Materials Science
Product Guide

Solutions for Science and Industry

FIB-SEM

TESCAN — PERFORMANCE IN NANOSPACE
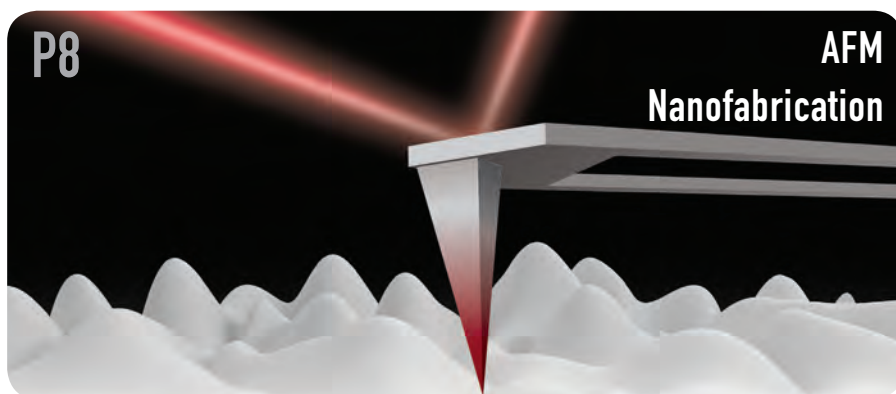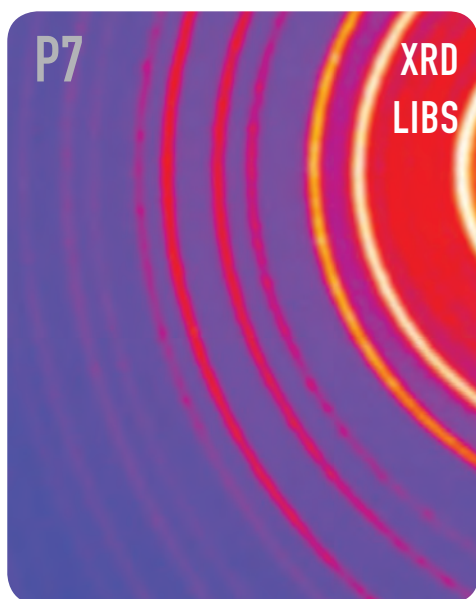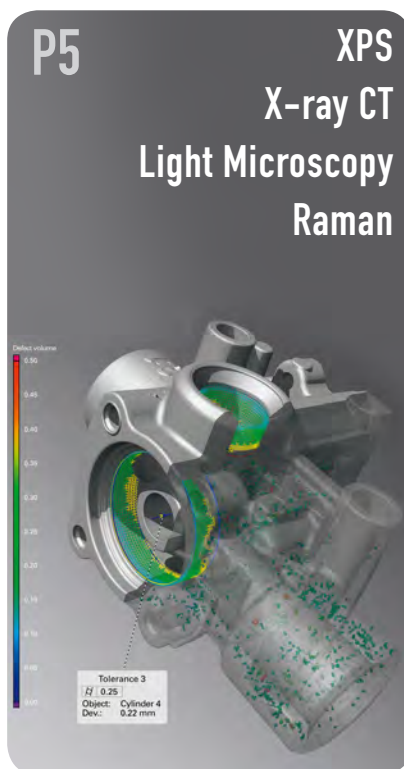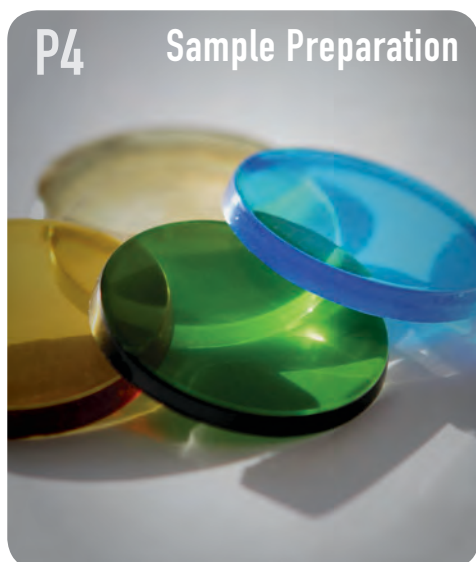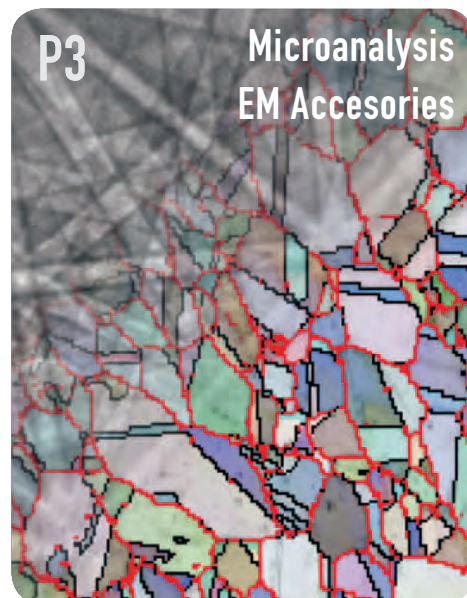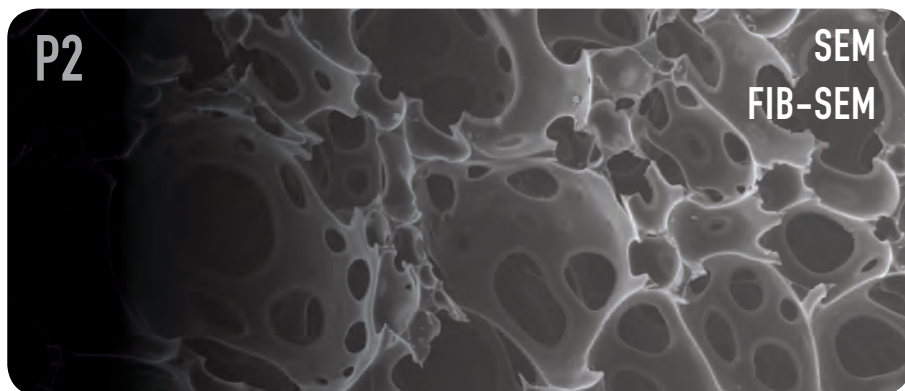
| 0.7 nm XEIA | 1.0 nm FERA | <15nm 2µA | new electron column Triglav™ | 20+ Accessories |

