Woollam M2000XI Spectroscopic Ellipsometer

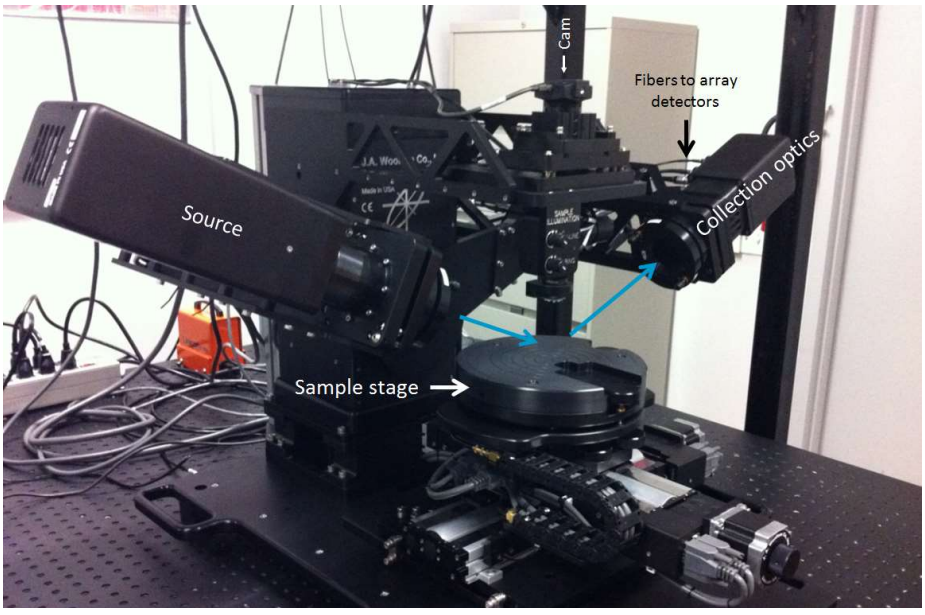
Instrument managed by Prof. Pieter G. Kik, x34622, kik@creol.ucf.edu

Basic system capabilities

- determination of film thickness, refractive index (n and κ accuracy ~0.001)
- spectral range 0.24um - 1.7um, spectral resolution 5nm (UV-VIS) to 10nm (NIR)
- full spectral measurements in under 5 seconds (single spot)
- automated variable angle measurements, automated sample mapping, area 6" x 6"
- Unfocused spot size ~2.5 x 4 mm (typical), focused spot size ~100 μm diameter

Sample requirements

- The sample should **not leave residue or be chemically aggressive**. If it is, use a suitable sample holder to make sure the sample stage does not get contaminated.
- Samples should have an **optically flat surface** across a ~2 × 2 mm^2 area.
- For thick transparent samples or thin films on transparent substrates, the **sample backside should be rough** if possible, to minimize the contribution of backside reflections to the signal. Example: for NIR measurements on Si wafers, use a single-side polished wafer
- For films on substrates, bring an identical **uncoated substrate for reference**. This will greatly help the modeling. Similarly, for multilayer samples, consider bringing reference samples that only have representative single layers of the same material. Fitting many unknowns at once is difficult, so having simple samples to build understanding of the optical properties is helpful.
- The sample surface **should not have significant variations in tilt across the surface**. Smooth but curved samples or faceted samples can pose a problem since (a) the angle of incidence is ill-defined, and (b) part of the reflected beam may not reach the collection aperture.



M2000 mapping variable angle spectroscopic ellipsometer