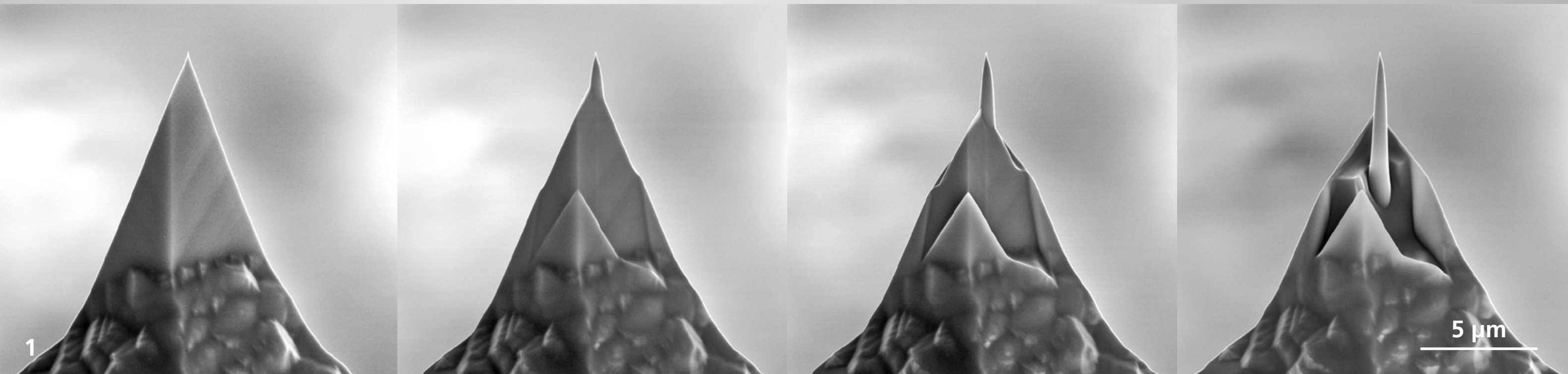
Fraunhofer IISB

FRAUNHOFER INSTITUTE FOR INTEGRATED SYSTEMS AND DEVICE TECHNOLOGY IISB



1 *Stepwise fabrication of an ultra-sharp AFM probe by FIB (aspect ratio ~ 10)*

FOCUSED ION BEAM (FIB)

CUSTOMIZED SERVICES AND SOLUTIONS

Our objectives

- Preparation and analysis of your samples
- Customized patterning on the micro- and nanoscale
- Providing our long-term research experience in FIB processes for your problems

Features

- Cross-section and failure analysis
- Sample preparation for HRTEM, nanoindentation, etc.
- Circuit modification
- Dedicated structuring of different materials
- Combining FIB patterning with a complete CMOS line

What can we do for you?

- Fabricate customized prototype structures
- Assisting your process development by FIB analysis
- Be your partner in applied and basic research projects