Plasma FIB-SEM

- Up to 50X faster than Ga FIB
- Suited to large volume milling
- High ionisation rates suited to TOF–SIMS
- Suited to compound semiconductors, hard materials etc.

| 0.7 nm GAIA | 1.5 nm LYRA | 2.5nm 50nA | new electron column Triglav™ | 20+ Accessories |

Ga FIB-SEM

- Ideal general purpose FIBs
- Optimised for high resolution at low currents
- Excellent platform for cryo–FIB
- Suited to sensitive materials e.g. biological samples

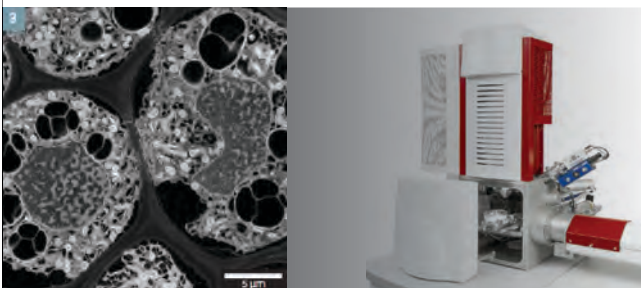- Excellent platform for 3D EDS/EBSD/Tomography
- Multitude of detectors including TOF–SIMS, CL, EBIC etc.
- Ultra–High Resolution (UHR) SEM column provides excellent image resolution at low voltages
- Large range of automated imaging modes
- UHV chambers available

FEG-SEM

TESCAN — PERFORMANCE IN NANOSPACE

| UHR SEM | BDT down to 50 eV | new electron column Triglav™ | 20+ Accessories |

FEG-SEM

- Channelling, depth, wide filed, field & resolution imaging modes available with one–click
- Various chamber sizes for different applications
- Easy to automate operation
- Optimised platform for CLEM and cryo–SEM
- Fastest and most accurate stages

0.7 nm MAIA

UHR
- Ultra–high resolution at low voltages
- Highest probe current of any UHR system
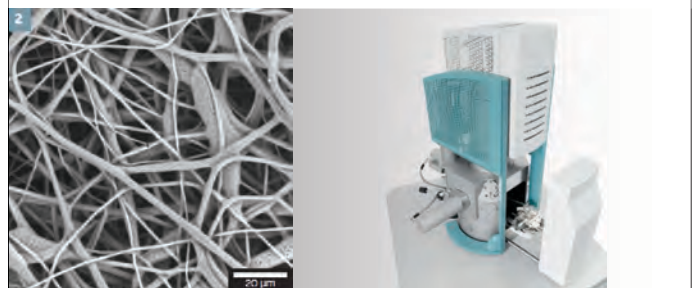- Ideal for bio–applications

