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

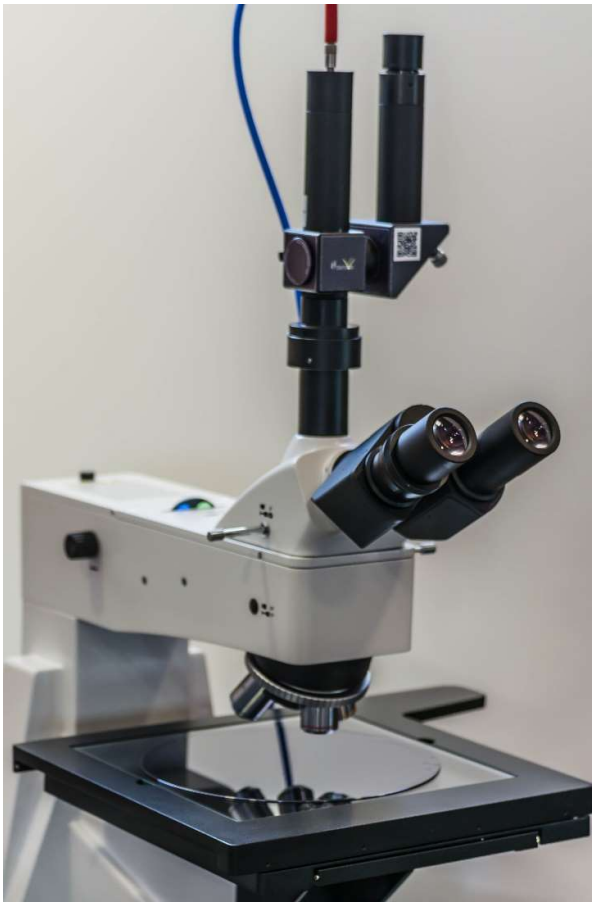
**FR-uProbe** is a stand-alone tool for applications that require spot size as small as very few microns, e.g. micro-patterned surfaces, samples that exhibit a high level of scattering light and numerous others.

With **FR-uProbe**, local film thickness, optical constants, reflectance, transmission, and absorbance measurements 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…

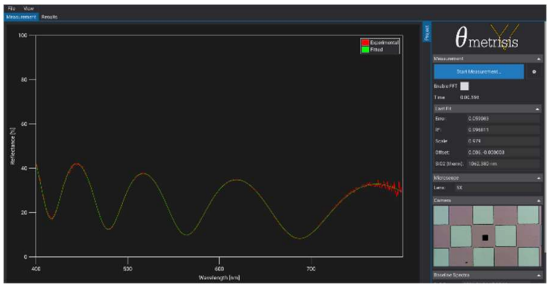


**FR-uProbe**, simply attaches to the C-mount adapter of most commercially available optical microscopes (reflectance and / or transmittance) and provides:

- 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

## Features

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



## Specifications

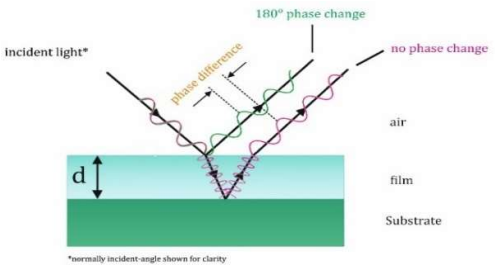
| | |
|---|---|
| **Microscope** | Reflectance/Transmittance trinocular |
| **Spectral Range** | 400nm – 1000nm |
| **Thickness range (5X obj. lens)** | 15nm – 90μm |
| **Thickness range (10X obj. lens)** | 15nm – 80μm |
| **Thickness range (20X obj. lens)** | 15nm – 40μm |
| **Thickness range (40X obj. lens)** | 15nm – 10μm |
| **Refractive Index calculation** | ✓ /min. thickness: 100nm |
| **Thickness Accuracy**[1] | 0.2% or 2nm |
| **Thickness Precision**[2,3] | 0.02nm |
| **Thickness stability**[4] | 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 $SiO_2$ on Si wafer, [4] Standard deviation of 100 thickness measurements. Sample: 1micron $SiO_2$ on Si wafer, [5] 2*Standard-Deviation of daily average over 15 days. Sample: 1micron $SiO_2$ on Si wafer. * no IR filter embedded at the microscope.