

CEDT Equipment List: Characterization Lab

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Characterization Lab – JHE 317

FT-IR Spectrometer - Vacuum (Bruker Vertex 80V)

Description:

- High-resolution vacuum Fourier-transform infrared (FT-IR) spectrometer for molecular and thin-film spectral characterization across the UV to THz bands.
- Applications: cell imaging, pharmaceuticals, semiconductors, surface characterization, emissivity studies

Details:

- Spectral detection range: from THz to UV wavelengths (12,000 to 20 cm^{-1})
- Integrated detector hardware: broadband deuterated l-alanine doped triglycine sulfate (DLaTGS) assembly
- Instrument optical resolution: down to 0.06 cm^{-1}
- Interferometer assembly type: UltraScan high-resolution mirror drive system
- Optical bench housing: benchtop Al housing equipped with 5 exit and 2 remotely switchable input beam ports
- Internal excitation hardware: air-cooled internal and water-cooled high-power external radiation sources

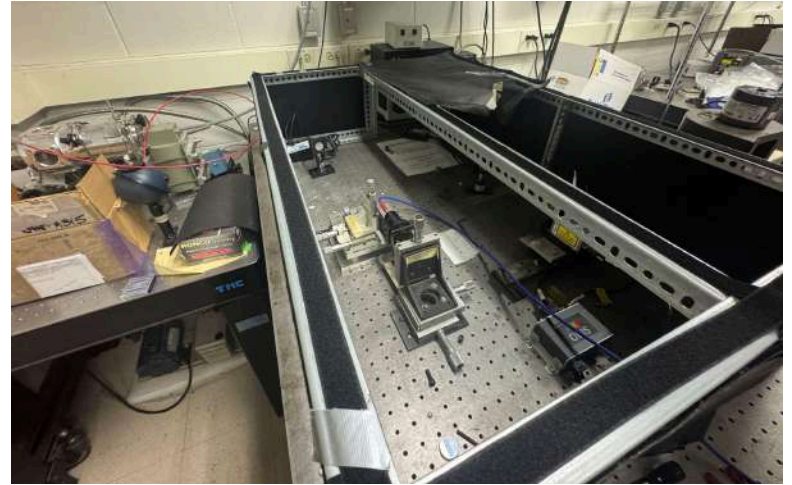


Photoluminescence System**

Description:

- Set-up for room-temperature photoluminescence (RTPL) used for characterization of Si-based thin films. Equipped with Coherent OBIS 375 nm He-Cd diode laser with max power of 50 mW, Ocean Optics USB2000+ charge-couple device (CCD) spectrometer, mirror, sample holder, filter, analog/digital converter, and computer. Software utilized are the Coherent OBIS Laser Controller and Coherent Connection package for power control and OoIrad from Ocean Optics for data analysis

** This equipment belongs to Dr. Peter Mascher. For inquiries, please contact him at mascher@mcmaster.ca



Spectroscopic Ellipsometer - Variable Angle (J.A. Woollam IR-VASE)**

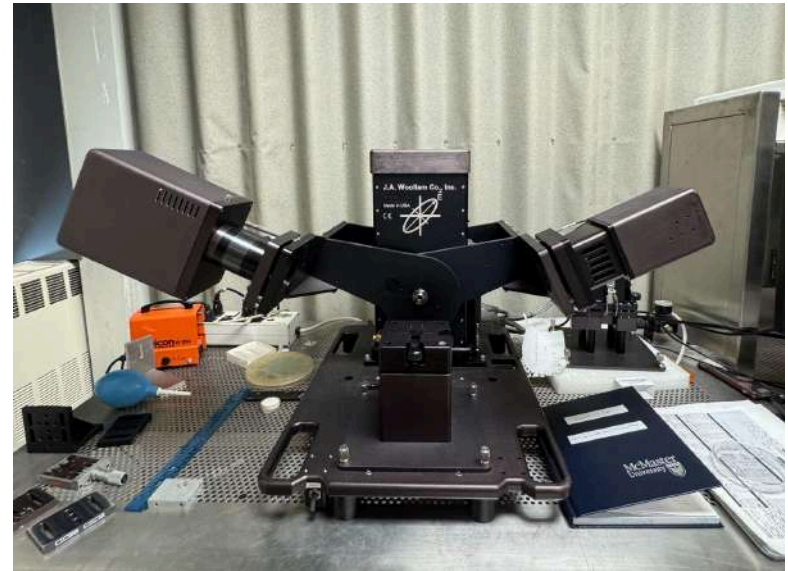
Description:

- Variable-angle spectroscopic ellipsometer for characterization of thin-film optical properties including thickness, refractive index, and extinction coefficient across ultraviolet, visible, and near-infrared wavelengths.

Details:

- Spectral range: 140–1100 nm (UV-Vis-NIR)
- Angle of incidence range: 10°–90° for 140–310 nm; 25°–90° above 310 nm
- Angular resolution/accuracy: down to 0.01°
- System components: M-2000UI optical engine, EC-400 electronics controller, and HTC-100 temperature controller
- Thermal measurement hardware: integrated heating controller for temperature-dependent characterization

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Sputter Deposition System - Compact Research Coater (Torr International CRC-600)

Description:

- Compact tabletop sputtering system designed for thin-film deposition. Features a DC/RF-compatible planar magnetron sputtering source and turbomolecular high-vacuum pumping.

Details:

- Target material compatibility: Al, Cr, Au, Ag, Ti, SiO₂, and ITO
- Substrate size: 150 mm stage supporting up to 150 mm (6") diameter wafers
- Vacuum chamber geometry: 300 mm electropolished stainless steel chamber
- Vacuum viewing port: 100 mm (4") front access viewport with manual shutters
- Deposition monitoring: integrated quartz crystal microbalance thickness sensor and mass flow controller

