

## Optical measurement equipment:

- **Variable angle spectroscopic ellipsometer RC2:**

- Wavelength Range: 210-1690 nm;
- Angles of Incidence: 20°-90° ( $\pm 0.02^\circ$ ) (Vertical automated angle base);

**Measurement capabilities:**

- Spectroscopic Ellipsometry (SE), Psi ( $\pm 0.03^\circ$ )\* and Delta ( $\pm 0.06^\circ$ )\* over their full range;
- Generalized SE, complete 2x2 Jones matrix for anisotropic samples;
- Mueller Matrix SE, all 16 elements ( $\pm 0.005$ )\* of the 4x4 Mueller matrix;
- Depolarization, measure ( $\pm 0.5\%$ )\* and model the non-ideal nature of your sample;
- Intensity, both reflectance and transmittance, including anisotropic terms such as like-and cross-polarized intensities. (\* acquisition time 10 seconds)

**Accessories:**

- Camera with display to view spot location on sample.
- Focussing to 200  $\mu\text{m}$  beam diameter.
- Focussing to 400  $\mu\text{m}$  beam diameter.

- **Fourier-transform infrared spectrometer (FT-IR) Vertex 70v (Bruker) with PMA 50 Polarization modulation accessory:**

- Wavelength range: 12000 – 30  $\text{cm}^{-1}$  (resolution 0.2  $\text{cm}^{-1}$ );
- RAM II module equipped with 0.5 W power Nd:YAG (1064 nm) laser.

**Accessories:**

- 11° Combined transmission and specular reflection accessory;
- Variable angle reflection accessory;
- Automatic rotational holder for polarizers (Polyethylen and KRS-5);
- Standard transmission sampling kit;
- Horizontal ATR (ZnSe);
- Diffuse reflectance accessory;
- 30 degree specular reflectance accessory.

- **Shimadzu UV-VIS-NIR Spectrophotometer UV-3600:**

- Transmittance and reflectance
- Wavelength range of 185 to 3,300 nm
- Wavelength accuracy : Visible/ Ultraviolet region  $\pm 0.2$  nm, Near-infrared region  $\pm 0.32$  nm
- Absorbance range -6Abs to +6Abs, Accuracy within  $\pm 0.003$  Abs (1.0Abs)/  $\pm 0.002$  Abs (0.5 Abs), Drift 0.0002 Abs/h.
- Kinetics
- Accessories: MPC-3100 Multi-Purpose Large-Sample Compartment (built-in integrating sphere, Wide wavelength range : 240 ~ 2600 nm, Maximum sample size : Transmission 305 mm dia. ~50 mm thick or 204 mm dia. ~300 mm long. Reflection 305 mm dia. ~50 mm thick)

- **Low-temperature (3-300 K) modulation spectroscopy setup:**

- photoluminescence and photoluminescence excitation
- Spectroscopic range 200 nm (UV) - 2500 nm (NIR)
- Resolution: <1 nm
- Sensitivity for the modulation spectroscopy: Delta R/R  $\sim 10E-4$  -  $10E-5$ .
- Various CW and pulsed excitation/modulation sources available (266, 355, 473, 532, 633, 657 nm) to excite for luminescence and probe different depth of a sample.