LASER BASED SAMPLE PREPARATION FOR ADVANCED PACKAGING APPLICATIONS

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GATAN 3D MICROMAC Fraunhofer IMWS

Fraunhofer Center for Applied Microstructure Diagnostics CAM

Microstructure. Properties. Relationship.

- 25 years experience in microstructure diagnostics.
- Comprehensive base of equipment:
  - Non-destructive testing
  - Reliable target prep
  - State-of-the-art nano analytics
- Continuous development of preparation and analytical methods.

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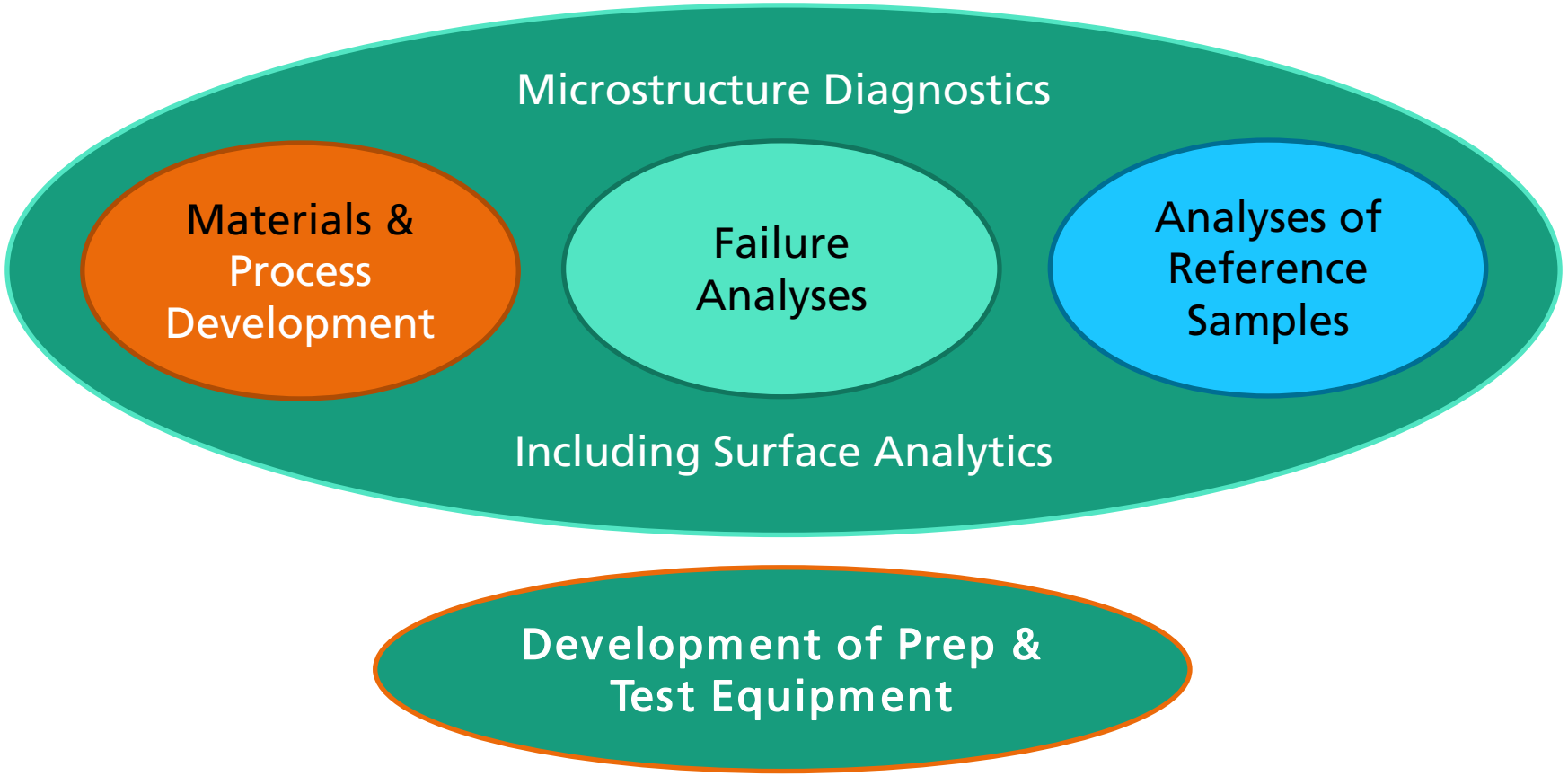
Fraunhofer Center for Applied Microstructure Diagnostics CAM

Services Offered



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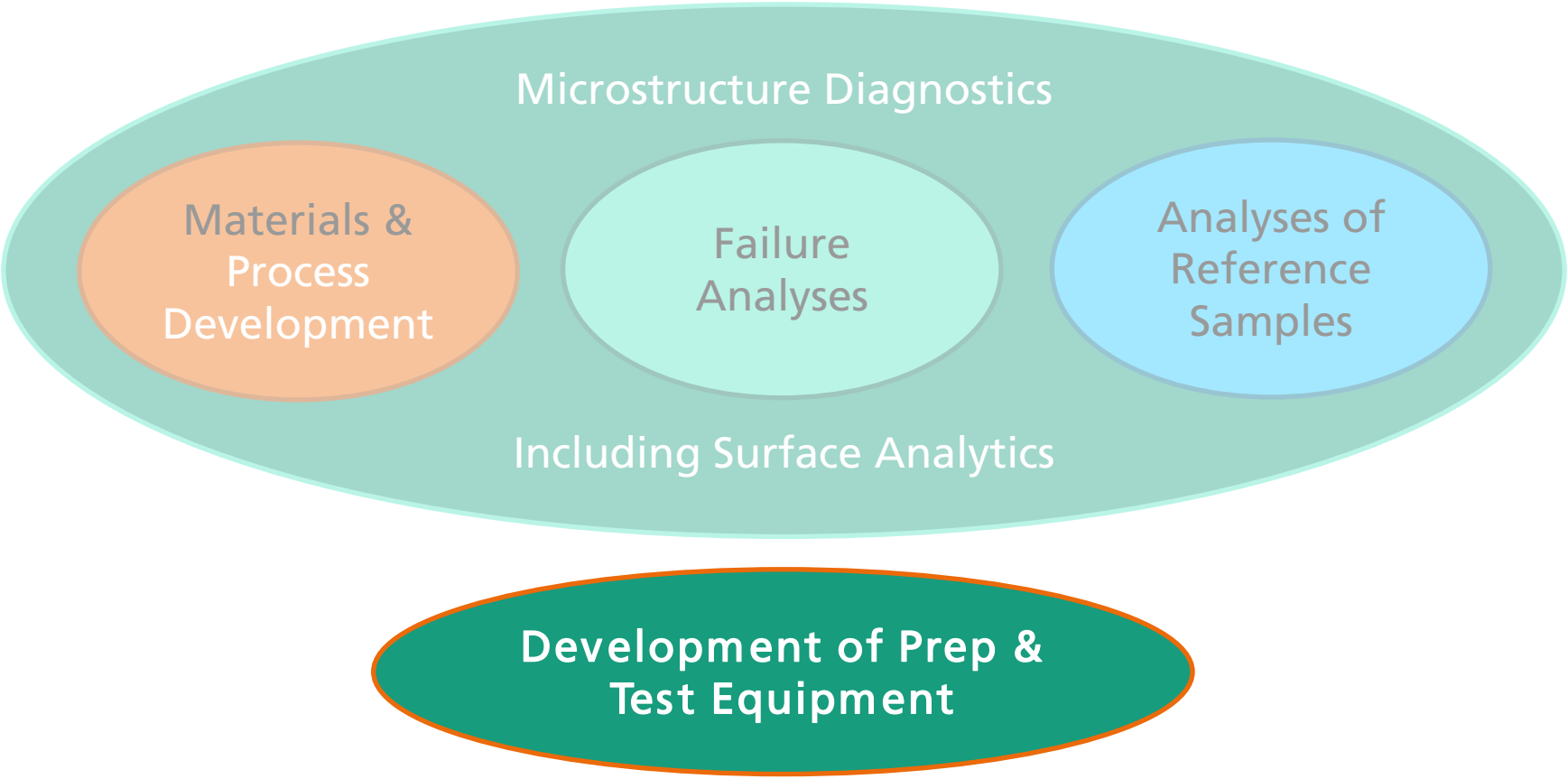

