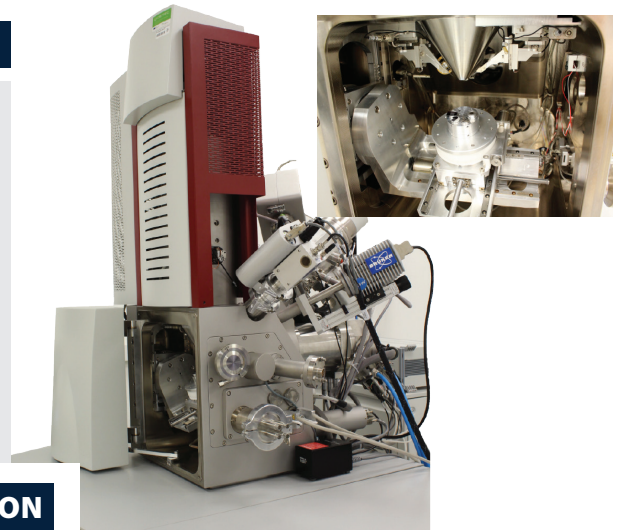


Scanning Electron Microscope with Focused Ion Beam

FIB-SEM TESCAN LYRA3

DESCRIPTION

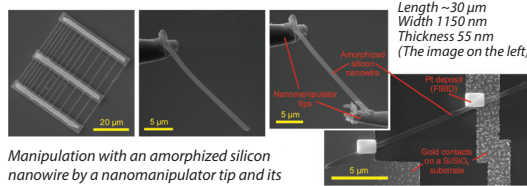
SEM/FIB is a type of microscope where a focused electron/ion beam is scanned over the sample to generate an image of the surface or to modify it with nanometric resolution (usually better than 10 nm). The image is formed by detecting secondary and backscattered electrons emitted from the impact place of particle beam. The Gas Injection System (GIS) provides a gas inlet for gaseous precursors, thus allowing deposition and enhanced or selective etching on the sample surface using advanced surface chemistry. The microscope is equipped with two closed loop nanomanipulators (optionally two more can be installed), which allows measurement of 2-probe or 4-probe current-voltage characteristics. The tool is equipped with Electron Dispersive X-Ray spectroscopy analyser (EDX) for elemental analysis. Applications include positive/negative lithography, sample imaging and modification, electrical measurements and basic chemical and elemental analysis.



SPECIFICATION

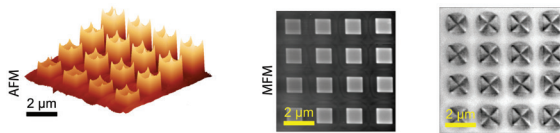
SEM		FIB	
Product name	LYRA 3 XMH	Ion Column	Canion
Emitter	Schottky cathode	Emitter	Ga LMIS
Acceleration Voltage	200 V–30 kV/50 V–30kV in Beam Deceleration Mode (BDM)	Acceleration Voltage	500 V–30 kV
Probe Current	2 pA–200 nA	Probe Current	1 pA–40 nA
Detectors/Resolution	SE/ 1.2 nm @ 30kV / 2.5 nm @ 3kV	SEM - FIB Coincidence at	WD 9 mm (SEM) WD 12 mm (FIB)
	SE (BDM) / 1.5 nm @ 3kV	SEM - FIB Angle at	55°
	In Beam BSE / 2.0 nm @ 15kV	GIS	
	BSE / 2.0 nm @ 30kV	Number of Channels	5
	TE	Type of Precursors	SiO _x , H ₂ O, F, Pt, W, (Co)
EBIC	Nanomanipulators		
Chamber Vacuum	< 9e-3 Pa (<5e-4 Pa reachable)	Type	Smaract (closed loop)
Specimen Stage Movements	Compucentric, fully motorized	Position	2 at chamber roof 2 optional at SEM stage
	X: 130 mm (–65 mm to +65 mm)	Analytical (EDX) detector	
	Y: 130 mm (–65 mm to +65 mm)	Type	BRUKER XFlash 5010
	Z: 100 mm	Energy Resolution	≤ 129 eV @ MnKa 59 eV @ FKa 52 eV @ CKa
Rotation: 360° continuous	Tilt: –30° to +90° mm	Decontaminator/Plasma Cleaner	

RESULTS

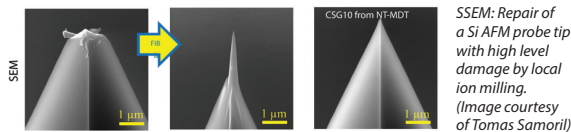


Manipulation with an amorphized silicon nanowire by a nanomanipulator tip and its resistance measurement by use of two nanomanipulators and gold contacts on Si/SiO₂ substrate. (Image courtesy of Tomas Samoril)

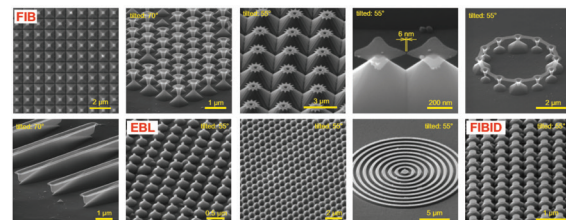
Resistivity $1.7 \times 10^2 \Omega \text{m}$ of the nanowire with the parameters:
Length ~30 μm
Width 1150 nm
Thickness 55 nm
(The image on the left)



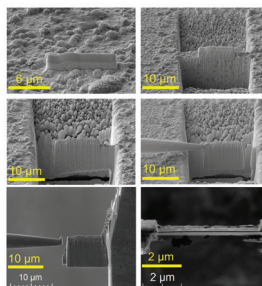
Focused Electron Beam Induced Deposition (FEBID) of Magnetic Nanostructures by using Dicobalt octacarbonyl Co₂(CO)₈ precursor characterized by AFM (Atomic Force Microscope) and MFM (Magnetic Force Microscope). (Image courtesy of Michal Urbánek)



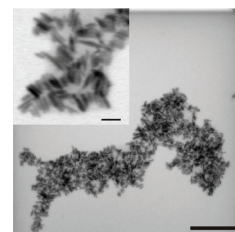
SSEM: Repair of a Si AFM probe tip with high level damage by local ion milling. (Image courtesy of Tomas Samoril)



Fabrication of micro- and nanostructures by selective wet etching (KOH) of Si (100) with FIB, EBL or FIBID mask. (Image courtesy of Tomas Samoril)



TEM lamella preparation. (Image courtesy of Eva Kolibalova)



Characterization of CuO/ZnO nanocomposite by transmitted electron (TE) detector in bright field. (Image courtesy of Jan Cechal)

MORE INFO

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