1.5 nm MIRA

Analytical
- Ultrafast image acquisition
- Excellent resolution at vacuum & pressure
- Highly versatile – suits many applications

SEM

TESCAN — PERFORMANCE IN NANOSPACE

| | LaB₆ | W | 20+ Accessories |

Thermionic SEM [VEGA]

- Versatile and highly reliable
- High resolution imaging with W & LaB$_6$ emitter
- Suitable for high & variable vacuum operation
- Fully automated column set–up and alignment
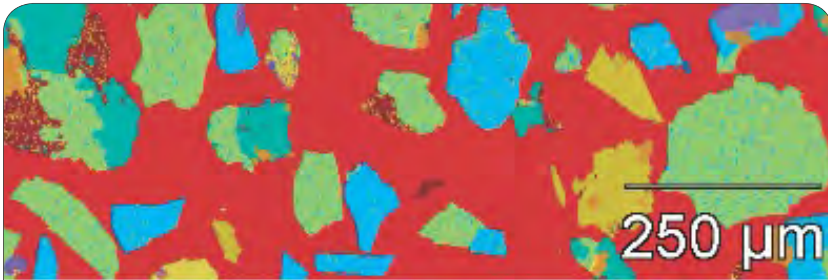- User friendly software suits novice operators

Economical SEM [VEGA-SB]

- Full-featured SEM with fully–automated column
- Small footprint
- Low cost, comparable to bench top systems
- Excellent choice for beginners and training
- Up to 1,000,000X magnification
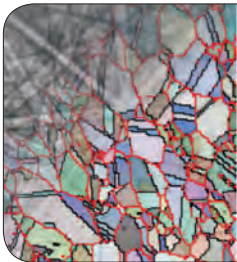- Superior performance to benchtop SEMs

3 nm VEGA

Thermo SCIENTIFIC

Microanalysis

250 µm

EDS [Ultradry & Compact Ultradry]
- Superior resolution at incredibly high collection rates
- New, comprehensive and feature-rich software
- Light element sensitivity down to Be
- The best solid angle detector on the market

EBSD [QUASOR]
- Acquire EBSD, WDS & EDS spectra simultaneously
- Wide range of mapping display options e.g. Euler, HKL & UVW
- Phase and grain boundary maps
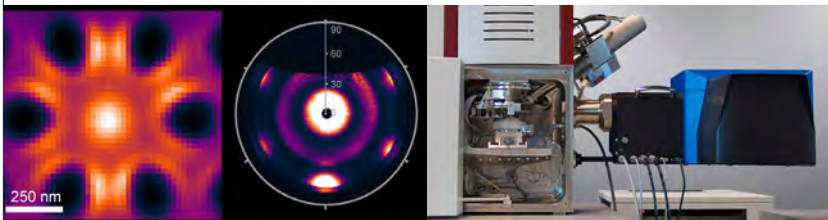- Texture analysis and rapid pole figure interpretation

WDS [MagnaRay]
- Unparalleled microanalysis results
- Automatically handles alignment, analysis settings & acquisition
- High sensitivity for trace elements
- Continuous spectrometer coverage over the entire spectral range

delmic

## Spectroscopic CL

250 nm

CL/SEM [SPARC]
- High performance cathodoluminescence detection system
- Future proof modular design
- Angle-resolved mode makes new types of research possible
- High precision, automated mirror alignment stage gives unprecedented photon yield and reliability
- Class-leading nanoscale spectroscopic information with SEM resolution

kleindiek nanotechnik

Nanomanipulators
- Suited to SEM and optical microscopes
- Models for material and life sciences
- Simple to use/plug-and-play
- Precise manipulation at the nanoscale
- Robust and stable (drift 1nm/min)
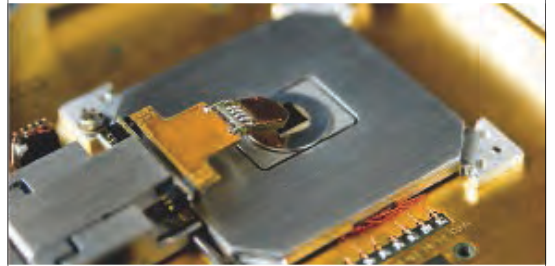
SuperFlat AFM for SEM
- Fast 3D images in your SEM
- Perform AFM *in situ* within your SEM
- Combine structural/topographical/force data
- Can be used in air or SEM