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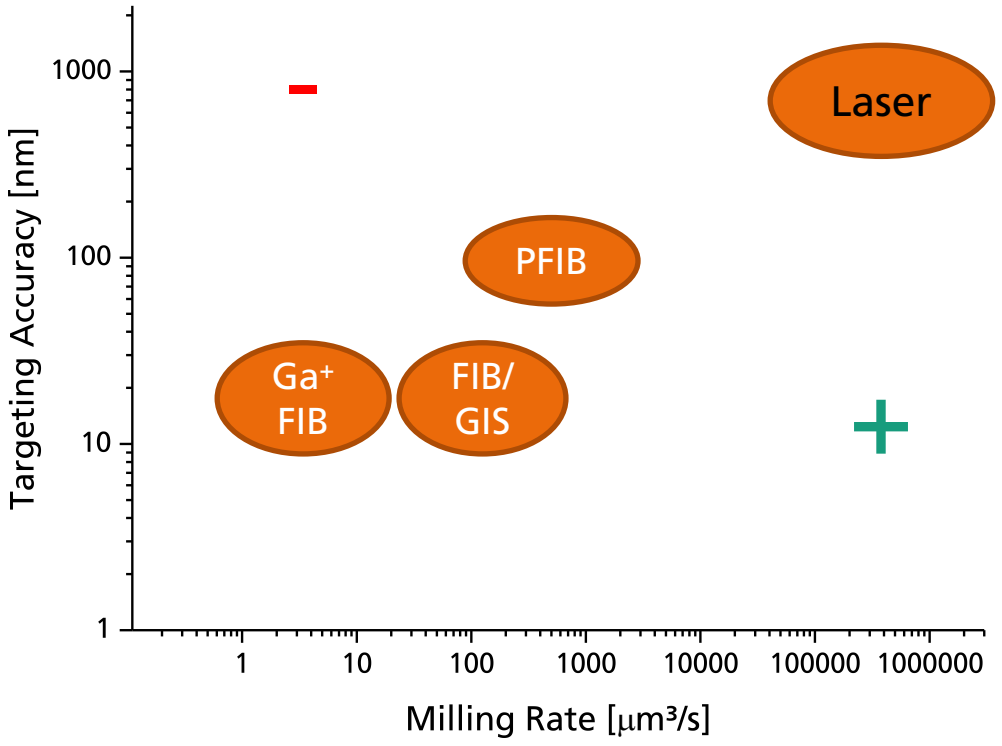
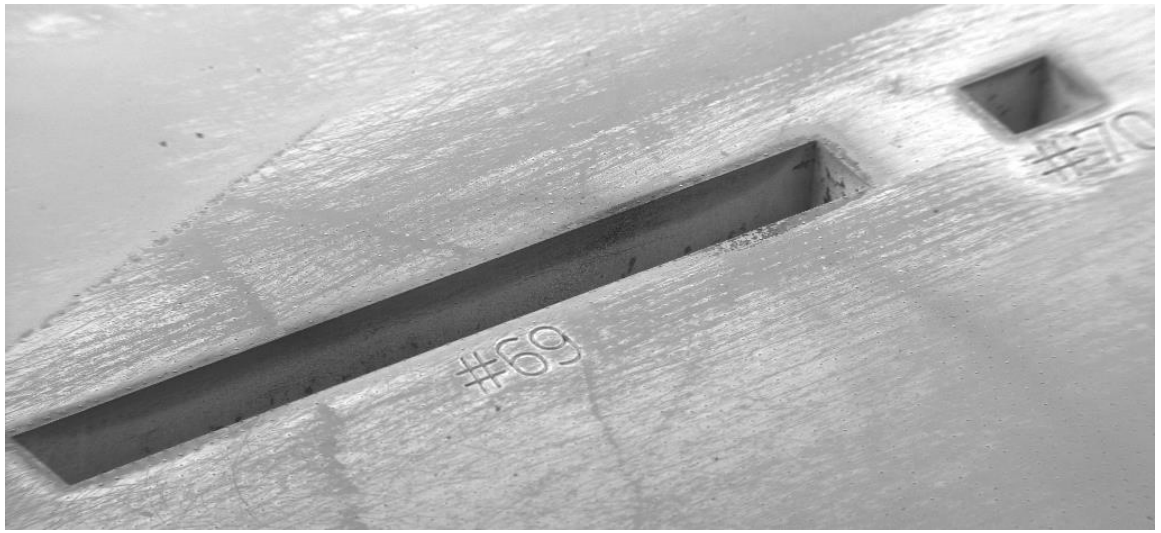
The Advantage of Being MUCH Faster



In Parts after: Martens *et al.*, EuroSimE, 2010.



#	Size of cut	Time required	
		microPREP™	FIB
69	3.000 x 300 x 300 µm³	23 min 40 s	~6 months*
70	300 x 300 x 250 µm³	3 min 40 s	17.5 days*

*Not practical for a FIB system

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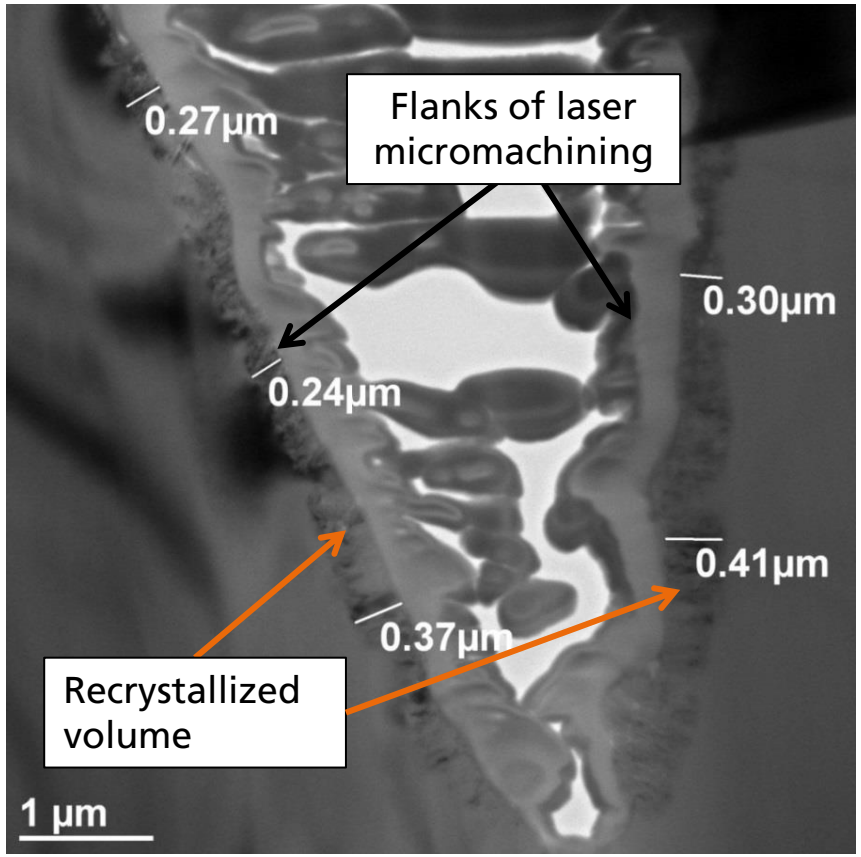
Price to Be Paid for Being MUCH Faster?

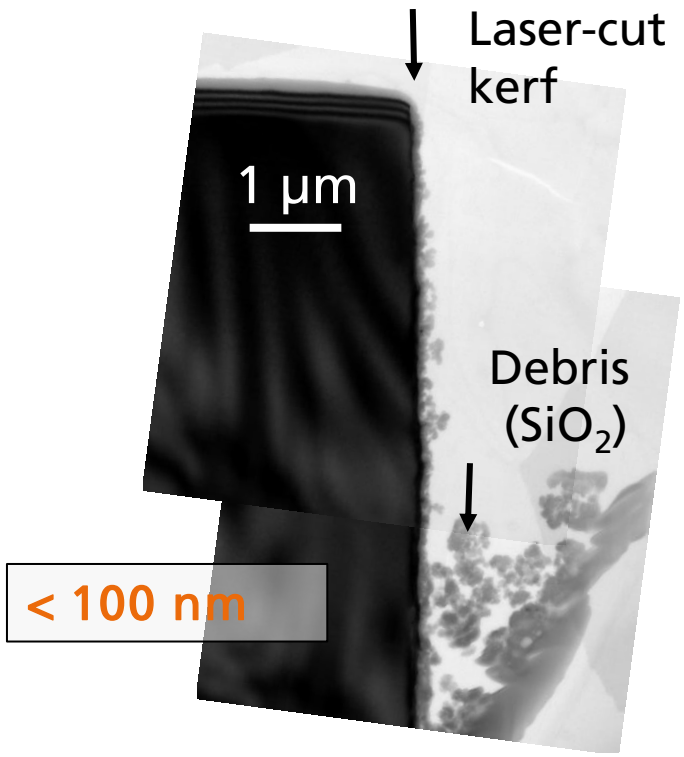


Pico-second Laser

Laser-affected zone is omnipresent.

