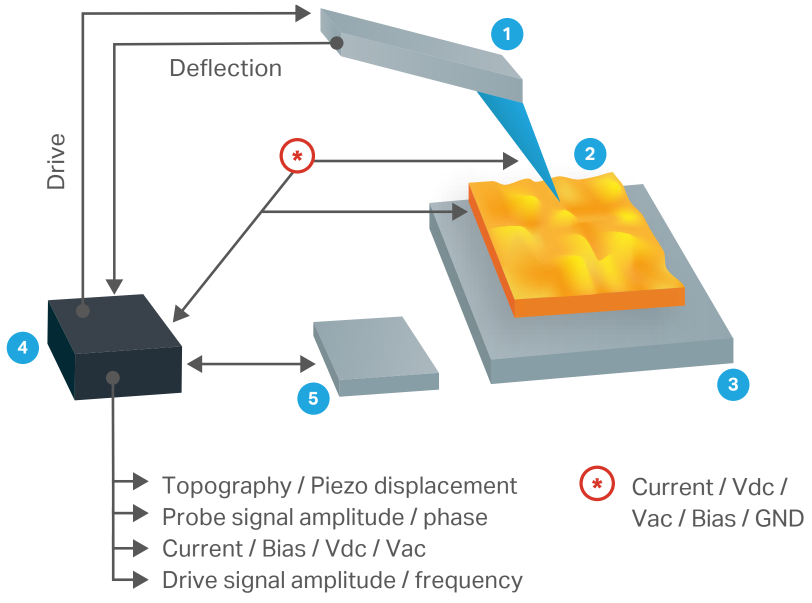
- Plug-and-play AFM solution for SEM microscopes
- Wide range of applications in the field of Materials Science and Nanotechnology, Semiconductor Industry, and Life Science
- Unique Correlative Microscopy Technique – CPEM
- Complex sample surface analysis
- Precise AFM tip navigation to the region of interest by SEM
- User-friendly and intuitive web-based interface



Measurement Modes

- Atomic Force Microscopy (AFM)
- Conductive AFM (c-AFM)
- Conductive CPEM (C-CPEM)
- Scanning Tunneling Microscopy (STM)
- Piezoresponse Force Microscopy (PFM)
- Force Modulation Microscopy (FMM)
- Kelvin Probe Force Microscopy (KPFM)
- Energy Dissipation
- Force-distance Curves
- Nanomanipulation
- Nanoindentation
- Spectroscopy modes

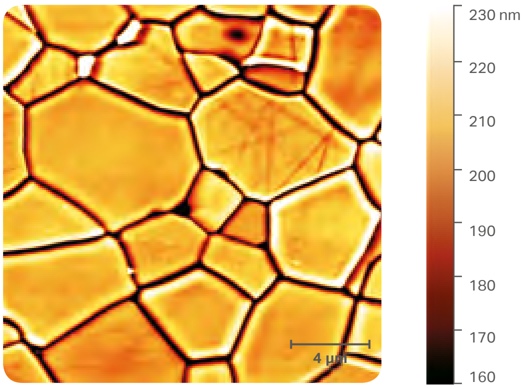
LiteScope™ is an innovative solution for in-situ AFM-SEM measurement providing a huge range of possible application techniques. Due to the complex control system of the LiteScope, it is possible to measure almost any SPM technique when proper electrical connections are set up.

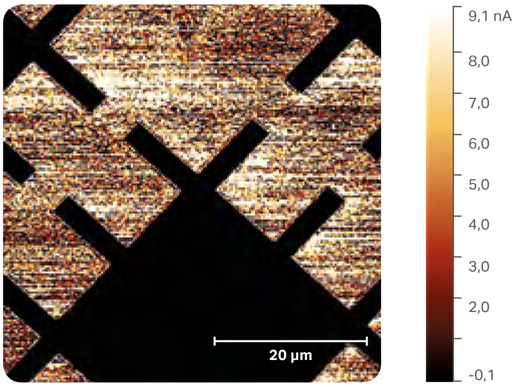


① Self-sensing Probe ② Sample ③ AFM scanner
④ SPM controller with PLL ⑤ External Lock-in / PLL / PID

Atomic Force Microscopy (AFM)

