PRODUCT INFO

Raith

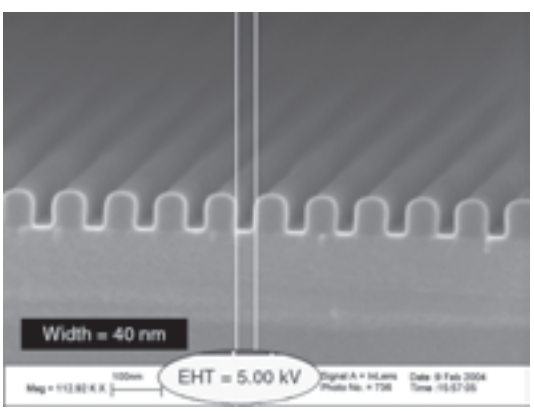
INNOVATIVE SOLUTIONS FOR NANOFABRICATION AND SEMICONDUCTOR NAVIGATION

Ultra high resolution electron beam lithography and nano engineering workstation

eLiNE

Introduction to eLiNE

Ultra high resolution
electron beam Lithography and
Nano Engineering workstation



High resolution grating

»__ *e_LiNE* is the most versatile e-beam system for uncompromised nano structuring, pattern inspection, dimensional metrology and nano engineering. TFE filament technology offers ultra high resolution capabilities in all operation modes.

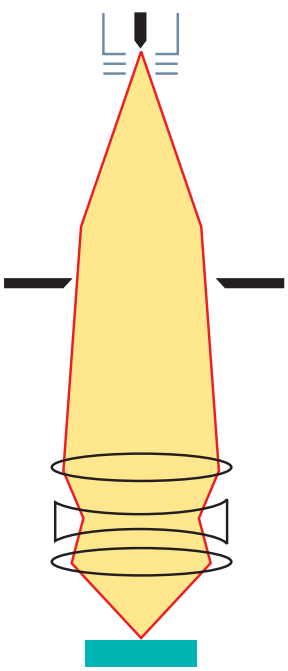
Advanced application like e-beam CVD, nano manipulation, electrical probing and x-ray analysis are available by selecting nano engineering accessories.

e_LiNE electron column comprises the ultimate in electron optical development. A unique cross over free beam path gives extremely high beam current density and exceedingly low aberrations. This results in top quality lithography performance.

e_LiNE electron optics offers unsurpassed low voltage inspection and metrology even below 1 keV.

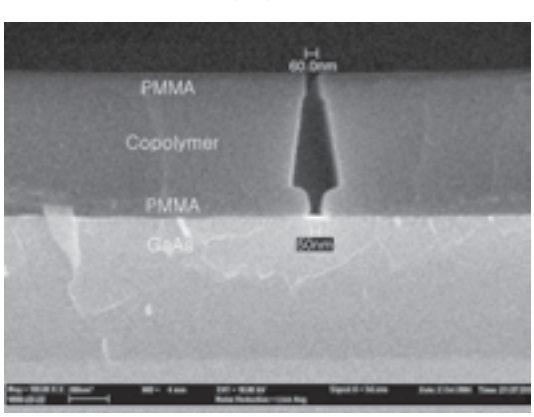
Software integration is the key asset of *e_LiNE*: No other system can match the Raith software suite in terms of flexibility, ease of use and safety in a multi user environment.

e_LiNE is completely built-up and fully tested at the Raith factory. The system undergoes two complete acceptance procedures; one before it leaves factory, and the other one after the instrument has been installed. The system is designed and intended for turnkey operation once it is delivered and installed. A smooth installation and set up is guaranteed since all mechanical, electronic, and software components are under control of a single vendor. __«



Cross over free beam path

eLiNE Applications



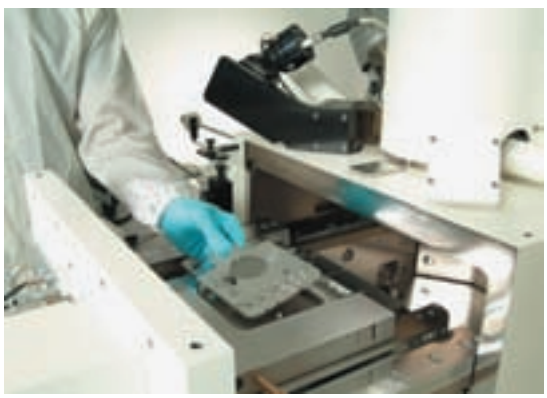
50 nm T-gate footprint in 800nm thick resist
(courtesy Lee, Postech, Korea)

- Nano lithography with sub 20 nm resolution
- Fabrication of photonic crystals
- Gratings, DFB lasers, SAW devices
- Optical devices, holograms, micro lenses
- Three-dimensional structures
- High speed devices e.g. HEMT
- CMOS process and device developments
- Resist less lithography
- E-beam induced deposition and etching
- Imprint template fabrication

- Nano probing and electrical measurements
- Nano and pattern placement metrology
- X-ray analysis of nano structures
- High resolution SEM inspection

e_LiNE Key hardware features

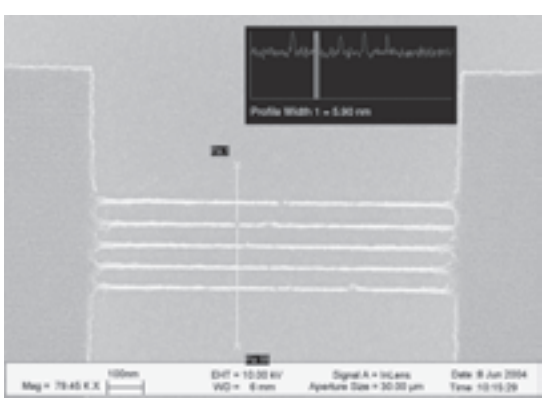
- Thermal assisted field emission gun - TFE
- Cross over free beam path
- Highest beam current density
- Compound objective lens for lowest beam aberrations
- Digital controlled electron optics column
- Fast electrostatic beam blanking
- 100 x 100 mm laser interferometer stage
- True closed loop piezo control for finest sample positioning
- 2 nm XY position resolution at any working distance, write field size and SEM magnification
- User defined write fields from 0.5 µm to 2 mm with automated calibration and selection
- 30 mm variation in working distance
- Easy mount of small samples from few mm up to 4 inch through front door and pull out stage
- Kinematic - stress free sample mount
- Automated focus setting by objective lens
- 10 MHz DSP controlled high speed pattern processor



