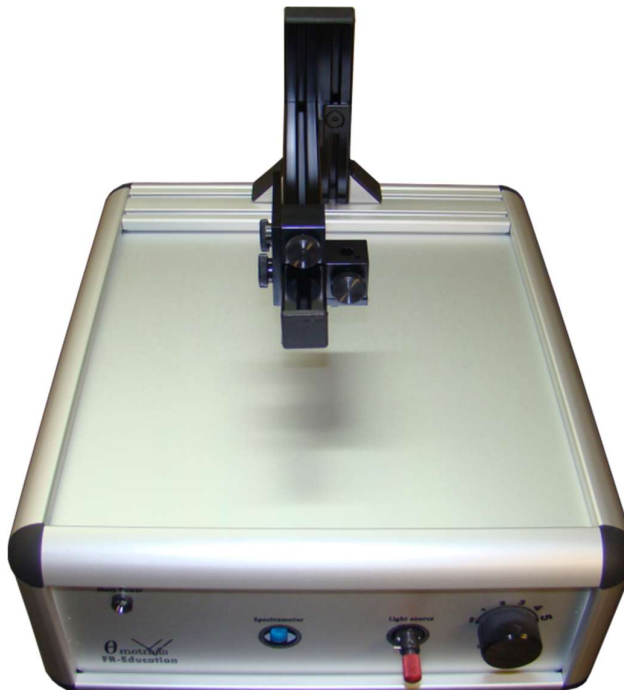


FR-Education: Film characterization for University educational labs

FR-Education is a table-top optical instrument for non-destructive measurement of **film thickness** and **optical constants** (n & k) of thin and thick films.

It is the ideal tool for **hands-on demonstration** to engineers and scientists of the principles of **optical interference** and their applications on **semiconductor and coating industries**.



FR-Education is ideal for use at under-graduate labs of Universities and comes along with:

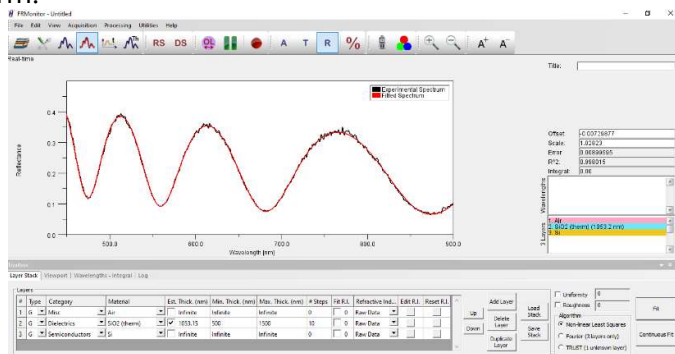
- **Film Thickness kit** for characterization of coatings (Reflection Probe, Reflection Probe Holder, Reference / Calibration Samples)
- **Film/Cuvette holder** for Absorbance / Transmittance measurements
- **Two Fibers** (1m long)
- Dedicated software

Applications

- Universities - R&D labs
- Semiconductors
- Polymer & Resist characterization
- Chemical measurements
- Dielectric characterization
- Hardcoat, Anodization, Metal parts process
- Optical Coating
- non-metal Films
- And more...

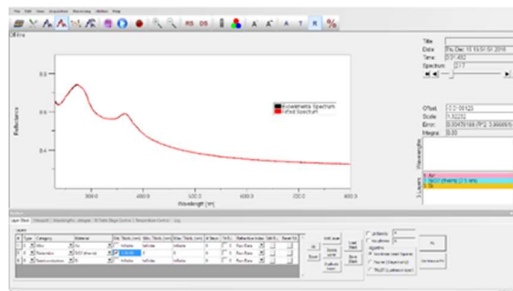
(contact us with your requirements)

This way, several exercises could be designed on the same platform.



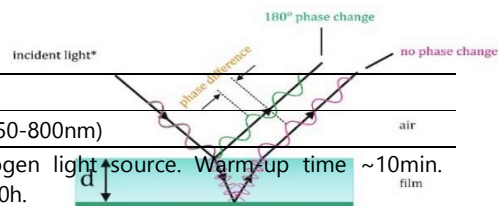
Features

- Single-click analysis (no need for initial guess)
- Dynamic measurements
- Optical parameters (n & k, color) included
- Save videos for presentations
- Multiple installations for off-line analysis
- Free of-charge Software update

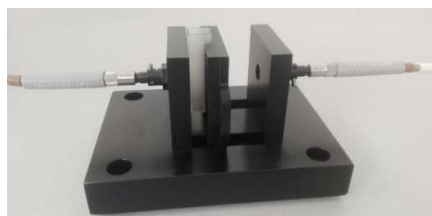


Specifications Principle of Operation

Measurements: Reflectance / Transmittance / Absorbance.
White Light Reflectance Spectroscopy (WLR) measures the amount of light reflected from a film or a multilayer stack over a range of wavelengths, 1024 pixels Si CCD, 12 bit A/D spectrometer (350-800nm) (perpendicular) to the same. Included, software-controlled tungsten halogen light source. Warm up time ~10min. The measured reflectance spectrum, produced by interference from the interfaces is being used to determine the optical constants (n & k), movement for precise positioning of the reflectance probe over the measurement area.
Sample Stage Aluminum Top panel, Reflection probe, Holder with 170mm – 200mm – 145mm (XYZ) manual movement for precise positioning of the reflectance probe over the measurement area.
Sample Size partially/full film (150mm) stack of films.



Reflection probe	Spot size 350microns (diameter), 0.8m long, proprietary design.
Reference Samples	a) Si standard, b) characterized SiO ₂ /Si (Secondary NIST) c) characterized Si ₃ N ₄ /SiO ₂ /Si.
Software	FR-Monitor (32 bit, and 64bit). Win 7, 8, 10.
Etc.	Hardware & Software manual (electronic and hard copies). USB & power cables, Tweezers
Meas Precision	1nm or 1%. Average of standard deviation of mean value over 15 days. Sample: 1micron SiO ₂ on Si wafer.
Refractive Index	All standard refractive index models (Cauchy, Sellmeier, Lorentz). For the measurement of the refractive index of a film, the film should have thickness ≥200nm).
Spot Size	350um (in diameter).
Materials database	650+ materials
Size/Weight/Power	380mm(W) x 320mm(D) 8.0Kg, 110/220V



Film/Cuvette kit

Transmission measurements of films or liquids in standard cuvettes