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



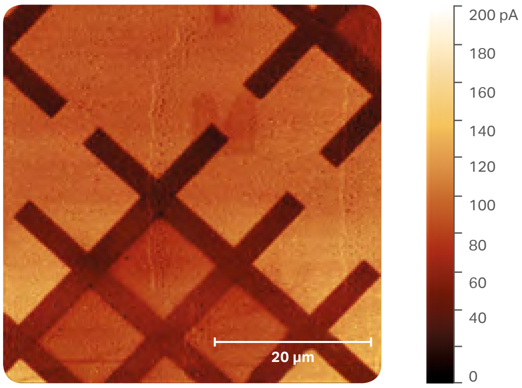


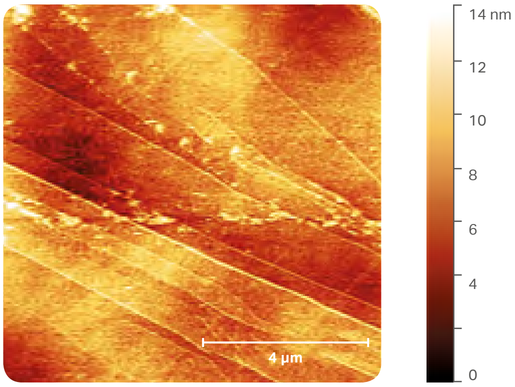
Conductive AFM (C-AFM)

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

Conductive CPEM (C-CPEM)

Unique conductive CPEM allows conductivity measurements even in insulated areas of the sample. The electron beam at the constant distance from the tip replaces the need of an applied bias in the measured area, but the tip-sample bias can still be simultaneously applied. During scanning, the tip-sample current flow is measured in contact AFM mode.

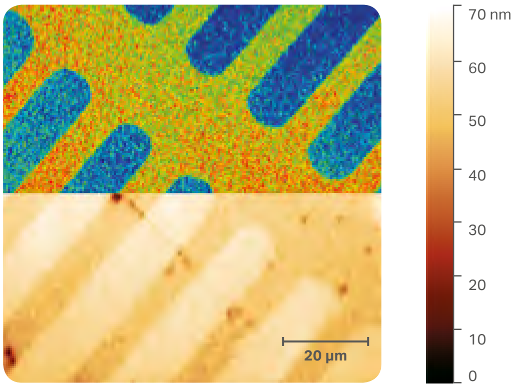




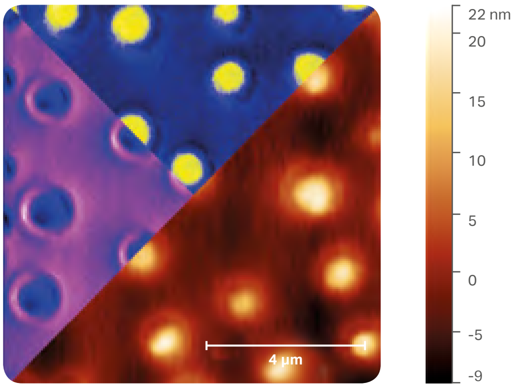
Scanning Tunneling Microscopy (STM)

STM allows measurement of conductive or semi-conductive samples with sub-nanometer resolution. The voltage bias is applied and tip-sample tunneling current is measured. STM provides topographic information about the sample. Measurements are performed in constant current or constant height mode.

Piezoresponse Force Microscopy (PFM)



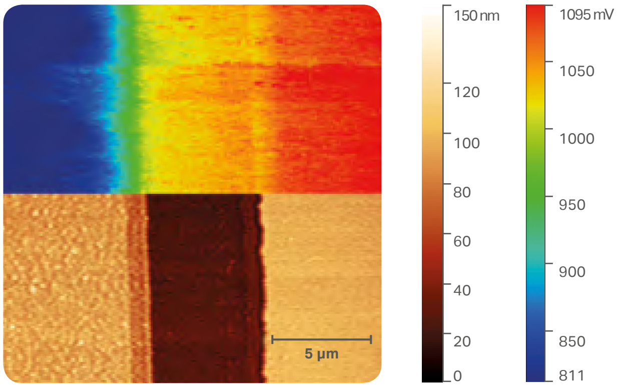
PFM allows imaging and manipulation of piezoelectric material domains. This method measures simultaneously topography and mechanical response of the material to the applied alternating voltage. Amplitude and phase of the demodulated signal contain information about the local piezoresponse.



