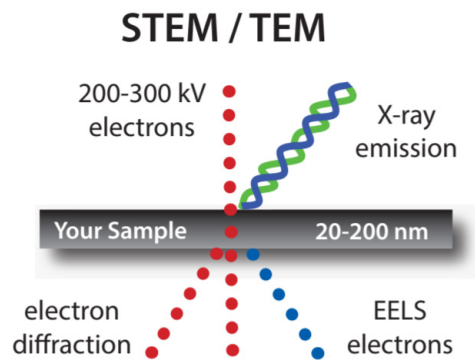


TECHNIQUE NOTE

TEM / STEM EELS / EDS: Atomic Scale Imaging Nanometer Scale Chemistry

OVERVIEW

- Electrons IN - Electrons OUT
- Electrons IN - X-rays OUT
- EELS, EDS, e-Diffraction
- EELS/EDS Detection Limit: > 1 atom %
- Smallest EELS/EDS Area: 1 nm
- Spatial Resolution: < 0.2 nm
- Includes Images & Report
- Sample Thickness: 20-200 nm



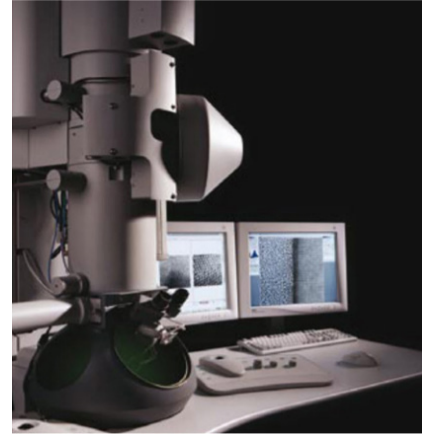
STRENGTHS / ADVANTAGES

- Fast turn (2 day) TEM prep & imaging
- 0.16 nm STEM resolution
- 0.17 nm TEM point resolution
- 11 Mega-pixel CCD camera
- Electron diffraction
- Analytical TEM with EDS & EELS
- Advanced image processing

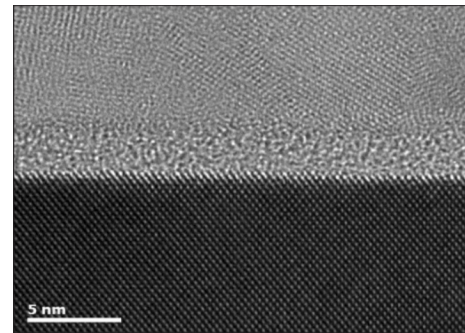
EQUIPMENT

- FEI Tecnai TF-30 HR-STEM
- JEOL 3010 HR-TEM
- GIF Quantum SE - EFTEM & EELS
- Oxford X-MAX EDS - SDD 80 mm²
- FEI Helios 450 with Omni-Probe lift-out
- Gatan Orius SC 1000 11 Mega-pixel camera
- BF, DF & HAADF detectors

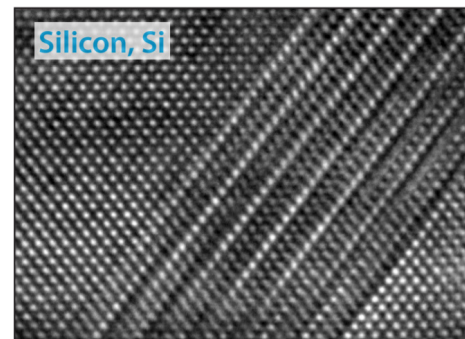
NanoLab's State-Of-The-Art 'TEM'



High Resolution TEM (CMOS Gate Oxide)

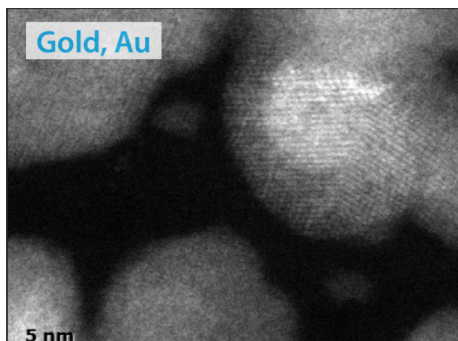


High Resolution TEM - Stacking Faults

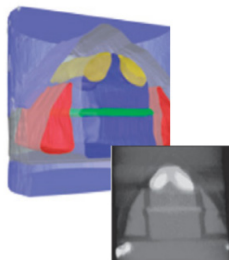
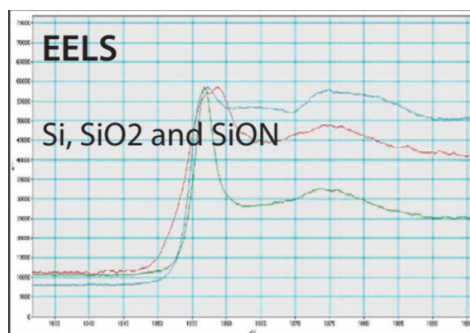
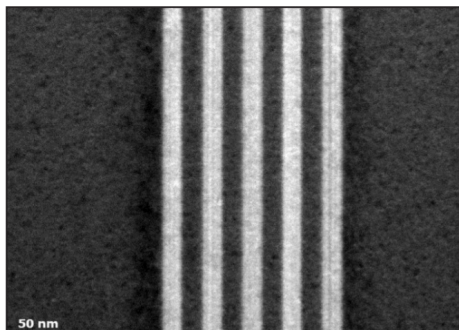


TEM / STEM EELS / EDS: Atomic Scale Imaging Nanometer Scale Chemistry

High Resolution STEM - Atomic Resolution



HAADF STEM - Z Contrast (LED MQW's)



ROUTINE ANALYSES

- High resolution STEM imaging
- High resolution TEM imaging
- STEM-EELS spectra imaging
- STEM-EDS spectra imaging
- Electron diffraction
- Nano-beam electron diffraction
- Tomographic tilting series
- Energy-filtered TEM element mapping
- Energy-filtered TEM imaging

ADVANCED ANALYSES

- Specialty work? - Give us a call.

GLOBAL USES

- Materials development
- Problem solving
- Failure analysis
- Reverse engineering
- IP verification

APPLICATIONS

- Nano-electronics
 - GOX thickness
 - Gate length
 - Killer pores
 - Defect analysis
 - Cu adhesion barrier
- Catalysts
- Ceramics
- Compound semiconductors
- Nano-biology
- Many more - let's talk.

SAMPLE PREPARATIONS

- Dual-Beam FIB - UHR
- General or site specific
- In-situ lift-out after FIB
- Mechanical preparation
 - Wedge polishing
 - Plan-view prep
- Advanced treatments - let us help with your special needs.