Easy sample exchange and chamber access

e_LiNE Key software features

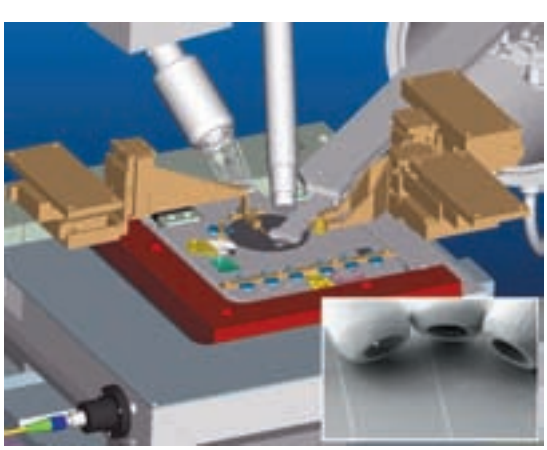
- System control software
- Multi user interface
- SEM inspection software
- Image archiving software
- Dimensional metrology software
- Integrated GDSII editor with
- Large file handling capabilities (2 GB)
- Proximity effect correction
- Data postprocessor



Sub 10 nm lines fabricated with e_LiNE

e_LiNE Nano engineering options

- Gas injector unit with up to five capillaries
- Nano prober arrangement with up to four needles
- Retractable x-ray analysis unit
- Optical microscope
- Height sensor
- Load lock
- Rotation tilt module for SEM inspection



Nano engineering arrangement

Raith

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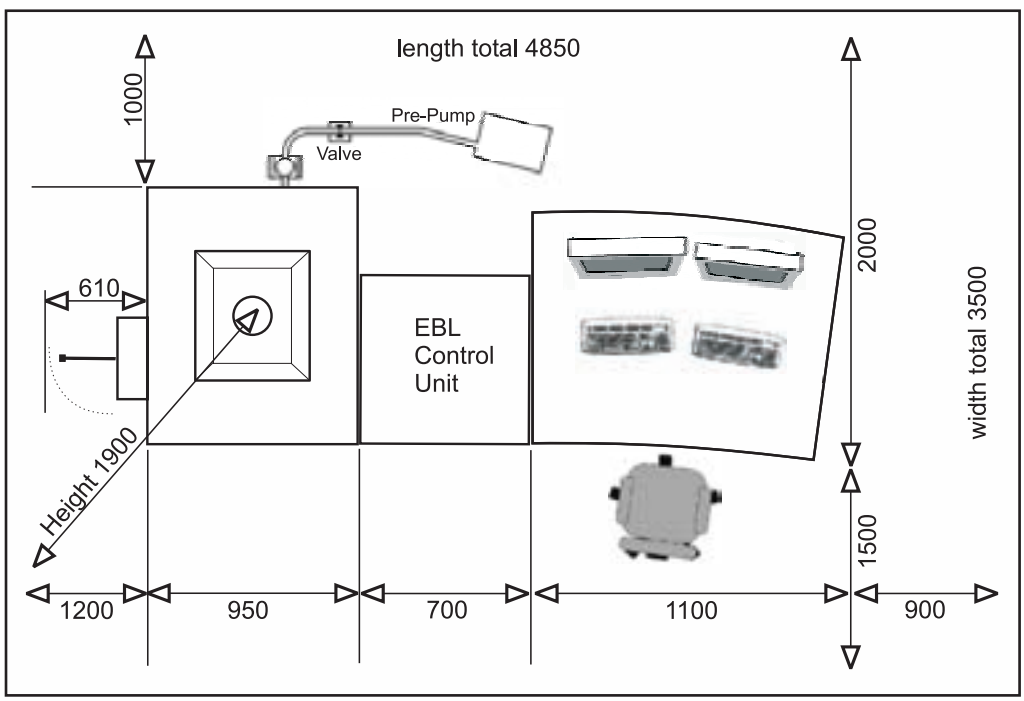
eLiNE Specs

• Filament	Schottky TFE
• Stage travel range	100 × 100 × 30 mm
• Beam size	≤ 2 nm @ 20 keV
• Beam current range	5 pA - 20 nA
• Beam energy	100 eV - 30 keV
• Current density	≥ 7.500 A / cm²
• Current stability	≤ 0.5 % / 8 hours
• Detector	In Lens, Everhart Thornley
• Minimum line width	< 20 nm guaranteed (< 10 nm achievable)
• Stitching accuracy	40 nm (mean+3 sigma)
• Overlay accuracy	40 nm (mean+3 sigma)
• Import file format	GDSII, DXF, CIF, ASCII, BMP

Technical specification can be changed without notice. For this product it is required to apply for export license when delivered to certain countries.

eLiNE Floor plan



For details about site requirement please consult the technical description, Raith or one of Raith´s accredited partners. Details about local Raith contacts in your country can be found at www.raith.com/WWW_RAITH/contact/contact.html