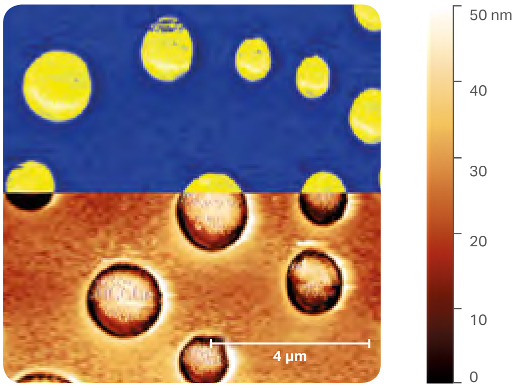
Force Modulation Microscopy (FMM)

FMM allows imaging of the local elastic properties of the sample. This method simultaneously measures topography and mechanical response of the material to the mechanically excited cantilever's oscillations. Amplitude and phase of the demodulated signal contain information about local elasticity.

Kelvin Probe Force Microscopy (KPFM)



KPFM estimates the local distribution of surface potentials. First, the topography in tapping AFM mode is measured. Second, the probe is lifted and the probe oscillation (AM-KPFM) or resonant frequency change (FM-KPFM) is minimized by applied DC voltage in a feedback loop.

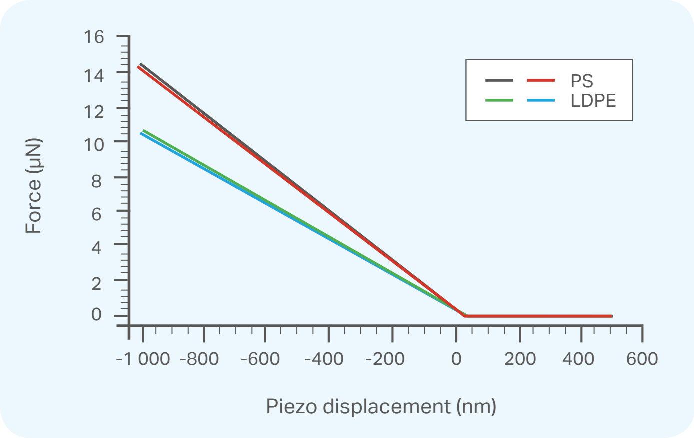


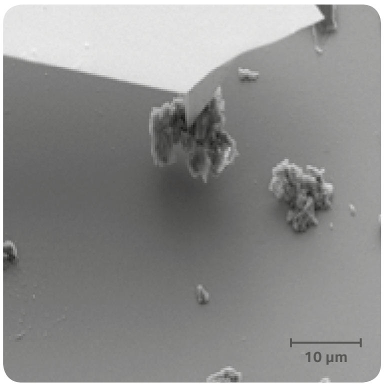
Energy Dissipation

Energy dissipation provides imaging of the local elastic properties of the material. Thanks to the utilization of the tapping mode AFM, the sample damage risk is minimized compared to FMM. Energy dissipation information is read from the drive signal amplitude.

Force-distance curves

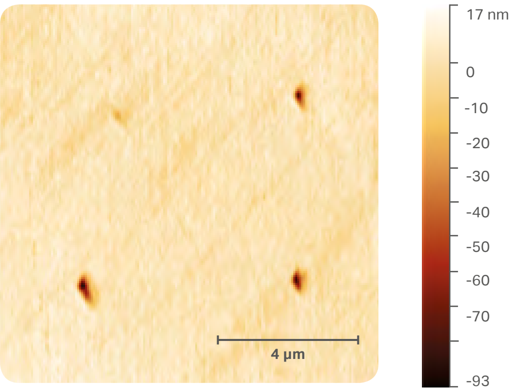
F/z spectroscopy is a useful tool for precise local sample characterization. Spectroscopy is used for many purposes like a sample stiffness analysis, detailed surface-tip force progress or local elasticity/plasticity determination.





Nanomanipulation

Mechanical and electrostatic manipulation allows in-situ movement of the particles with nanometer precision. It can be used instead of or with SEM nanomanipulators for complex in-situ operation.



Nanoindentation

Widely used method for material hardness characterization. The sample hardness is determined from the indentation profile depth and the used force.

Spectroscopy modes

LiteScope™ provides a wide range of complex spectroscopic techniques. Spectroscopy modes enable to measure the dependence of selected quantity on time, voltage bias, tip-sample distance, electron beam current, etc.
The whole process can be monitored by SEM for the exact tip location on the sample.