In Situ TEM Platforms

DENS solutions

Wildfire
Heating stage for thermal studies
Heating

Lightning
Biasing and heating for controlled electrical/thermal studies
Biasing

Climate
Gas & heating for high pressure gas studies at elevated temperatures
Gas

Ocean
Liquid cell for studying materials and biologicals – static and flowing
Liquid

Pellet Press

SPEX SamplePrep

X-Press 3636
- Fully programmable automated operation
- Fast, accurate and consistent pressing for XRF, IR etc.
- Safety interlocks for operator protection

Cryogenic Mill

SPEX SamplePrep

High Energy Mixer Mill
- Most advanced cryogenic grinding systems
- Suited to tough/temperature–sensitive samples
- High throughput/fully automated
- Ideal for polymers, composites, fibres etc.
- Various sizes to suit your applications

Ball Mill

SPEX SamplePrep

High Energy Ball Mill
- Highly efficient grinding motion
- Fast and effective grinding to analytical fineness
- Ideal for various samples, mechanical alloying, nanomilling etc.

FISCHIONE INSTRUMENTS

Plasma Cleaners
- Simultaneously cleans samples, sample holders and mounts
- Enhances imaging and analytical results
- Removes contaminants keeping your EM clean
- No change to elemental composition or structural characteristics
- Suits most commercial TEM and SEM sample holders

Fragmentation

SELFRAG HIGH VOLTAGE PULSE POWER FRAGMENTATION

Selfrag
- Selective fragmentation
- Smart alternative to crushing
- High voltage pulsed power technology
- Liberates morphologically intact minerals
- Allows control of target fraction size
- Suitable for breaking down composites
- Contamination and dust–free

Fusion Beads

Katanax® A Spex SamplePrep Company

Automatic Fluxers
- Fully programmable
- Safety switch & interlock
- Single–phase mains power
- User–friendly, industrial grade touchscreen interface
- Chemically inert heating elements impervious to flux

30 per hour	15 per hour
X–600	X–300

Pulverisers

ORBIS

OM222 Ring Mill
- High performance system
- Samples loads up to 1500g
- Programmable run timer
- Safety switch and interlocks

Ion Mills

FISCHIONE INSTRUMENTS

TEM and SEM Sample Prep
- Perfect complement to FIBs
- Artefact–free milling
- Removes amorphisation and ion implantation
- Optimised ion sources for milling and polishing
- Precise control of milling parameters
- *In situ* imaging

Ultra-low energy ion milling TEM	High & low energy milling TEM	High & low energy milling SEM	Ultra-low energy ion milling TEM
1040	1051	1061	1080

Thermo SCIENTIFIC — XPS+Auger

K-Alpha⁺

- Affordable & reliable with low running costs
- High-performance, low exposure X-ray sources
- Easy to operate
- High throughput
- Real-time hi-res sample visualisation
- Ion sources for all sample types
- Next generation electron optics & detectors
- MAGCIS ion cluster source
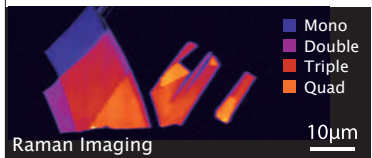
500 µm

ESCALAB 250Xi and Theta Probe

- Spectroscopy with unrivalled sensitivity and resolution
- Fast parallel imaging, <3µm
- Real-time physical imaging
- Microfocussed monochromators for rapid analysis of small areas
- Thin film analysis and parallel ARXPS
- Depth profiling using ion source
- Optional field-emission AES & UPS

nano photon — Raman

RAMANview
Wide Field Raman Scope

- Map 800mm² without moving sample
- Spatial resolution to 2.5 µm
- No focusing required
- Up to 70mm Working distance
- Image rough and curved samples