It needs to become removed with ion-beam polishing.

Femtosecond Laser



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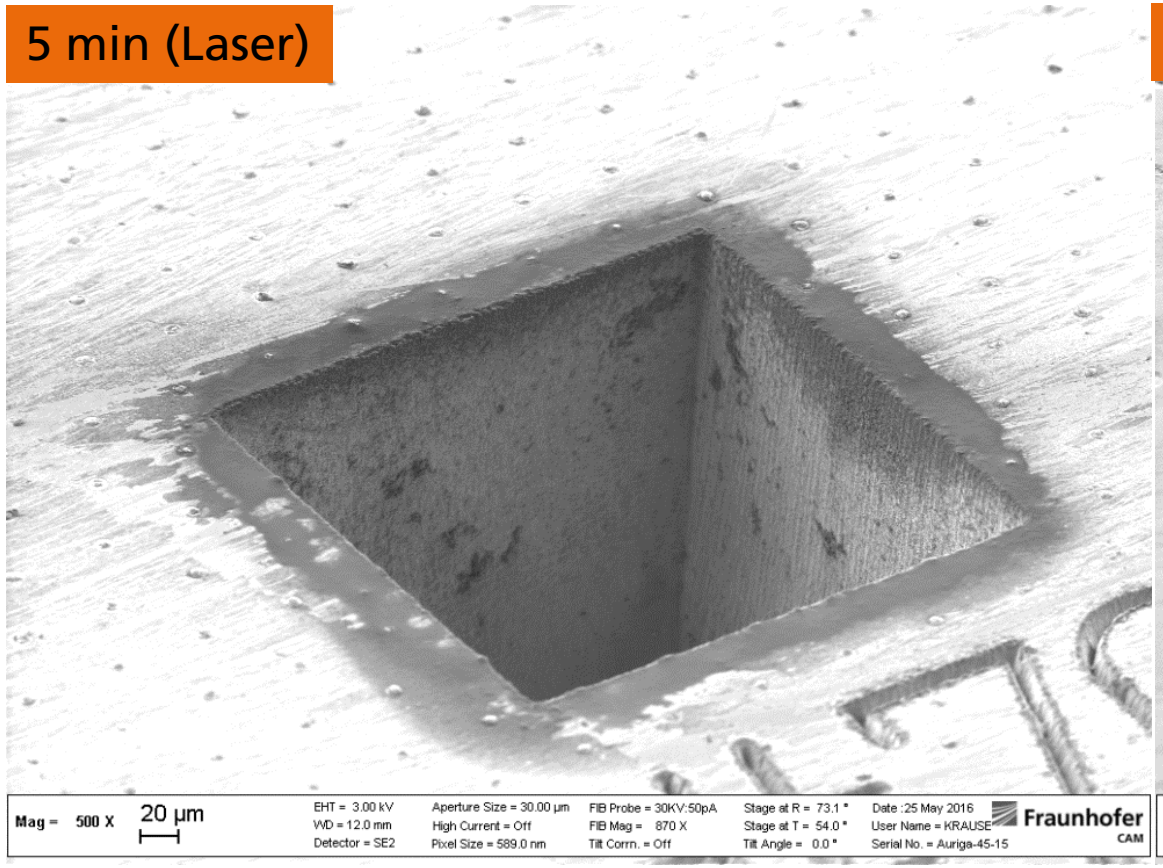
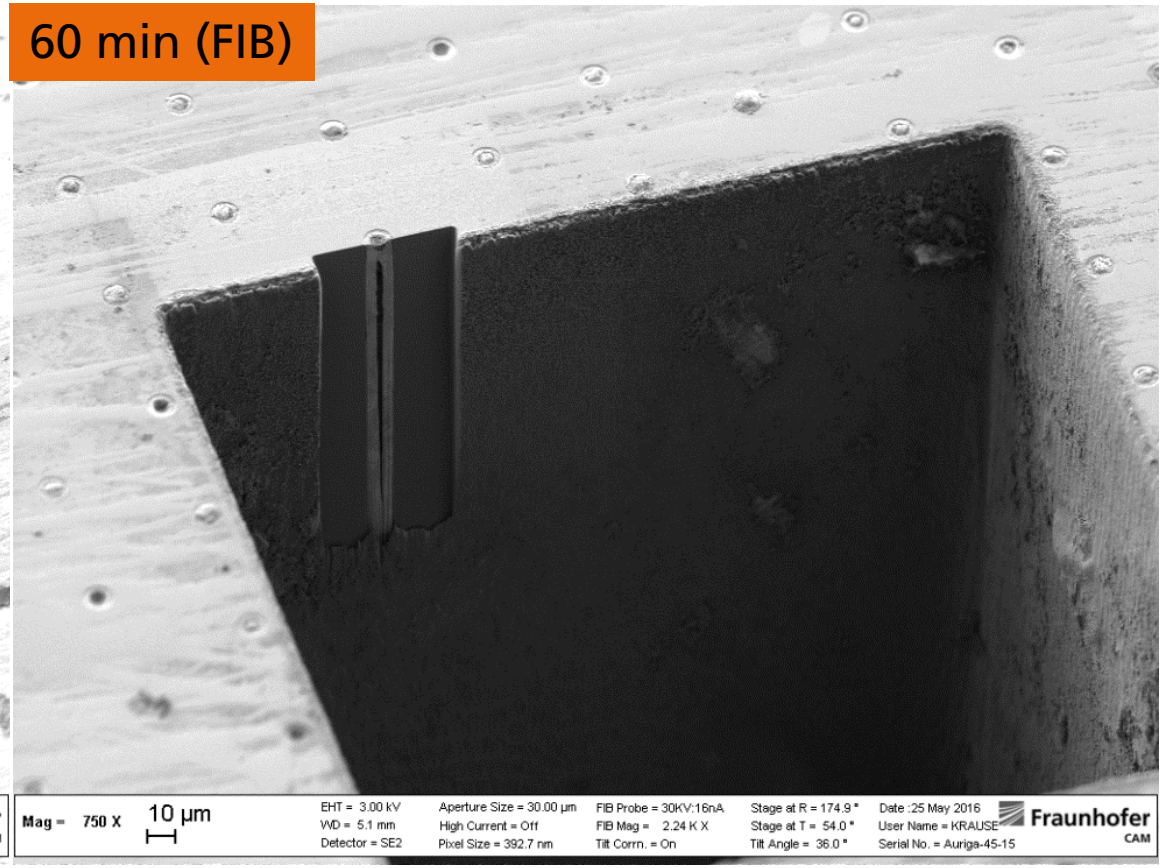
microPREP™

Advanced Packaging, Surgical (Excavation)





