

Focused Ion Beam/Scanning Electron Microscopy

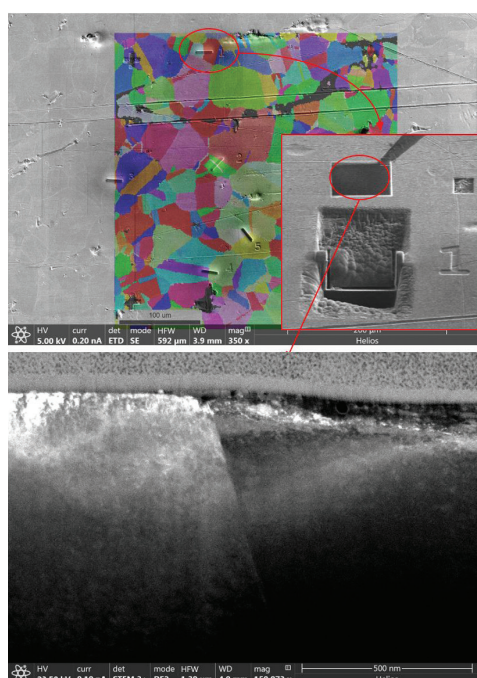
Helios NanoLab 660

DESCRIPTION

The Helios 660 NanoLab is an exclusive dual-beam microscope for ultra-high resolution imaging, analysis and fabrication at the nanoscale. It combines a monochromated field emission scanning electron microscope (FE-SEM) with an advanced focused ion beam (FIB) column. The instrument has superb imaging capabilities, providing sub-nanometer resolution across the whole 1-30 kV range. It is equipped with in-lens SE and BSE detectors, a STEM detector plus EDS and EBSD analyzers. The FIB column's exceptional low-voltage performance together with the Gas Injection System (GIS) and Easy Lift nanomanipulator makes this instrument ideally suited for TEM lamella preparation and observation. The Helios Nanolab is also capable of automated 3D chemical and crystallographic analysis as well as structure reconstruction. Moreover, The CryoMAT module extension allows the investigation of many non-traditional, non-wet materials like hard/soft mixes, composites or beam sensitive materials.



APPLICATION EXAMPLES



A radiation-damaged sample of 304 stainless steel: damage is different at grain boundaries with various misorientation. TEM lamellae made across specific EBSD-traced boundaries (top) and imaged using STEM detector (bottom).



SPECIFICATIONS

Electron Optics		Imaging Detectors (detected signals)		Micromanipulator	
Column type	Elstar UC	TLD (SE, BSE)		Manipulator type	EasyLift EX
Source type	Schottky FEG with monochromator	ICD (BSE)		Movements	X,Y,Z, rotation
Imaging modes	field free	MD (BSE)		Sample Stage	
	XHR immersion	ETD (SE, BSE)		X,Y	150 mm (piezo driven)
	EDS optimized	FSD (BSE)		Z	10 mm
	Beam deceleration	CBS (BSE)		Rotation	360 ° continuous
Probe current	0.8 pA to 100 nA	STEM (TE)		Tilt	- 10 ° to + 60 °
Landing energy	20 eV to 30 keV	ICE (SE, SI)		Tilt accuracy	0.1° (50° – 54°)
Ion Optics		Analytical Detectors		Maximum Sample Sizes (incl. holder)	
Column type	Tomahawk	EBSD EDAX Hikari XP		Maximum size	150 mm
Source type	Ga LMIS	EDS EDAX SDD Octane Super 60 mm ²		Max. thickness (loadlock)	9 mm
Probe current	0.1 pA to 65 nA	Others		Max. thickness via chamber door	55 mm
Landing energy	500 eV to 30 keV	IR camera		Special Stage Option	
Resolution		Nav-Cam+		Stage type	CryoMAT
E beam	0.6 nm @ 30 kV (STEM)	Integrated Beam current measurement		Working range	- 190 °C to + 50 °C
	0.6 nm @ 15-2 kV	GIS		Accessories	
	0.7 nm @ 1kV	carbon		Plasma cleaner	
	1 nm @ 500 V (ICD)	tungsten		Cryo cleaner	
I beam	4 nm @ 30 kV			Manual loadlock	
				Additional cold trap (part of CryoMAT)	

MORE INFO

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Web: <http://nano.ceitec.cz/focused-ion-beam-scanning-electron-microscope-fei-helios-nanolab-660-helios/>