NANOTECHNOLOGY

Raith

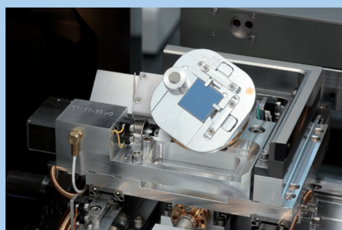
INNOVATIVE SOLUTIONS FOR NANOFABRICATION AND SEMICONDUCTOR NAVIGATION

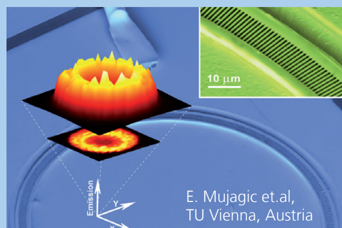
Nanolithography and imaging with a single tool

PIONEER

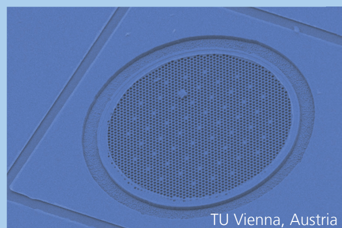
WRITE AND VIEW with

- ☑ *TFE Technology*
- ☑ *Sub 20nm lithography*
- ☑ *High resolution imaging and pattern inspection*
- ☑ *Laserinterferometer controlled stage with modular rotation and tilt*


Integrated Rotation / Tilt function



Grating-coupled surface emitting quantum cascade laser



Defect holes in photonic crystal

...the perfect EBL-SEM-Hybrid

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NEW *PIONEER*

… complements the widely used Raith portfolio of lithography and nanofabrication tools. Raith *PIONEER* is a new compact electron beam lithography (EBL) system based on thermal field emission (TFE) technology.

With sub 20nm lithography, highest resolution imaging capabilities and very low cost of ownership, the *PIONEER* is the ideal choice if you are looking for an uncompromised and affordable solution for fabrication and inspection of nanostructures. The *PIONEER* is the first true EBL/SEM hybrid available!

Compared to a state of the art SEM with a third-party pattern generator, the *PIONEER* is a complete turnkey EBL system from a single trusted vendor at a very competitive price. The *PIONEER's* highest grade ingredients enable much wider application bandwidth: Raith´s most recent laser interferometer controlled stage technology, which is a must for a dedicated EBL system, now provides integrated "on board" rotation and tilt of the entire sample holder thus preserving full SEM imaging capability.

Unique InLens detector hardware significantly improves secondary electron collection efficiency for brightly high contrast imaging and symmetric mark recognition. Especially at low voltages this detector delivers excellent surface information.

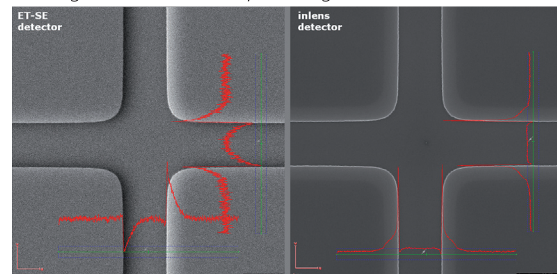
PIONEER Specs

Electron Beam Lithography main specifications:

• Filament type	Schottky-TFE
• Laserstage travel range	50x50x25 mm
• Beam size (resolution)	≤ 2.5 nm (≤ 1.6 nm *)
• Minimum feature size	≤ 20 nm (guaranteed)
• Field stitching	≤ 50 (60)nm (m+2σ) ** (guaranteed)
• Overlay accuracy (alignment)	≤ 50 (60)nm (m+2σ) **
• Beam current drift	≤ 0.5% / 1 hour
• Writing speed	2.5 MHz (10MHz optional)

* Following simple formula, resolution approx. relates to beam size by: resolution = 0.6 * d_{FWHM} with d_{FWHM}: half width of beam size assuming a scan across an ideal edge (equivalent to "20%/80% greyscale criterion")
** Values in brackets valid for basic ET-SE-detector configuration only

Better signal to noise and more precise edge detection with inlens detector



Integrated Tilt / Rotation function