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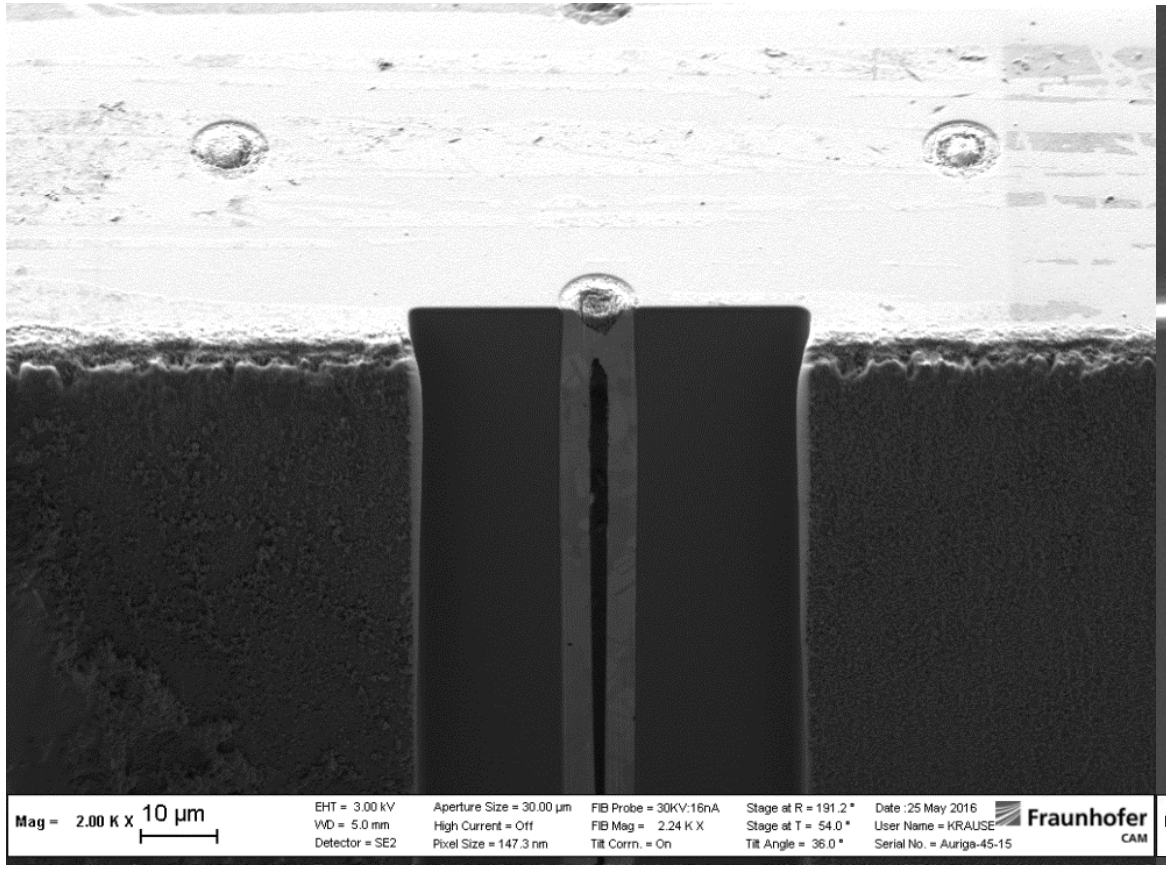
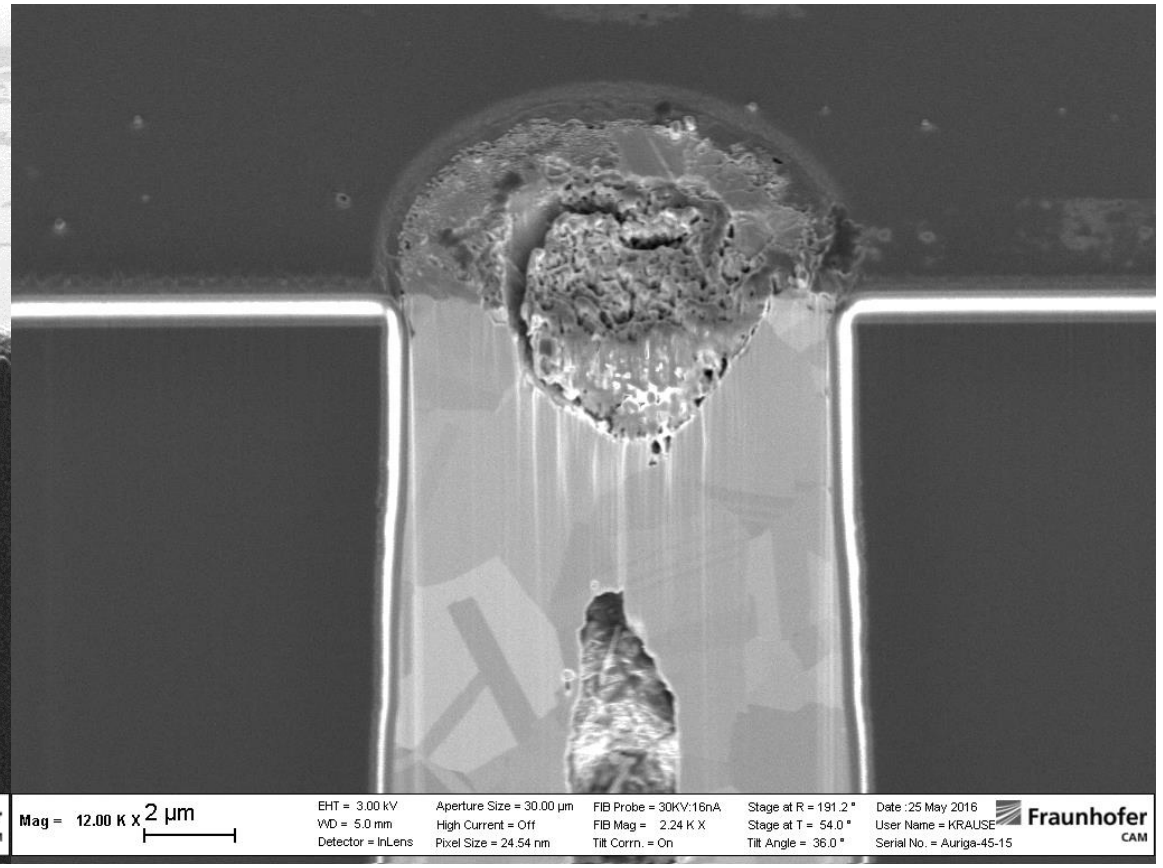
microPREP™

Advanced Packaging, Surgical (Excavation)





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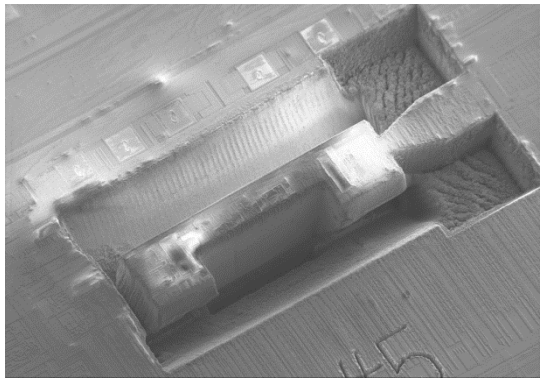
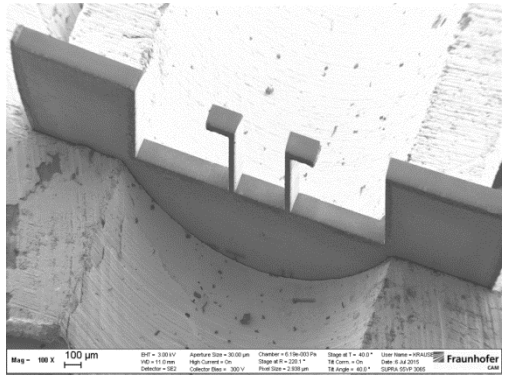
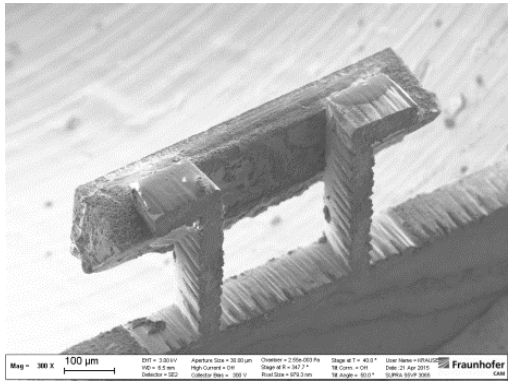
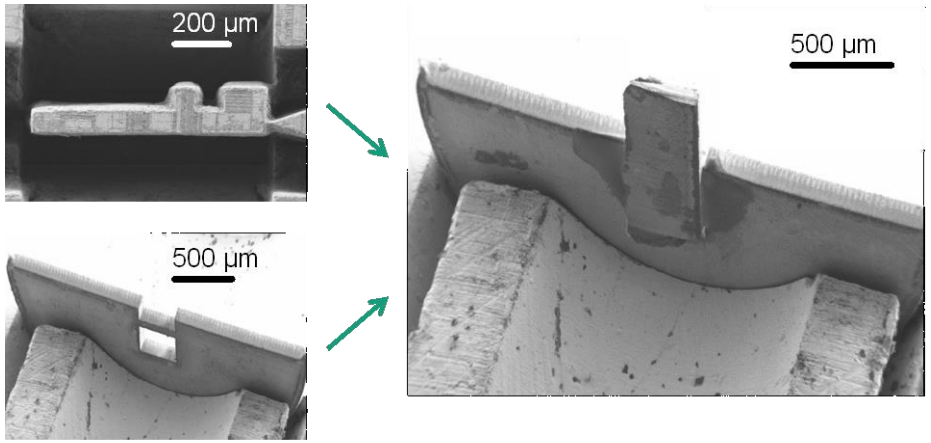
Advanced Packaging, Surgical (Excavation)