Raman Imaging   10µm

- Mono
- Double
- Triple
- Quad

Multi-layered polymer film   10µm

- PE
- Nylon
- PP

RAMANforce
Laser Raman Microscope

- Ultra-fast line laser scanning
- Stationary sample for ultimate stability
- Large samples & *in-situ* experiments
- <350nm spatial res guaranteed
- <100nm detectability guaranteed
- Highest spectroscopic performance
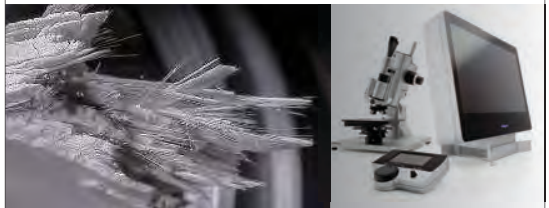- Powerful and dedicated software
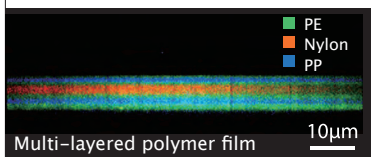
| FOV 25.6 mm	Resolution 3 µm	Full confocal microscope	Resolution 350 nm	Mapping 500 µm²/min
Rview	Rview	Rforce	Rforce	Rforce

HiROX — 3D Microscopy

Hirox Digital Zoom Microscopes

- World's most advanced digital microscopes
- Highly automated operation
- 3D profiling, roughness & volumetric analysis
- Real time HD output 1920x1200 px @ 50fps
- High contrast with no digital noise
- All in-focus imaging
- Wide range of lenses to suit your application

YXLON — X-ray CT
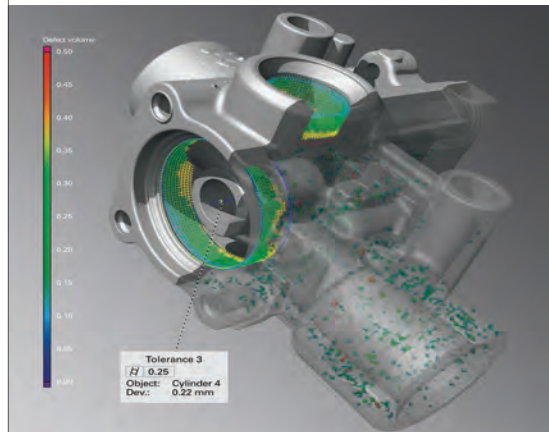
FF35 CT

- Large samples up to 300 x 500mm
- Large FOV with helical scanning
- 0.6µm resolution
- Fully automated acquisition
- Collision proof
- Smart Touch operation

Rigaku — X-ray CT

nano3DX

- True X-ray microscopy
- Relatively large samples measured at high res
- Fast measurement speed
- High-power X-ray source
- Switchable anodes for optimal contrast
- 3300x3300x2500 voxels @ 0.6µm
- Stitching possible for larger samples

WDXRF

Rigaku

X-ray Fluorescence

Primus Series

WDXRF

- Unmatched performance for light elements
- Tube above optics option – ideal for pressed powders
- Mapping and small sample analysis (<500µm)
- Precise vacuum pressure control
- Autoloader with cupless analysis
- Unique multilayered crystals to analyse Be, B, C, N and O

Tube Below	Tube Above	Mapping	Be → U	48+ position changer
Primus I	**Primus III+ /IV**	**Primus I / IV**	**Primus**	**Primus**

Supermini200

- World's only benchtop WDXRF
- WDXRF for EDXRF price
- 12 position auto–changer and spinner
- Superior light element performance
- User friendly software
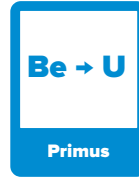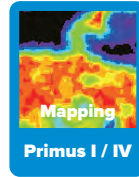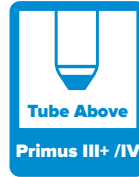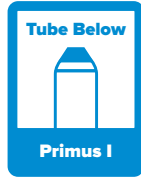- Same analytical tools as large WDXRFs
- Standardless analysis

O → U	12 position changer	Vac He Air
SM200	**SM200**	**SM200**

Simultix

WDXRF

- Multi–channel simultaneous WDXRF
- Up to 42 channels available
- Tube below for safe pressed powder operation
- Advanced synthetic curved crystals
- Optional light and heavy element goniometer

XRD	Be → U	Background correction
Simultix	**Simultix**	**Simultix**

SciAps
ANALYZE YOUR WORLD
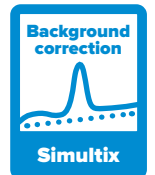
Handheld XRF

X-Series

- Latest tube and detector technology
- Providing the fastest and most precise analyses
- Exceptional count rates
- Lightweight ergonomic design
- Dual shield detector technology prevents against accidental damage
- Android operating system with vibrant display
- Built–in camera for precise aiming and recording
- Wifi and Bluetooth connectivity

