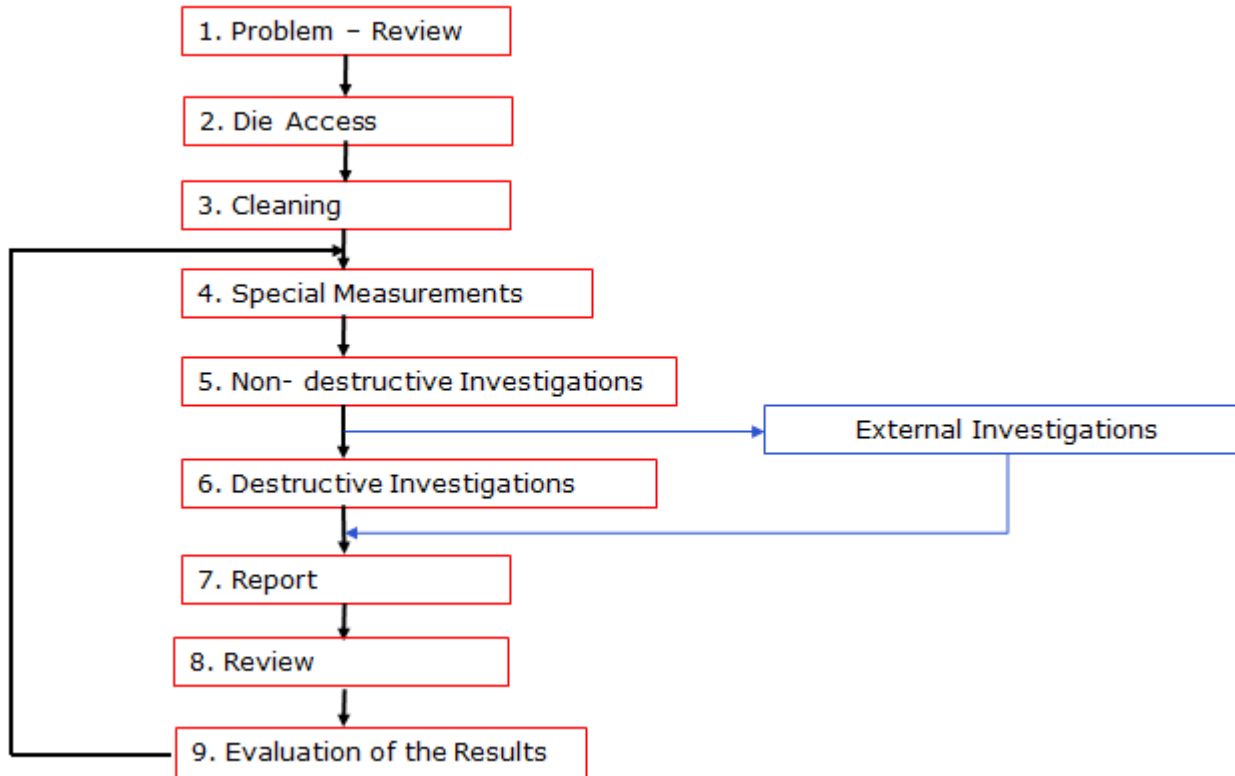




Failure Analysis Capabilities

Generic Failure Analysis Flow



Capability	Available in-house at X-FAB	Access through external lab
Sample preparation	<ul style="list-style-type: none">• Decapsulation• Cross Section• Wafer Cleaving• Micro Cleaving• Sawing• Wet Etch Delayering• Parallel Polishing• Ion Polishing• Sputter Coating• FIB Modification• STEM Lamella Preparation• Sample Cleaning	<ul style="list-style-type: none">• Decapsulation (adv. techniques)• Assembly• Plasma FIB

Capability	Available in-house at X-FAB	Access through external lab
<p>Physical failure / material analytics (Combination with environmental stress tests possible)</p>	<ul style="list-style-type: none">• IR/VIS/UV Microscopy• Laser Scanning Microscopy (LSM)• Focused Ion Beam (FIB)• Scanning Electron Microscopy (SEM)• Scanning Transmission Electron Microscopy (STEM)• Transmission Electron Microscopy (TEM)• Energy Dispersive X-ray Spectroscopy (EDX)• Secondary Ion Mass Spectroscopy (SIMS)• Electron Beam (EBSD)	<ul style="list-style-type: none">• X-ray Microscopy• Scanning Acoustic Microscopy (SAM)• Transmission Electron Microscopy (TEM)• Atomic Force Microscopy (AFM)• Energy Dispersive X-ray Spectroscopy (EDX)• Secondary Ion Mass Spectroscopy (SIMS, TOF-SIMS)• Auger Electron Spectroscopy (AES)• X-ray Fluorescence Spectroscopy (IXRF)• Liquid Crystal Analysis (LCA)• Vapor Phase Decomposition (VPD-ICPMS, VPD-TXRF)

Capability	Available in-house at X-FAB	Access through external lab
<p>Electrical failure analytics</p> <p>(Combination with environmental stress tests possible)</p>	<ul style="list-style-type: none">• Electrical Characterization<ul style="list-style-type: none">• Micro Probing• Nano Probing• Electron Beam (EBIC/EBAC)• Voltage Contrast	<ul style="list-style-type: none">• Optical Beam Induced Resistivity Change (OBIRCH)• Emission Microscopy (EMMI)• Lock-In Thermography (LIT)• Spreading Resistance