- XL Chunk™ holder









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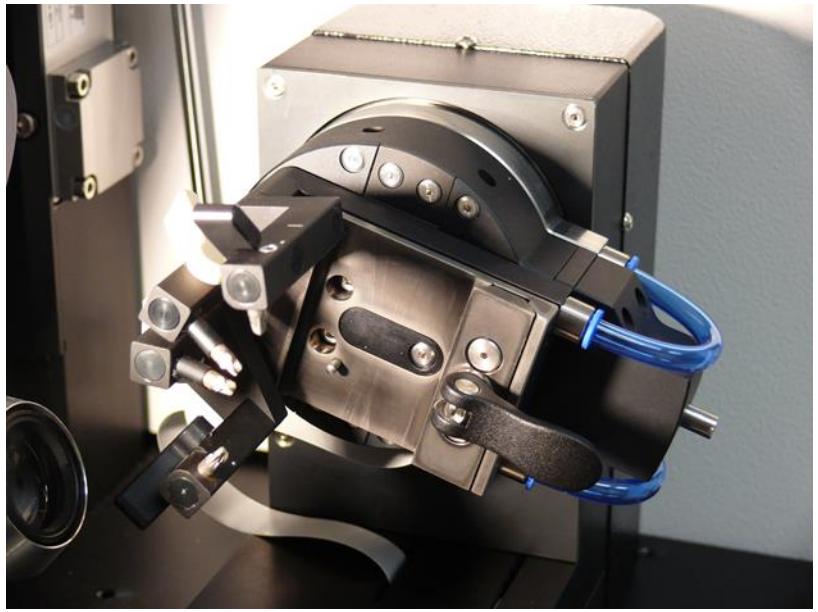
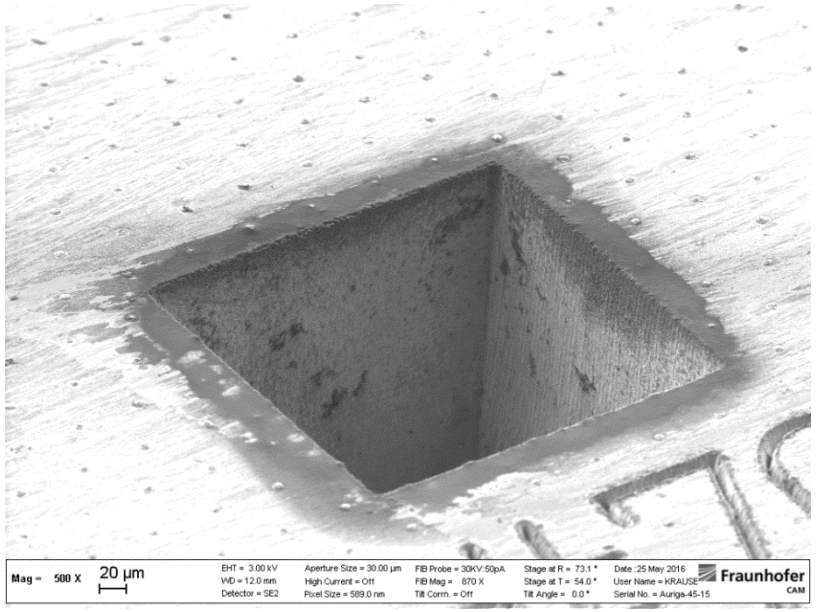
Advanced Packaging, Surgical (Excavation)



tilting

rotating



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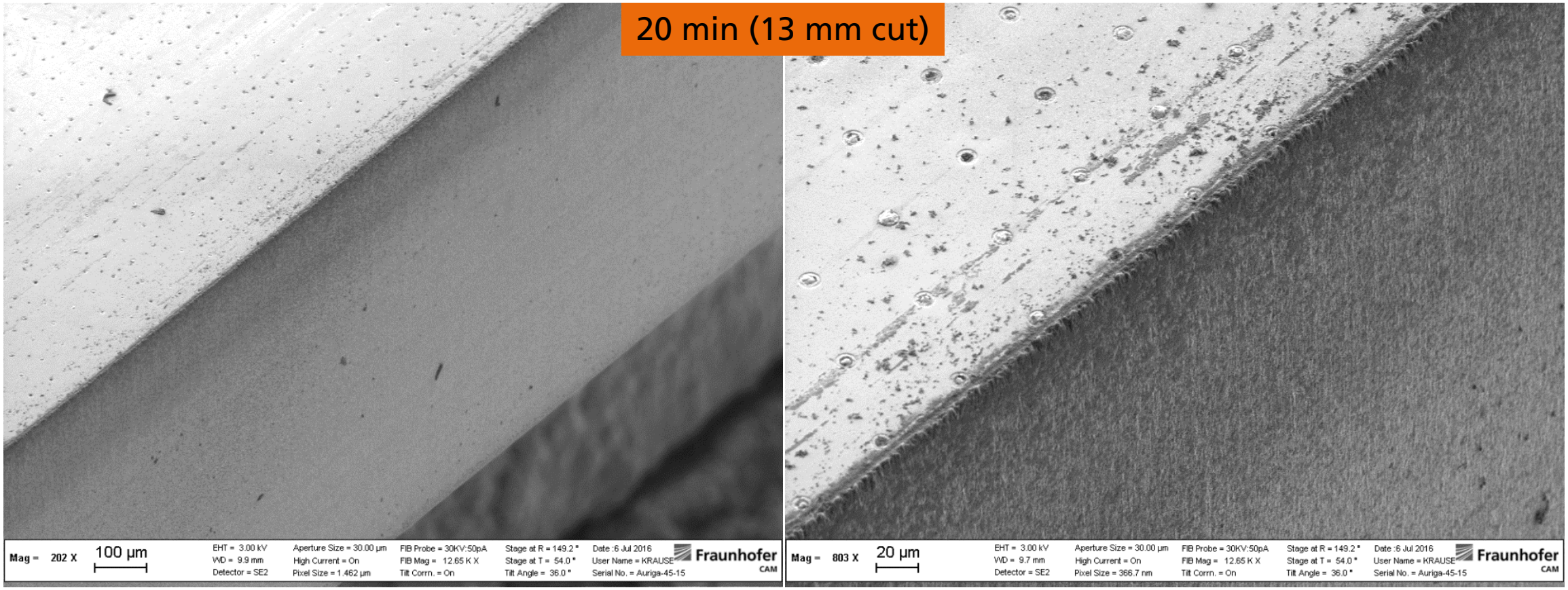
Advanced Packaging, High-Throughput (Cutting)



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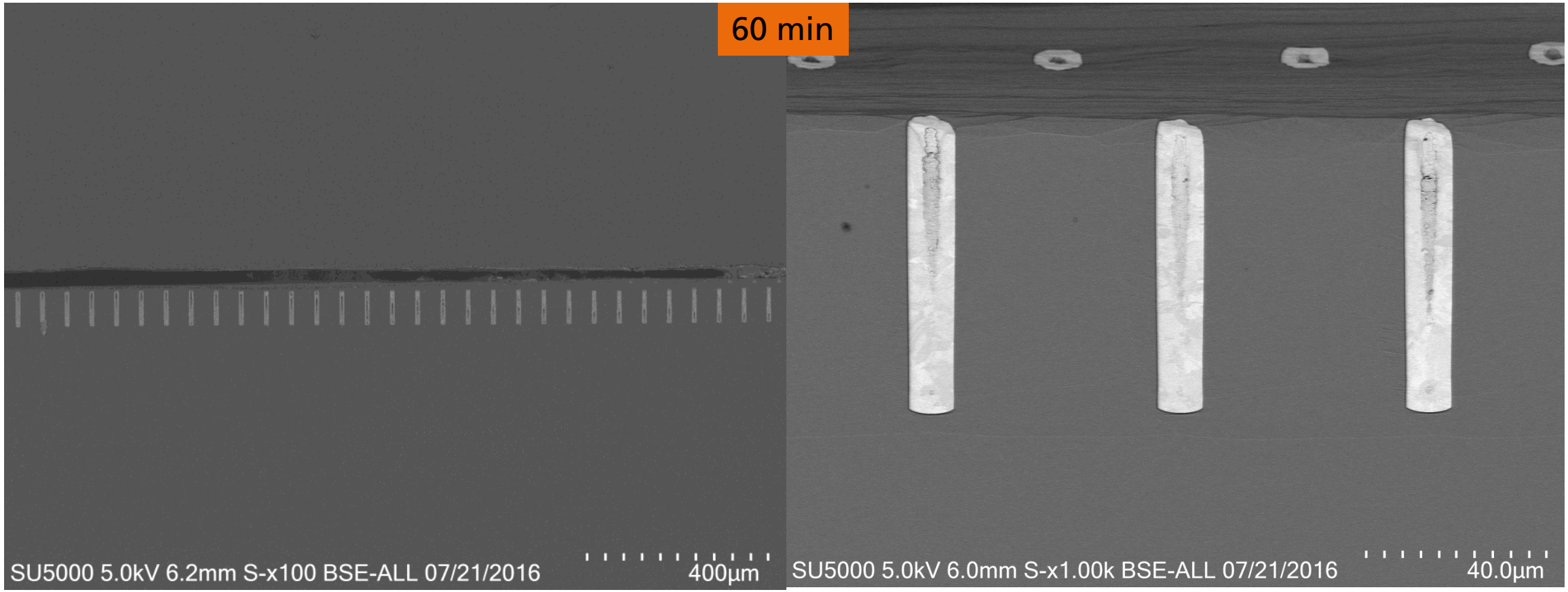
microPREP™

