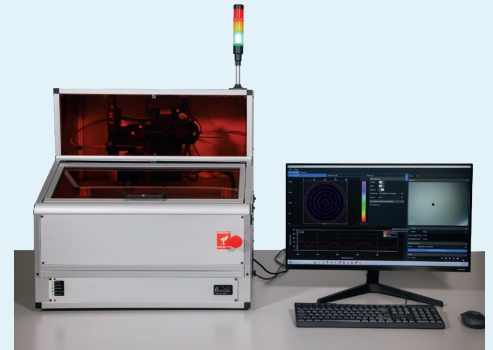


# POLOS<sup>®</sup> FR-SCANNER-AIO-MIC-XY200

Automated & Fast mapping of films in the micron lateral scale. FR-Scanner-AIO-Mic-XY200 is a holistic platform for the fully-automated in-depth characterization of patterned single and multilayer coatings on wafers. It provides 200 mm of travel along X and Y axes and is suitable for accurate measurements while the sample is secured on the stage through vacuum. The tool is offered in an endless range of optical configurations within the 200 - 1700 nm spectral range.



FR-Scanner-AllInOne-Mic-XY200 integrates under the same roof state-of-the-art optical, electronic, and mechanical modules for the accurate & precise characterization of patterned films. Typical examples include (but are not limited to): micro-patterned surfaces, rough surfaces, and numerous others. The wafer is placed on a vacuum chuck that supports any wafer size up to 200 mm diameter and is equipped with reflectance standards. The characterization is performed by a powerful optical module with a spot size as small as a few microns. The motorized XY stage provides travel of 200 mm on each axis with unprecedented speed, accuracy & repeatability.

FR-Scanner-AIO-Mic-XY200 provides:

- Real-time spectroscopic reflectance measurements
- Film thickness, optical properties, non-uniformity measurements, thickness mapping
- Imaging with an integrated high-quality color camera
- Wide range of statistics for the parameters under characterization
- Semi-automatic pattern alignment capability for mapping of periodic small patterns
- Unique S/W features such as: Click2Move, Scale bar and more

## APPLICATIONS

- Universities & research labs
  - Semiconductors (oxides, nitrides, Si, resists, etc.)
  - MEMS devices (photoresists, Si membranes, etc.)
  - LEDs, VCSELs
  - Data storage
  - Polymer coatings, adhesives, etc.
  - And many more...
- (contact us with your requirements)

## FEATURES

- Single-click analysis (no need for initial guess)
- Dynamic measurements
- Optical parameters (n & k, color)
- Click2Move & Pattern alignment functions
- 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 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.

## SYSTEM SPECIFICATIONS

Power Requirements	Single-phase 96 - 230 V, 5A@100 V, 2A@220 V
Tool dimensions	800(W) x 600 (D) x 850 mm (H) / 90 Kg
Material Database	> 800 different materials
SW Characteristics	FR-Monitor v4.0 (free of charge updates)

