

POLOS[®] FR-ES

FR-ES is a compact and light-weighted unit for the characterization of coatings. With FR-ES the user can perform reflectance and transmittance measurements in the 370 - 1020 nm spectral range. The FR-ES platform is designed to provide an excellent performance in terms of characterization of coatings.



The FR-ES can be employed in a wide range of diverse applications, such as: Film thickness, Refractive Index, Color, Transmittance, Reflectance, and many more. There are three configurations available: VIS/NIR (370 - 1020 nm), NIR-N1 (850 - 1050 nm), NIR (900 - 1700 nm).

Then, there is a wide range of accessories, such as:

- Filters to block light at certain spectral regimes
- FR-Mic for measurements at very small areas
- Manual stage, either 25 x 25 mm or 100 x 100 mm or 200 x 200 mm
- Film/Cuvette Holder for Absorbance / Transmittance and chemical concentration measurements
- Integration Spheres for diffuse & total reflectance

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

APPLICATIONS

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

FEATURES

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

PRINCIPLE OF OPERATION

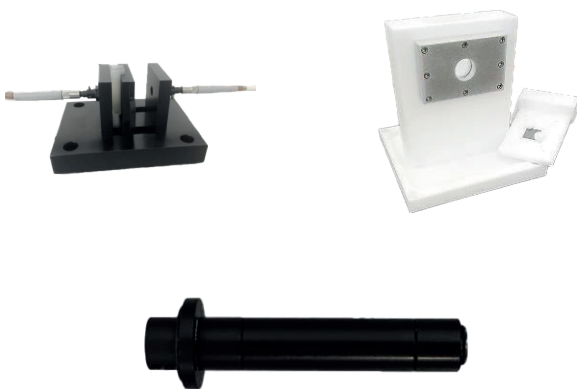
White Light Reflectance Spectroscopy (WLRS) measures the amount of light reflected from a film or a multilayer stack over a spectral range, with the incident light normal (perpendicular) to the sample surface.

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.



ACCESSORIES

- Focusing module: Optical module attached on the reflection probe for <math><100\ \mu\text{m}</math> diameter spot size
- Transmittance module: Optical module for transmittance/ absorbance measurements
- 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
- Manual X-Y stage: Manual X-Y stage for measurements over an area of 25 x 25 mm or 100 x 100 mm or 200 x 200 mm



MODEL	VIS/ NIR	NIR	NIR-N1
Spectral Range (nm)	370 - 1020	900 - 1700	850 - 1050
Pixels	3648	512	3648
Min Thick -SiO ₂	12 nm	50 nm	1 μm
Max Thick -SiO ₂	100 μm	250 μm	500 μm
Max Thick -Si	-	-	300 μm
n&k -Min. Thickness	100 nm	500 nm	-
Thick. Accuracy **	1 nm / 0.2%	3 nm / 0.4%	50 nm / 0.2%
Thick. Precision **	0.05 nm	0.1 nm	-
Thick. stability **	0.05 nm	0.15 nm	-
API support	Yes	-	Yes
Light Source	Halogen (internal), 3000h (MTBF)		
Integration Time	5 msec (min)		
Spot size	Diameter of 350 μm (smaller spot size as option)		
Material Database	> 700 different materials		
Dimensions (cm) / Weight (kg)	20 x 22 x 6 (L x W x H), 1.8 (stage excluded)		
Power	110 V / 230 V, 50-60 Hz, 10 W		

* Specifications are subject to change without any notice;
 ** Thickness range depends on the spectral range and refers to a single layer with refractive index ~1.5 over Si or similar substrate