Advanced Packaging, High-Throughput (Cutting)



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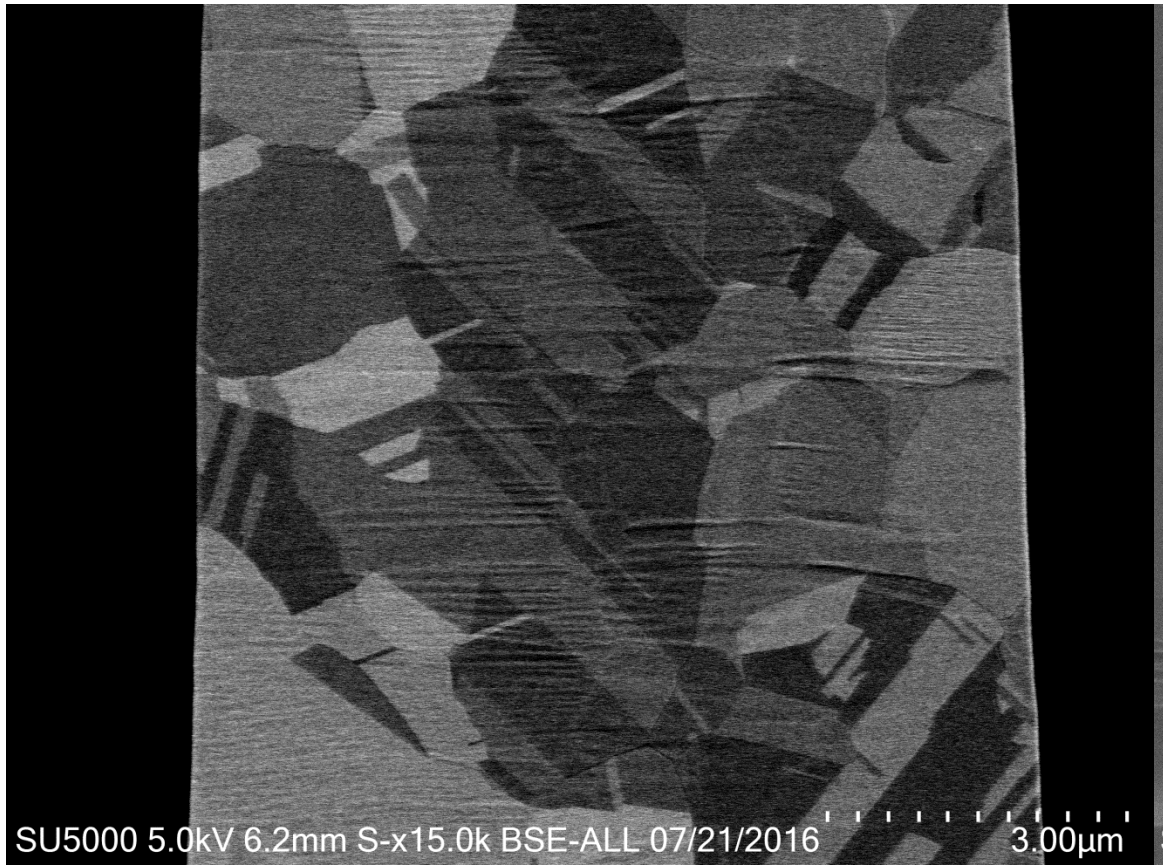
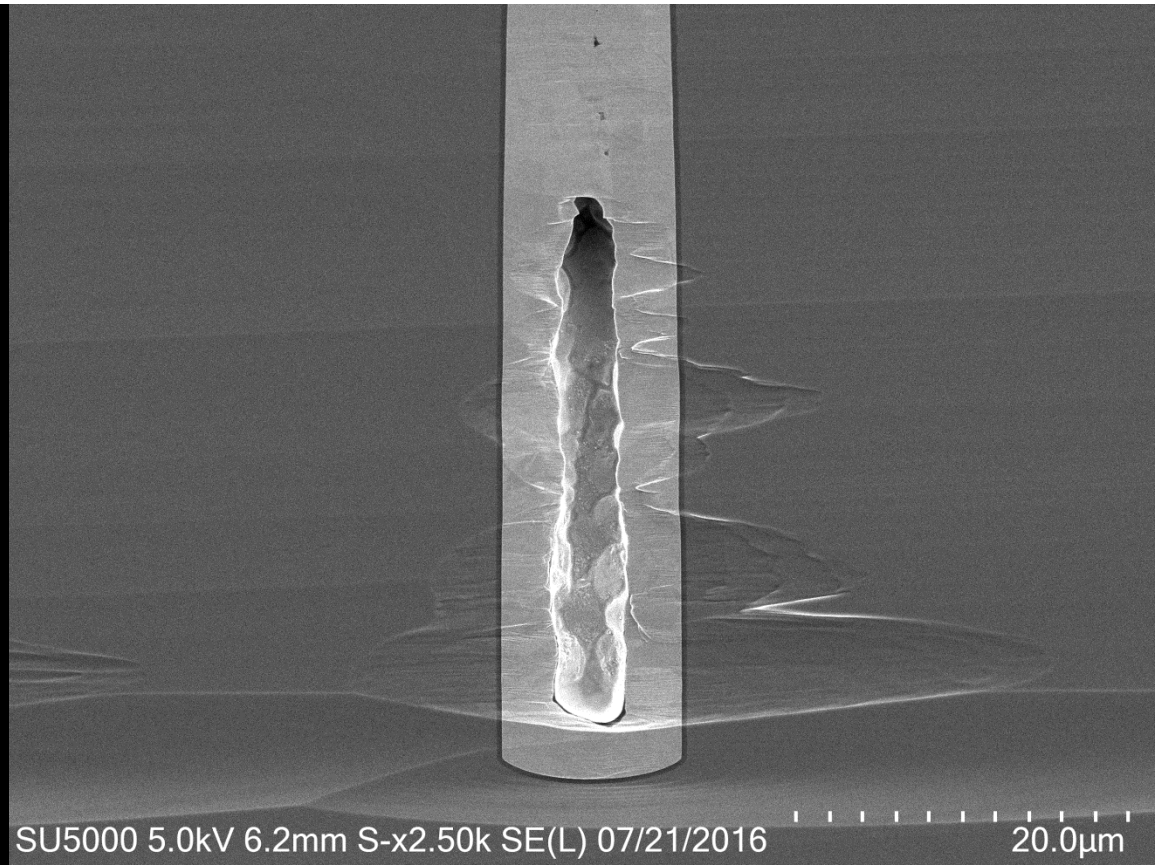
Advanced Packaging, High-Throughput (Cutting)





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microPREP™
Advanced Packaging - Conclusions

- microPREP™ to speed up preparation by orders of magnitude.
- Applicable to all (including at-the-wavelength-of-laser transparent) materials.
- Laser-affected zone precisely controlled.
- Positioning of the laser to less than within 2-3 µm.
- Minimal cross-contamination of ion-beam-erosion tools.

- Harmonized workflows with PECS to facilitate prep for advanced packaging.