## CONFIGURATIONS

MODEL		UV/Vis	UV/NIR-EX	UV/NIR-HR	D UV/NIR	VIS/NIR	D VIS/NIR	NIR	NIR-N2
Spectral range (nm)		200 - 850	200 - 1000	190 - 1100	200 - 1700	380 - 1020	370 - 1700	900 - 1700	900 - 1050
Spectrometer		CCD image sensor							
Spectrometer pixels		3648	3648	2048	3648 & 512	3648	3648 & 512	512	3648
Thickness range (SiO <sub>2</sub> )	5X- VIS/NIR	4 nm – 60 μm	4 nm - 70 um	4 nm - 80 μm	4 nm - 150 μm	10 nm - 90 μm	15 nm - 150 μm	100 nm - 150 μm	4 nm - 1 mm
	10X-VIS/NIR 10X-UV/NIR*	4 nm – 50 μm	4 nm – 60 μm	4 nm – 65 μm	4nm – 130 μm	10 nm – 80 μm	15 nm – 130 μm	100 nm – 130 μm	-
	15X- UV/NIR *	4 nm – 40 μm	4 nm – 50 μm	4 nm – 50 μm	4 nm – 120 μm	-	-	100 nm – 100 μm	-
	20X- VIS/NIR 20X- UV/NIR *	4 nm – 25 μm	4 nm – 30 μm	4 nm – 30 μm	4 nm – 50 μm	10 nm – 50 μm	15 nm – 60 μm	100 nm – 60 μm	-
	40X- UV/NIR *	4 nm – 4 μm	4 nm – 4 μm	4 nm – 5 μm	4 nm – 6 μm	-	-	-	-
	50X- VIS/NIR	-	-	-	-	10 nm – 7 μm	15 nm – 8 μm	100 nm – 8 μm	-
Min. Thickness for n & k <sup>1</sup>		50 nm	50 nm	50 nm	50 nm	100 nm	100 nm	500 nm	-
Number of layers		Simultaneous measurement of 4 layers with adequate refractive index contrast							
Thickness accuracy <sup>2</sup>		1 nm or 0.2 %				2 nm or 0.2 %		3 nm or 0.3 %	
Thickness precision <sup>3,4</sup>		0.02 nm				0.02 nm		<1 nm	5 nm
Thickness stability <sup>5</sup>		0.05 nm				0.05 nm		<1 nm	5 nm
Light Source		Deuterium & Halogen (internal), 2000 h (MTBF)				Halogen 12V/50W (internal)			
Microscope module		Microscope column with 2 MP / 5 MP color image sensor with wide observation area							
Stage resolution		Better than 0.5 μm							
Stage repeatability		±2 μm (bi-directional)							
Absolute accuracy		±3 μm							
Wafer size		50 mm (2'') - 75 mm (3'') - 100 mm (4'') - 150 mm (6'') - 200 mm (8'') and of any shape up to 200 mm							
Scanning Speed		49 meas / 90 sec (200 mm (8'') wafer size)							

<sup>1</sup> Specifications are subject to change without any notice. True X-Y scanning is also possible through custom-made configuration \*\* Measurements compared with a calibrated spectroscopic ellipsometer and XRD, Average of standard deviation of mean value over 15 days. Sample: 1 micron SiO<sub>2</sub> on Si wafer, Standard deviation of 100 thickness measurements. Sample: 1 micron SiO<sub>2</sub> on Si wafer, <sup>2</sup>\* Standard-Deviation of daily average over 15 days. Sample: 1 micron SiO<sub>2</sub> on Si wafer. \*\*\* For Double Side Polished Si wafers \*\*\*Stage for 450 mm wafers is also available upon request.

## OPTIONS

- FR-AutoFocus 100 mm long linear axis for autofocus with two modes of operation: Image focus (contrast) / Reflectance intensity
- FR-FilterWheel Motorized filter wheel module fully computer controlled with slots for 8 filters: filter dimensions: diameter of 1-inch (clear aperture 23 mm).
- FR-AutoTurret Motorized and computer-controlled turret that can accommodate 4 objective lenses: typical switching speed between lenses of 2.0 - 3.0 sec.
- Lenses Long Working Distance VIS/NIR lenses: 5X, 10X, 20X, 40X, 50X.  
Reflective UV/NIR lenses: 10X, 15X, 20X, 25X, 40X
- Pump Low-noise vacuum pump with 2.5L/min and degree of vacuum -60 kPa.
- Chucks
  - a) Single diameter wafer chucks (4-inch, 6-inch, 200 mm)
  - b) Photomask chuck (6-inch) with reference area
  - c) Multiwafer chuck (100 mm, 150 mm, 200 mm and irregular shape pieces) with reference and dark areas for automated baseline
- Enclosure Enclosure to house the tool, with interlock to activate the shutter or shut-down the lamp when the door to load the wafer opens