FR-uProbe: the stand-alone tool for applications that require spot size as small as very few microns, e.g. micro-patterned surfaces, samples that exhibit a high level of scattering light and numerous others.

With FR-uProbe, local film thickness, optical constants, reflectance, transmission, and absorbance measurements in Vis/NIR, **is just a matter of a click.**

APPLICATIONS

- **Univ. & Research labs**
- **Semiconductors** (Oxides, Nitrides, Si, Resists, etc.)
- **MEMS devices** (Photoresists, Si membranes, etc.)
- **LED**
- **Data Storage**
- **Anodization**
- **Hard/Soft coatings on curved substrates**
- **Polymer coatings,** adhesives, etc.
- **Biomedical** (parylene, balloon wall thickness, etc.)
- And many more…

FR-uProbe, simply attaches to the C-mount adapter of most commercially available optical microscopes (reflectance and / or transmittance) and provides:

- Real-time spectroscopic measurements at the wavelength range supported by the microscope
- Film thickness, optical properties, non-uniformity measurements
- Imaging with an integrated, USB connected and high-resolution & quality color camera
- Unaffected performance of the microscope itself

The spot size, the area from which the reflectance or trasnmittance signal is collected is defined by the aperture size and objective lens magnification and can be as small as 2µm.

Specifications

	FR-uProbe	FR-uProbe-LC
Microscope	Reflectance/Transmittance trinocular	
Spectral Range (depends on light source)	400nm – 1000nm	400nm – 1000nm
# Pixels	3648	1024
Thickness range (5X, NA 0.12	15nm – 90µm	20nm-50µm
Thickness range (10X, NA0.25	15nm – 80µm	20nm – 35µm
Thickness range (20X, NA 0.40	15nm – 50µm	20nm – 25µm
Thickness range (50X, NA 0.70	15nm – 25µm	20nm – 15µm
Thickness range (80X, NA 0.80		20nm-8µm
Refractive Index calculation	✓ /min. thickness: 100nm	✓ /min. thickness: 200nm
Thickness Accuracy**	0.2% or 2nm	0.3% or 3nm
Thickness Precision**	0.02nm	0.05nm
Thickness stability**	0.05nm	0.07nm
Camera	2M/5M pixels	2M/5M pixels
Working distance	Defined by objective lens	
Internal Light source	Stabilized tungsten halogen, MTBF >3000h with filter holder (OPTIONAL)	
Microscope's Light source	Microscope's light source (tungsten / LED)	
Wavelength resolution	0.8nm	1.5nm
A/D converter	16 bit	
FR-API	YES	NO
Power	USB – (external light source), 110V/230V, 50-60Hz, 20W (internal light source)	
Dimensions	220x160x95mm (Spectrometer) & 227x107x51mm (microscope attachment)	
Material Database	> 850 different materials	
SW Characteristics	FR-Monitor v4.0 (free of charge updates) Full details at related catalog's page	

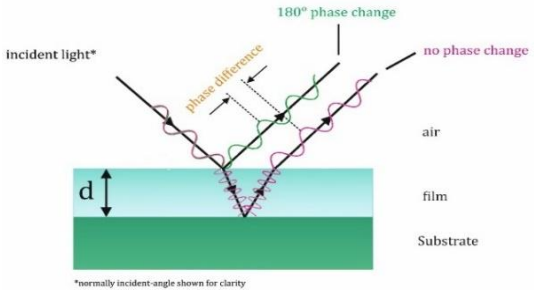
The measurement area (the area from which the reflectance or transmittance signal is collected) is relative to the microscope's objective lens and the FR-uProbe's aperture size. Standard apertures sizes are: 500µm, 250µm, 100µm. Apertures with size 150µm and 50µm are also available upon request.

Objective Lens	Spot Size (µm)		
	500 µm Aperture	**250 µm Aperture**	**100 µm Aperture**
5x	100 µm	50 µm	20 µm
10x	50 µm	25 µm	10 µm
20x	25 µm	14 µm	5 µm
50x	10 µm	5 µm	2 µm

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 range depends on the spectral range and refers to a single layer with refractive index ~1.5 on Si substrate ** Measurements compared with a calibrated spectroscopic ellipsometer and XRD, Average of standard deviation of mean value over 15 days. Sample: 1µm SiO_2 on Si, Standard deviation of 100 thickness measurements. Sample: 1µm SiO_2 on Si, 2*Standard-Deviation of daily average over 15 days. Sample: 1µmicron SiO_2 on Si.