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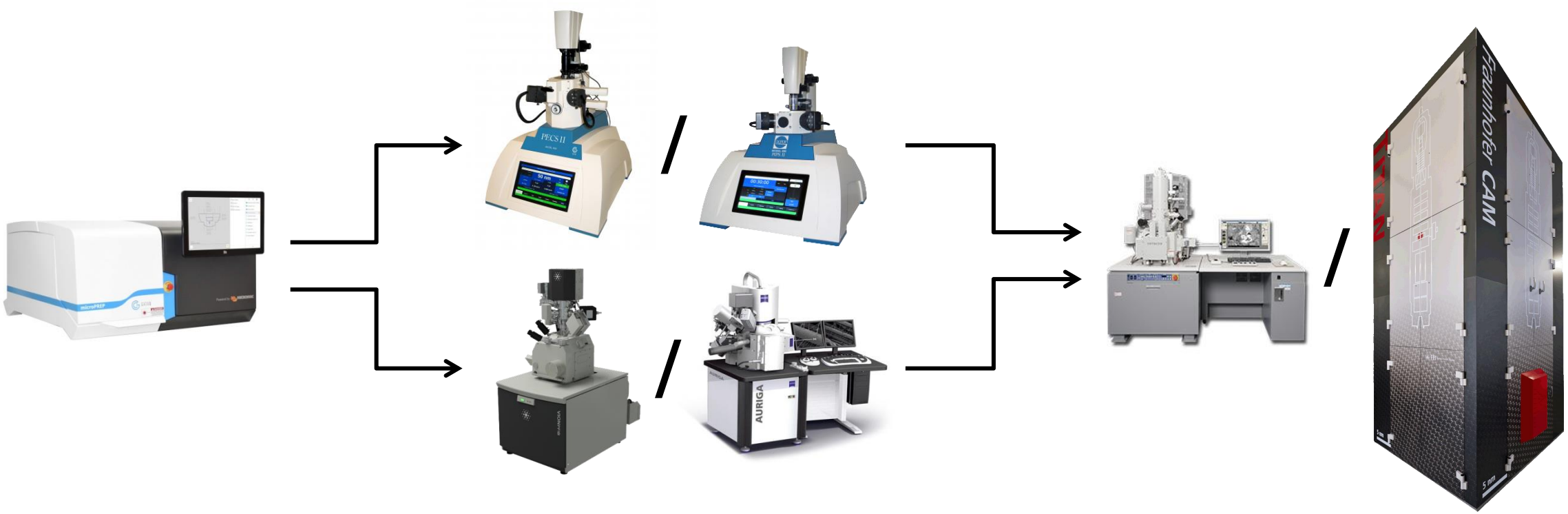
microPREP™
A Versatile Plattform



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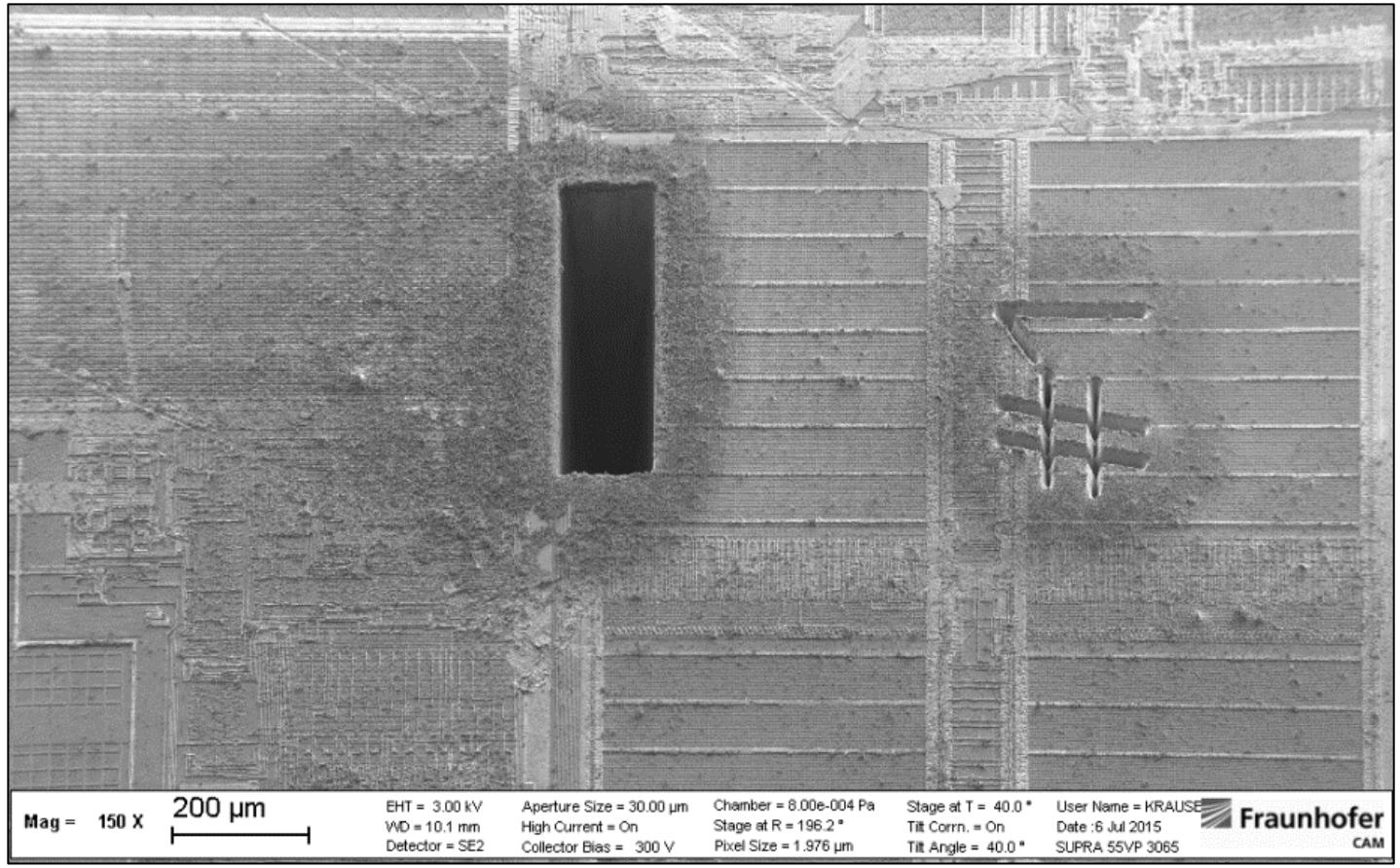
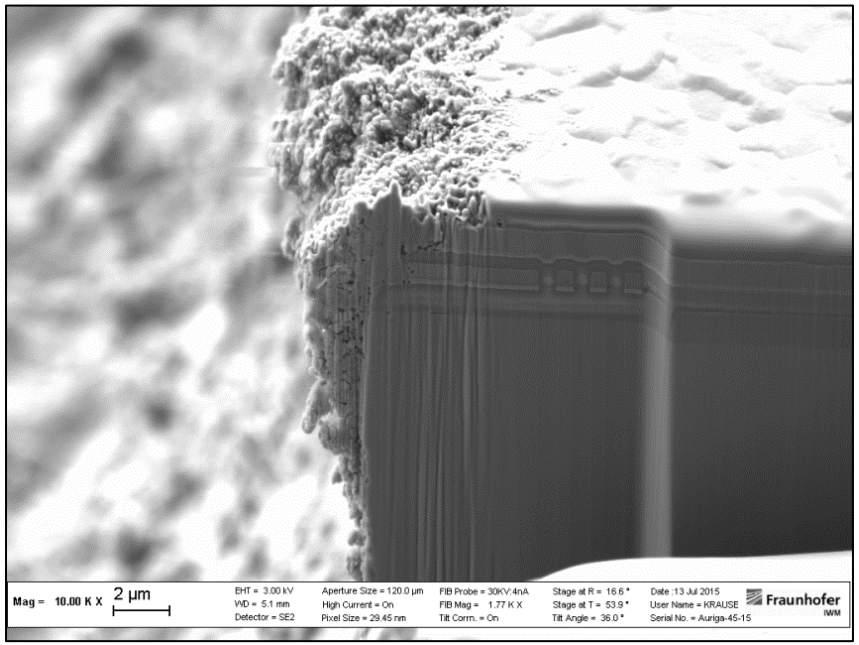
microPREP™
Standard Cleanliness/Damage





