**The AFSEM™**

**Improved Understanding of Material Behavior using Correlative In-Situ Techniques**

**The AFSEM concept**

AFSEM correlated microscopy

AFSEM is a novel AFM platform specifically designed and developed for integration into other host systems, such as SEM or Dual-beam (SEM/FIB) microscopes. Its open design allows to simultaneously operate SEM/FIB and AFSEM inside the SEM/FIB vacuum chamber.

**Main benefits:**

- Direct 3D information with sub-nanometer resolution
- Correlative Microscopy at highest SEM resolution of exactly the same sample position by SEM/FIB, EDX and AFSEM
- No air exposure of the sample during interactive analysis by different methods
- Nanometer Scale Analysis before SEM sample contamination
- Ease of Use – No AFM laser alignment due to self-sensing cantilever technology
- AFSEM accepts any Sample the host system accepts

**Self-Sensing Cantilever Technology**

<table>
<thead>
<tr>
<th>Static Modes (soft)</th>
<th>Dynamic Modes (stiff)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 x 110 µm²</td>
<td>100 x 45 µm²</td>
</tr>
<tr>
<td>70 x 35 µm²</td>
<td>50 µm</td>
</tr>
</tbody>
</table>

Electrical Noise Level of 0.32 Å for Self-Sensing Cantilever equals Optical Noise Level


**In-Situ Micro-Mechanical Testing**

Combine SEM, tensile stage and AFSEM

Observe sample changes with SEM, measure details with AFSEM

**Correlative Nano-indentation Analysis**

Combine SEM, nano-indentor and AFSEM for correlative in-situ experiments

- Investigate evolution of slip-step dynamics with sub-nanometer resolution
- Analyze your sample before SEM contamination or oxidation effects
- Quantify the number of emitted dislocations exactly at the area of interest


**Mechanical Testing of Flexible Electronics**

Combine SEM, AFM and in-situ 4-point-probe measurements to study flexible electronics during straining

Measure in-situ 3D-topography AND conductivity

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