

# Spectroscopic ellipsometers

## Product overview

from vacuum ultraviolet to far infrared



- Solar cell modules
- Textured silicon solar cells
- Bio applications, adsorption kinetics
- Liquid crystals, retardance, tilt profile
- Photoresists
- Organic and inorganic AR coatings
- Optical coatings
- Multilayers
- (PR/ARC, hi-lo stacks...)

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## Product overview

### alpha-2.0



For routine measurements of thin film thickness and refractive index, the alpha-2.0 dual rotation ellipsometer is a great solution. Designed for ease-of-use: simply mount a sample, choose the model that matches your film, and press measure.

Specification alpha-2.0	
<b>Wavelength range</b>	400 nm to 1000 nm, 190 wavelengths
<b>Angle of incidence</b>	65°, 70°, 75° or 90° and transmission (manual)
<b>Data acquisition time</b>	5-10 seconds for full spectrum (typically)

### theta-SE



The theta-SE is a push-button spectroscopic ellipsometer for characterizing thin film uniformity. It features advanced ellipsometry instrumentation in a compact package at an affordable price.

Specification theta-SE®	
<b>Wavelength range</b>	400 to 1000nm, 190 wavelengths Dual rotating ellipsometer technology
<b>Angle of incidence</b>	65°
<b>Data acquisition time</b>	0.3 sec (fastest), 1-2 sec (typical)
Mapping stage	300 mm theta-theta
Spot size	~250 µm x 600 µm

### iSE – In-situ spectroscopic ellipsometer



We are excited to announce a new ellipsometer developed specifically for in-situ monitoring of thickness and optical properties.

Determine thickness and optical constants with high certainty with our proven spectroscopic ellipsometry including advanced data analysis capability, gives you thickness and optical properties with much higher certainty than other techniques.

Specification iSE	
<b>Measurement speed</b>	
Fastest	Complete spectrum in 0.3 seconds
Typical	Complete spectrum in 1-2 seconds
Technology	Patented dual-rotation™ optics with CCD detection
<b>Wavelength options</b>	
# of wavelengths	190
Wavelength range	400 - 1000 nm
Measurement types	Advanced measurements within 0.3 seconds
	Fast, accurate measurements with great sensitivity over full range of values
	Advanced measurements including generalized SE and Mueller-matrix SE

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### M-2000®



The M-2000 delivers both speed and accuracy. Our patented RCE technology combines Rotating Compensator Ellipsometry with high-speed CCD detection to collect the entire spectrum (hundreds of wavelengths) in a fraction of a second with a wide array of configurations. The M-2000 is the first ellipsometer to truly excel at everything from in-situ monitoring and process control to large-area uniformity mapping and general purpose thin film characterization.

Specification M-2000	
<b>Wavelength range</b>	
M2000V	370 - 1000 nm, 390 wavelengths
M2000VI	370 - 1690 nm, 580 wavelengths
M2000U	245 - 1000 nm, 470 wavelengths
M2000UI	245 - 1690 nm, 660 wavelengths
M2000X-210	210 - 1000 nm, 485 wavelengths
M2000XI-210	210 - 1690 nm, 675 wavelengths
M2000D	193 - 1000 nm, 500 wavelengths
M2000DI	193 - 1690 nm, 690 wavelengths
<b>Angle of incidence</b>	
Fixed angle	65°
Horizontal auto angle	45° - 90°
Vertical auto angle	20° - 90°
<b>Data acquisition time</b>	typical for full spectrum: 0.5 to 5 sec.
<b>Max. data acquis. rate</b>	20 Hz

### RC2®



The dual rotating compensator ellipsometers RC2 are a new generation of advanced spectroscopic ellipsometry.

Superior measurement accuracy and precision, combining standard ellipsometry with measuring all 16 elements of complete Mueller Matrix.

Fast CCD detection (0.3 sec for entire spectrum even with full MM measurement), automated intensity adjustment for measurements as ex-situ or in-situ system.

Specification RC2®	
<b>Wavelength range</b>	
RC2-U	210 - 1000 nm, ~790 wavelengths
RC2-X	210 - 1000 nm, ~790 wavelengths
RC2-D	193 - 1000 nm, ~800 wavelengths
+I	1005 - 1690 nm, ~275 wavelengths
+XNIR	1005 - 2500 nm, ~250 wavelengths
<b>Angle of incidence</b>	
Fixed angle	65°
Horizontal auto angle	45° - 90°
Focusing	65°
Vertical auto angle	20° - 90°
<b>Data acquisition time</b>	complete spectrum within 0.3 sec, even for advanced data types

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### VASE®



The VASE is our most accurate and versatile ellipsometer for research on all types of materials as semiconductors, dielectrics, polymers, metals, multi-layers, and more. It combines high accuracy and precision with a wide spectral range of 193 to 4000 nm.

Specification VASE®	
<b>Wavelength range</b>	
Single chamber standard	250 - 2500 nm
Double chamber standard	240 - 2500 nm
DUV extension	193 nm
4IR extension	4000 nm
<b>Angle of incidence (fully automated)</b>	15° - 90° (standard system) Accuracy: 0.01°
<b>Data acquisition time</b>	
Typical	0.1 to 3 seconds per wavelength, depending on reflectivity of sample.
High accuracy	Measurements using full AutoRetarder® capability require 20 seconds per wavelength.

### IR-VASE®

The IR-VASE is the first and only spectroscopic ellipsometer to combine the chemical sensitivity of FTIR spectroscopy with thin film sensitivity of spectroscopic ellipsometry. It is used to characterize both thin films and bulk materials in research and industry.



### VUV-VASE®



The VUV-VASE variable angle spectroscopic ellipsometer is the gold standard for optical characterization of lithography thin films. It measures wavelengths from vacuum ultraviolet (VUV) to near infrared (NIR). This provides incredible versatility to characterize numerous materials.

Specification VUV-VASE®		
<b>Wavelength range</b>	Standard: 146 nm to 1100 nm, NIR: 146 nm to 1700 nm, XNIR: 146 nm to 2500 nm	
<b>Angle of incidence</b>		
GEN I	10° - 90°	Wavelengths <300 nm
	25° - 90°	Wavelengths >300 nm
GEN II	10° - 90°	Wavelengths <300 nm
	20° - 90°	Wavelengths >300 nm
<b>Data acquisition time</b>		
Typical	1 to 3 seconds per wavelength, depending on reflectivity of sample.	
High accuracy	20 - 30 seconds	

Specification IR-VASE®	
<b>Wavelength range</b>	1.7 μm to 30 μm (333 cm <sup>-1</sup> to 5900 cm <sup>-1</sup> )
<b>Angle of incidence</b>	32° to 90° (standard)
<b>Data acquisition time</b>	1 to 30 minutes typical (1 angle of incidence at 16 cm <sup>-1</sup> resolution). Finer resolution will require longer time.