For routine measurements of thin film thickness and refractive index, the alpha-SE® is a great solution. Designed for ease-of-use: simply place the sample on the stage, choose the model that matches your film, and press measure. You have results within seconds.

Why an alpha-SE?

**Easy-to-Use**
Simple push-button operation with advanced software with built in models that does the work for you.

**Powerful**
Proven spectroscopic ellipsometer technology gives you both thickness and index with much higher certainty than other techniques.

**Flexible**
Measure any kind of material - dielectrics, semiconductors, organics, and more.

**Affordable**
The power of spectroscopic ellipsometry at a reasonable price.

**Fast**
Hundreds of wavelengths simultaneously collected in seconds - immediate results.
Applications

For Transparent Films
With fast measurement speed and push-button operation, the alpha-SE® is ideal for qualifying thin films. Single-layer dielectrics on silicon or glass substrates can be measured in seconds. Log results for easy-to-use comparisons in both graphical and tabular formats.

![Image of SiNx Refractive Index graph]

A series of silicon nitride thin films is quickly compared to study variation in the thickness and refractive index with process conditions.

Self-Assembled Monolayers
Phase information of a spectroscopic ellipsometry measurement is highly sensitive to very thin films (<10 nm). For example, self-assembled monolayers can be measured and quickly compared using the alpha-SE.

![Image of Spectroscopic Ellipsometric (SE) Data graph]

For thin organic layers on gold, the phase parameter ($\Delta$) shifts downward with increasing thickness.
For Absorbing Films

Advanced models allow quick and efficient fits for a wide variety of absorbing materials you may encounter.

Materials
- a-Si
- poly-Si
- Diamond-like carbon
- Organic materials
- Organic LED films
- SiC
- Photoresist
- Display color filters
- Metals

Models
- Lorentz
- