

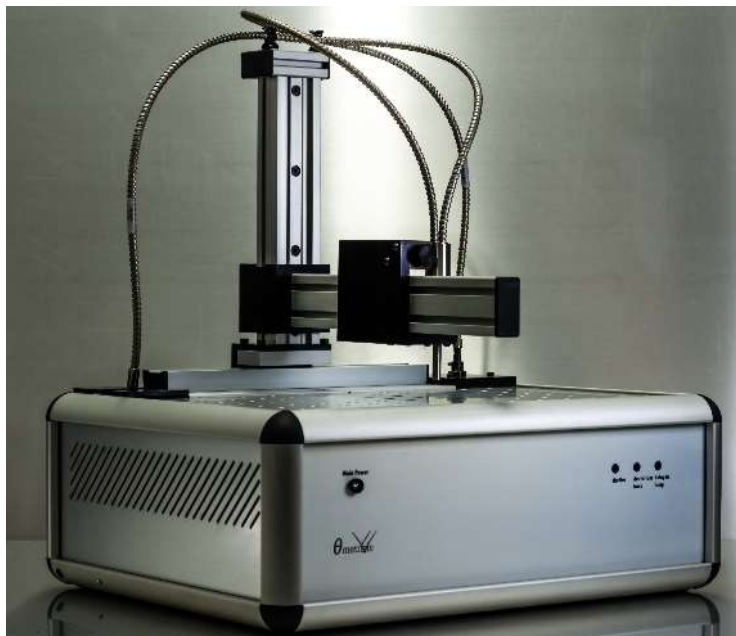
FR-pRo: Build2Order film characterization tool

FR-pRo is a modular & expandable platform for the characterization of coatings in the **1nm-3mm** thickness range. FR-pRo tools are tailored to the user needs for a wide range of diverse applications, such as:
 Film thickness, Refractive Index, Color, Transmittance, Reflectance, Film Characterization under temperature or ambient controlled environment or in liquid environment and many more...

Applications

- Univ. & Research labs
- Semiconductors
- Polymer & Resist characterization
- Chemical measurements
- Dielectric characterizations
- Biomedical
- Hardcoat, Anodization, Metal parts process
- Optical Coating
- non-metal Films
- And many more...

(contact us with your requirements)



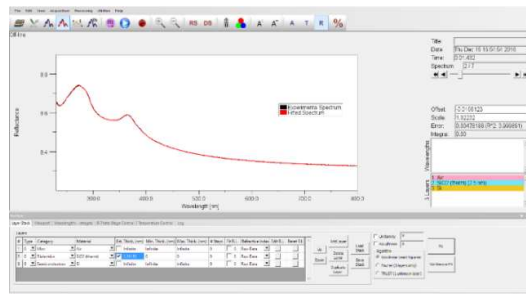
FR-pRo tool is assembled by user selected modules. The Core Unit accommodate the light source, the spectrometer (for any spectral regime in the 200nm-2500nm range) and the control & communication electronics. Then, there is a wide range of Accessories, such as:

- **Film Thickness kit** for characterization of coatings,
- **FR-Mic** for measurements at very small areas,
- **Manual & Motorized stages,**
- **Film/Cuvette Holder** for Absorbance / Transmittance and chemical concentration measurements,
- **Thermal or Liquid kits** for measurements under controlled Temperature or in Liquid environment,
- **Integration Spheres** for diffuse & total reflectance

By the combination of different modules, the final set-up meets any end-user needs

Features

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



FR-pRo Specifications (standard configurations)

Model	UV/Vis	UV/NIR -EXT	UV/NIR-HR	D UV/NIR	VIS/NIR	D Vis/NIR	NIR	NIR-980	NIR-1310	NIR-1550
Spectral Range (nm)	200 – 850	200 –1020	200-1100	200 – 1700	370 –1020	370 – 1700	900 – 1700	900 - 1050	1280-1350	1510-1560
Pixels	3648	3648	3648	3648 & 512	3648	3648 & 512	512	3648	512	512
Thick. range (SiO₂)	1nm – 80um	3nm – 90um	1nm– 120um	1nm – 250um	12nm – 100um	12nm – 250um	50nm–250um	1um–1.2mm	12um-2mm	20um-3mm
Thick. range (Si)								500um (max)	1mm (max)	1.3mm(max)
Min. Thick. for n&k	50nm	50nm	50nm	50nm	100nm	100nm	500nm	-	-	-
Thick. Accuracy ***	1nm or 0.2%	1nm or 0.2%	1nm or 0.2%	1nm or 0.2%	1nm or 0.2%	2nm or 0.2%	3nm or 0.4%	50nm or 0.2%	50nm / 0.2%	50nm /0.2%
Thick. Precision***	0.02nm	0.02nm	0.02nm	0.02nm	0.02nm	0.02nm	0.1nm	5nm	5nm	5nm
Thickness stability***	0.05nm	0.05nm	0.05nm	0.05nm	0.05nm	0.05nm	0.15nm	5nm	5nm	5nm
Light Source	Internal Balanced Deuterium & Halogen, 2000h (MTBF)				Halogen (internal), 10000h (MTBF)				SLED, 200000h (MTBF)	
Spot size (diameter)	350um (smaller spot size options are available upon request)									
Material Database	> 650 different materials									

Accessories

Computer

Laptop / Touch Panel PC with 19inch screen

Focusing module

Optical module attached on the reflection probe for <100µm diameter spot size

Film/Cuvette kit

Transmission measurements of films or liquids in standard cuvettes

Contact probe

Thickness & optical measurements of coatings in the field. Ideal for curved surfaces

Microscope

Microscope-based reflectance and thickness measurements with high lateral resolution

Scanner (motorized)

Polar (R-θ) or Cartesian (X-Y) automated stage with wafer chuck. Reflectance& transmittance

Integrating sphere

For the characterization of specular and diffuse reflectance of coatings and surfaces

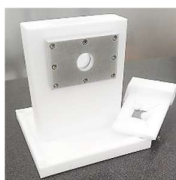
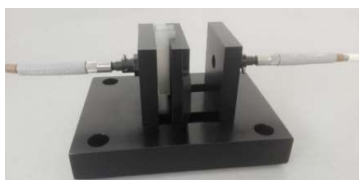
Manual X-Y stage

Manual X-Y stage for measurements over an area of 100mm x 100mm or 200mm x 200mm

Thermal Module

Computer controlled Hot plate embedded in the FR-tool (Room temperature - 200°C, 0.1°C acc.)

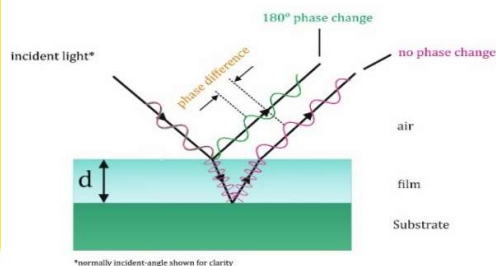
And Many more.....



Principle of Operation

White Light Reflectance Spectroscopy (WLRs) measures the amount of light reflected from a film or a multilayer stack over a spectral range, with the incident light normal (perpendicular) to the sample surface.

The measured reflectance spectrum, produced by interference from the individual interfaces is being used to determine the thickness, optical constants (n & k), etc. of free-standing and supported (on transparent or partially/fully reflective substrates) stack of films.



* Specifications are subject to change without any notice; ** Thickness measurements range is representative of the spectra range and refers to a single film layer with refractive index ~1.5 over a high reflective substrate