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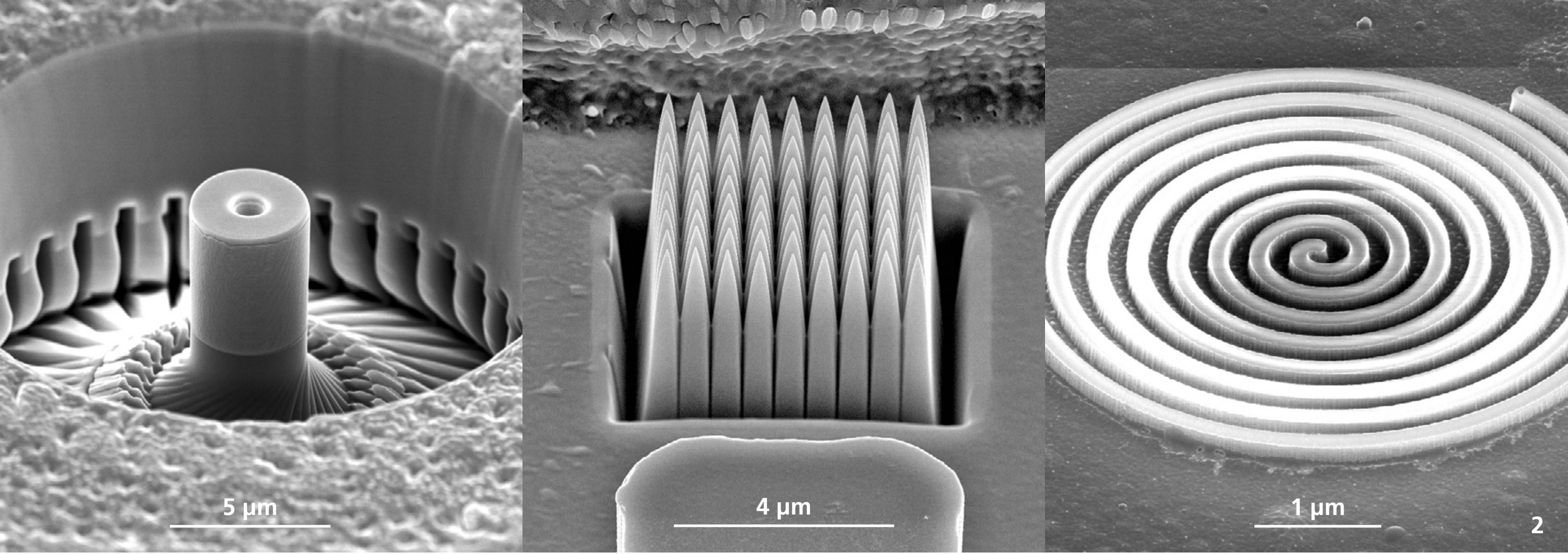


FRAUNHOFER IISB OFFERS R&D SERVICES ON FIB SAMPLE ANALYSIS AND PROTOYPE STRUCTURE FABRICATION

2 *Micro pillar for nanoindentation of a multilayer metal stack, Si nano-electrodes by automated FIB mix & match patterning, NIL quartz stamp by GaRL (from left to right)*

Our capabilities

Cross section and failure analysis

- State-of-the-art SEM resolution
- In-situ EDX inspection

Sample preparation

- Lamellae or pillars for HRTEM analysis
- Nanoindentation structures with vertical sidewalls

Dedicated structuring of different materials

- Patterning of protruded structures
- FIB pattern development
- Stream file generator for customized patterns available (suitable for FEI systems)
- Deposition of 2.5D or 3D structures (C or Pt)

Combining FIB patterning with a complete CMOS line

- Structuring of pre-patterned substrates (Mix & Match)
- RIE with Ga implanted etch mask (Ga resistless lithography, GaRL)

Circuit modification

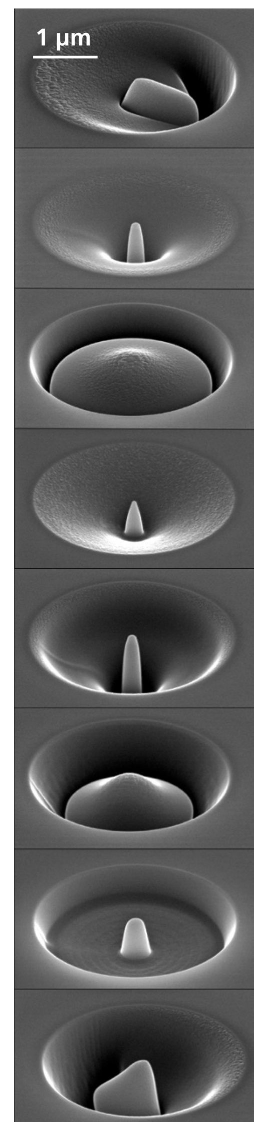
Applied research

- Characterization of FIB induced damage by electrical Scanning Probe Microscopy (SPM)
- Influence of FIB patterning strategies on resulting structures
- ... and much more

Equipment

Dual beam FEI Helios Nanolab 600

- 0.5 – 30 keV Ga (1.5 pA – 21 nA)
- 1 – 30 keV e-beam (1.3 pA– 22 nA)
- Gas injection system (Pt, C, I_2, XeF_2, TEOS)
- EDX, STEM
- Substrates up to 200 mm



3 *The same local ion dose results in significantly different structures depending on the applied FIB patterning strategy*