- Debris, courtaining
- Rounded flank entrance
- Thermal load to edge

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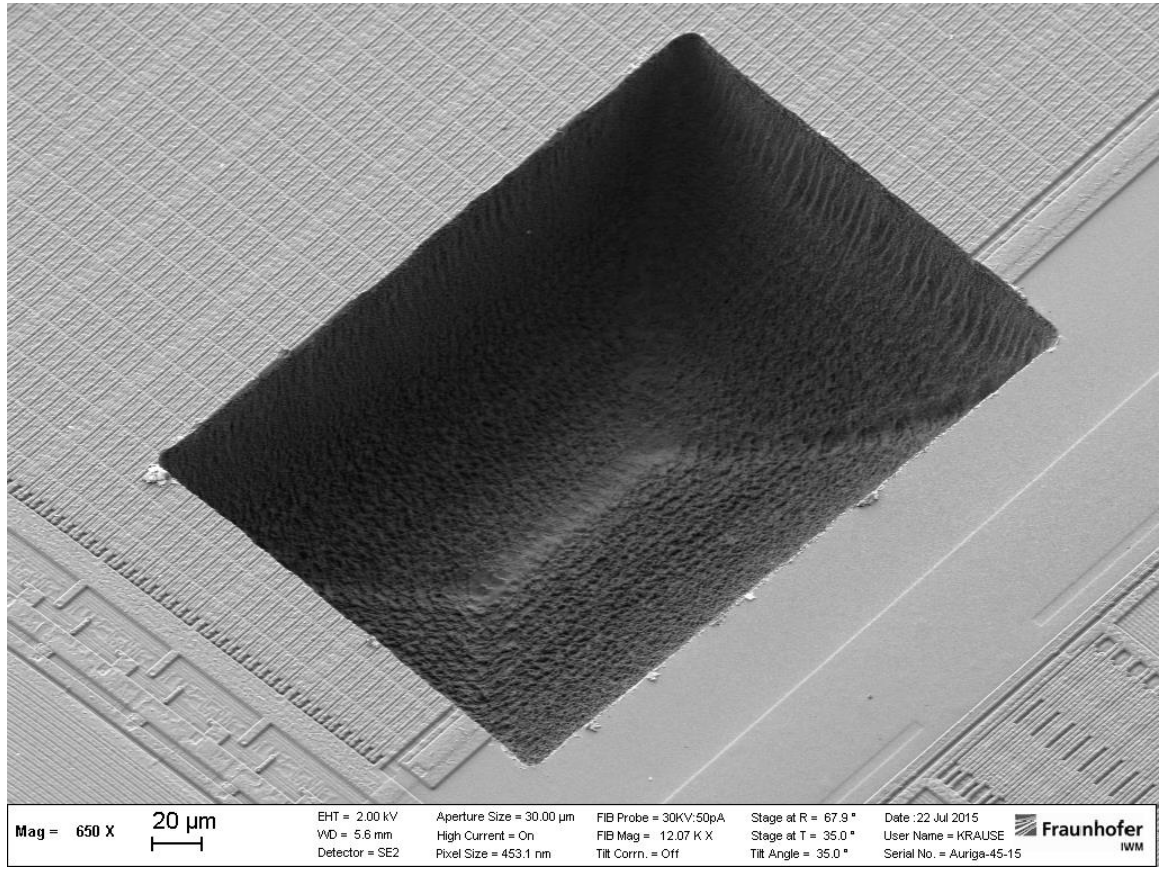
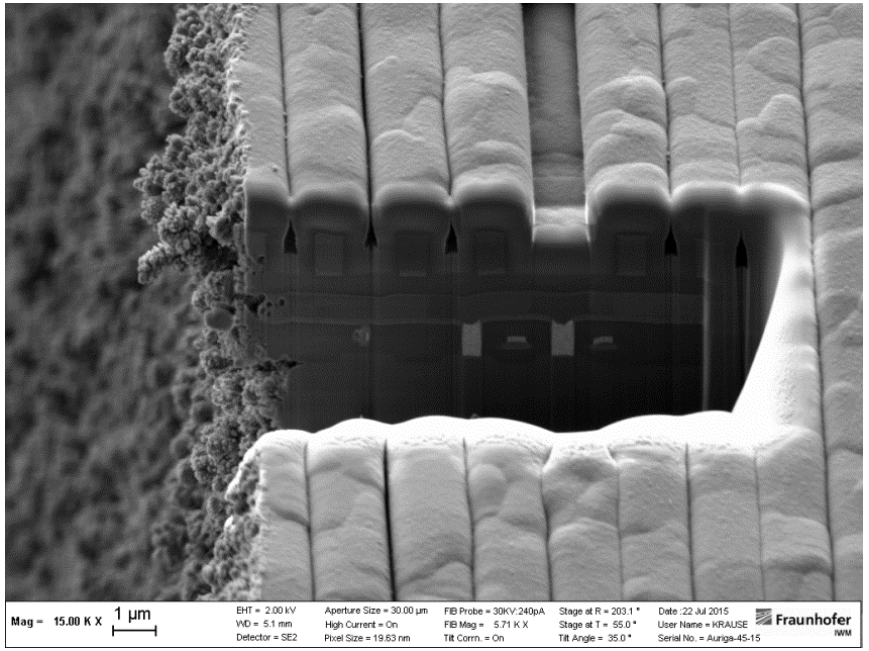
microPREP™
Advanced Cleanliness & Reduced Damage





- No burr, sharp flanks
- Applicable to all materials
- No debris

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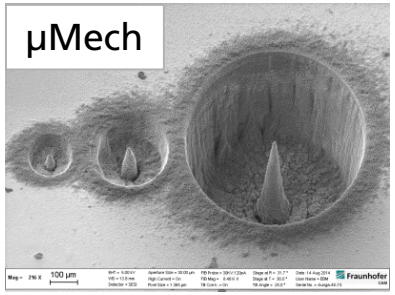
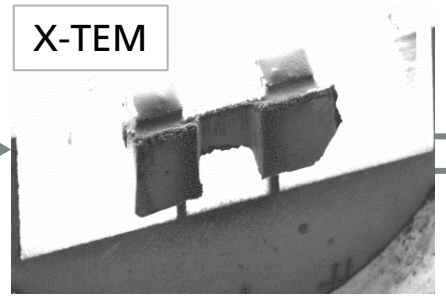
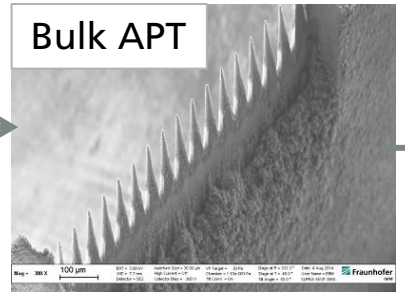
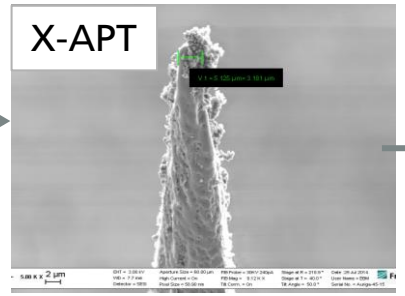
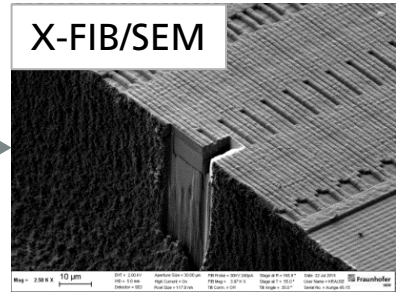
A Versatile Plattform Serving Manifold Workflows

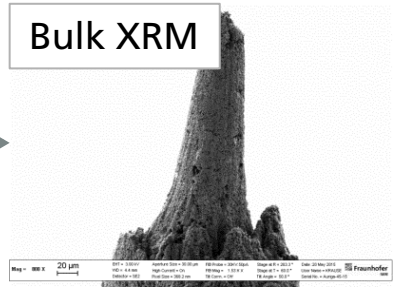


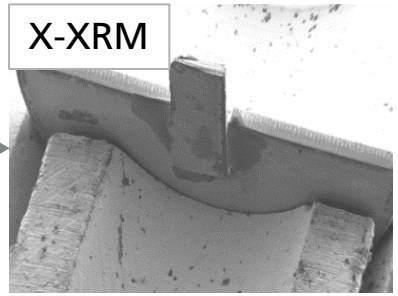












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Come Closer and Have a Look!

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