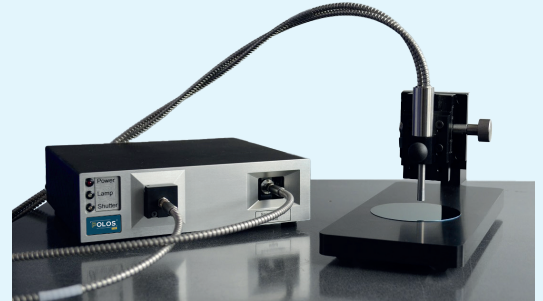


POLOS® FR-ES

FR-ES is a compact and light-weighted unit for the non-destructive characterization of transparent and semi-transparent coatings in a wide thickness range and of thin metallic layers. FR-ES is the ideal configuration for research labs. With FR-ES, the user can perform reflectance and transmittance measurements in various spectral ranges.



FR-ES platform is designed to provide excellent performance in terms of characterization of coatings at a small footprint. It is employed in a wide range of diverse measurement applications: Film thickness, Refractive Index, Color, Transmittance, Reflectance, and many more. There are five FR-ES configurations available: VIS/NIR (380-1020 nm), UV/VIS (200-850 nm), UV/NIR-EXT (200-1000 nm), UV/NIR-HR (190-1100 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.

FILM CHARACTERIZATION

MODEL	VIS/NIR	NIR	NIR-N1	D VIS/ NIR	UV/VIS	UV/NIR- EXT	UV/NIR- HR
Spectral Range (nm)	380 - 1020	900 - 1700	850 - 1050	380 - 1700	200 - 850	200 - 1000	190 - 1100
Pixels	3648	512	3648	3748 & 512	3648	3648	2048
Min Thick -SiO ₂	12 nm	50 nm	1 µm	12 nm	1 nm	1 nm	1 nm
Max Thick -SiO ₂	120 µm	250 µm	500 µm	250 µm	80 µm	90 µm	100 µm
n&k -Min. Thickness	100 nm	500 nm	-	100 nm	50 nm	50 nm	50 nm
Thick. Accuracy ***	2 nm / 0.2%	3 nm / 0.4%	50 nm / 0.2%	2 nm / 0.2%	1 nm / 0.2%	1 nm / 0.2%	1 nm / 0.2%
Thick. Precision***	0.05 nm	0.1 nm	0.1 nm	0.05 nm	-	0.05 nm	-
Thick. stability ***	0.05 nm	0.15 nm	0.15 nm	0.05 nm	-	0.05 nm	-
API support	Yes						
Light Source	Halogen (internal), 3000h (MTBF)				VIS/NIR operation: Halogen (internal), 3000h (MTBF)		
Integration Time	5 msec (min)	0.5 msec (min)	5 msec (min)				1 msec (min)
Spot size	Diameter of ~350 - 400 µm (smaller spot size as option)						
Material Database	> 800 different materials						
Dimensions (cm) / Weight (kg)	FR-ES: 20 x 22 x 6 cm (LxWxH), 1.8 Kg (stage excluded), FR-ES D: 20 x 27 x 12 cm (LxWxH), 3.3 Kg (stage excluded)						
Power	110V/230V, 50-60Hz, 20-50W (LS-2, external light source is excluded)						
SW Characteristics	FR-Monitor v4.0 (free of charge updates)						

* 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

ACCESSORIES

- Focusing module: Optical module attached on the reflection probe for <100 µm 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