X–ray Diffraction

Rigaku

World's most versatile diffractometer

XRD

SmartLab
- Class leading accuracy and versatility
- High power 9kW or 3kW
- Intelligent Guidance software
- Patented in–plane arm for thin film analysis
- HyPix 3000 HPC detector (0D, 1D and 2D detection modes)
- Auto alignment
- Focussed & parallel beam geometries
- Vast range of attachments (detectors, sample changers, stages – heating, cooling, environmental, DSC, etc)

Diffraction applications
- Phase identification
- Quantitative analysis
- Percent crystallinity
- Crystallite size/lattice strain analysis
- Precise lattice parameter determination
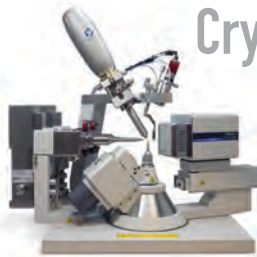- Rietveld refinement

Thin film modes
- Composition
- Orientation/texture
- Strain/stress
- Interface roughness
- Surface uniformity
- Perfection
- Relaxation
- Thickness
- Density

Crystallography

Rigaku oxford diffraction

XtaLAB
- 3D structural analysis
- High speed HPC detectors
- Powerful, user–friendly Crysalis Pro software

	mini II	SuperNova	Synergy–S/R
Speed	Fast	Faster	Fastest
Flexibility	Good	Better	Best
Dual wavelength	No	Yes	Yes
Telescopic 2θ arm	No	No	Yes

SAXS

NANOPIX
- High–power point focus X–ray source
- OptiSAXS high–performance multilayer optics
- ClearPinhole high–performance pinhole slits
- HyPix–3000 high–performance 2D HPAD detector
- Superior small angle resolution (Q_{min} to 0.02 nm^{-1})
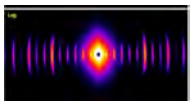- Variable samples to detector distance

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Benchtop XRD

Miniflex
- Most powerful benchtop XRD
- Publication quality data
- Suited to teaching, research & industry
- Combines speed and sensitivity
- Simple operation

Handheld LIBS

SciAps ANALYZE YOUR WORLD

Z-Series
- Perfect for all alloy types including Al and Mg alloys
- Goes beyond XRF. Can measure Li, Be, B and C
- Argon purge gives faster and more accurate results
- Patented cleaning approach eliminates sample prep
- Smallest, lightest, fastest LIBS available
- Android operating system
- No radiation training required

NT-MDT

Integrable SPM

SPECTRA
Raman
TERS
SNOM

NTEGRA
- Modular platform
- Ultimate versatility
- Wide range of imaging modes
- Extending the capabilities of AFM
- HybriD mode for nanoscale quantitative stiffness mapping

AURA
Controlled environment, low vacuum, magnetic field

NANO IR
Infrared scattering SNOM

THERMA
−30 to 300°C with low thermal drift

PRIMA
Multifunctional SPM, hi−res, low noise

VITA
Molecules and live specimens in liquid environments

NT-MDT Revolutionary AFM/STM

Titanium
- Fast/automated tip exchange using revolutionary cartridge
- Rock solid stability – World's lowest drift
- >30 SPM imaging modes
- Simultaneously measures 5 signals
- HybriD mode for nanomechanical and chemical mapping

Nanofabrication

SwissLitho AG
Innovative Nanofabrication Tools

NanoFrazor Explore
- Rapid prototyping of nanoscale devices
- Highly automated
- Unmatched precision
- Single step fabrication of 3D patterns
- Simultaneous AFM inspection
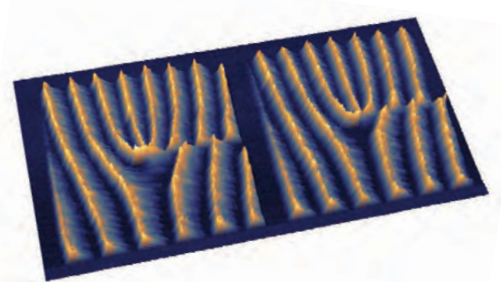- No need for vacuum or high voltage supplies

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NT-MDT Educational AFM/STM

Nanoeducator
- Affordable, robust and user−friendly
- Excellent scanner with closed loop control
- High resolution with low noise
- Research grade instrument, perfect for teaching
- Excellent alternative to EBL