

FR-uProbe: Extend your microscope in a powerful film thickness measurement tool

FR-uProbe is a 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 across UV/Vis/NIR, is just a matter of a click.

Applications

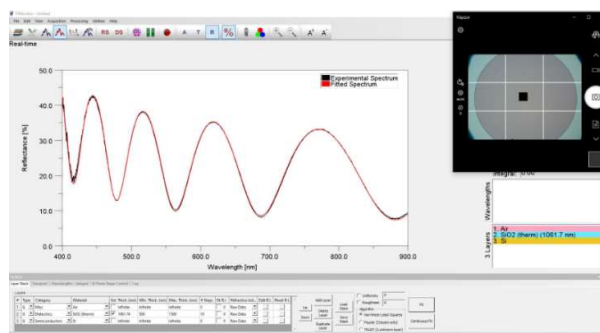
- **Univ. & Research labs**
- **Semiconductors** (Oxides, Nitrides, Si, Resists, etc.)
- **MEMS devices** (Photoresists, Si membranes, etc.)
- **LED**
- **Data Storage**
- **Anodization**
- **Hard/Soft coatings on curved substrates**
- **Polymer coatings, adhesives, etc.**
- **Biomedical** (parylene,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

And many more...



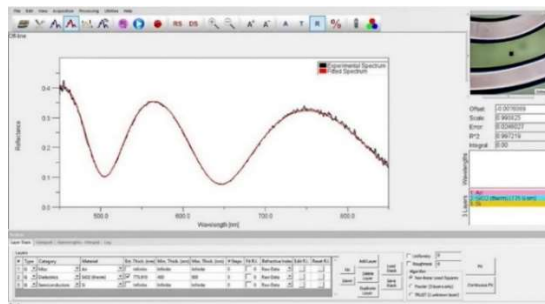
FR-uProbe, simply attaches to the C-mount adapter of most commercially available optical microscopes (reflectance and / or transmittance) and provides:

- Real-time spectroscopic measurements at the wavelength range supported by the lenses
- 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



Features

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



Specifications

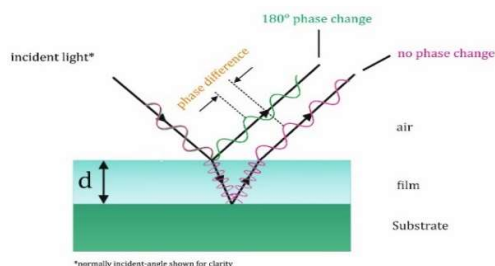
Microscope	Reflectance/Transmittance trinocular
Spectral Range	400nm – 1000nm
Thickness range (5X obj. lens)	15nm – 90µm
Thickness range (10X obj. lens)	15nm – 80µm
Thickness range (20X obj. lens)	15nm – 20µm
Thickness range (20X obj. lens)	15nm – 20µm
Refractive Index calculation	✓ /min thickness: 100nm
Thickness Accuracy¹	0.2% or 2nm
Thickness Precision^{2,3}	0.02nm
Thickness stability⁴	0.05nm
Camera	2 or 5Mpixel high resolution
Working distance	Defined by obj. lens
Spot size	100-2µm (see below)
Light source	Microscope's light source (tungsten / LED)
Wavelength resolution	0.8nm
Number of Layers Measured	Max. 5 layers
A/D converter	16 bit
Power	USB - supplied
Dimensions	300mm x 110mm x 40mm ⁵

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

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	17 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.



¹ Specifications are subject to change without any notice, ² Measurements compared with a calibrated spectroscopic ellipsometer and XRD, ³ Average of standard deviation of mean value over 15 days. Sample: 1micron SiO₂ on Si wafer, ⁴ Standard deviation of 100 thickness measurements. Sample: 1micron SiO₂ on Si wafer, ⁵ 2*Standard-Deviation of daily average over 15 days. Sample: 1micron SiO₂ on Si wafer. * no IR filter embedded at the microscope.** reflective objective lens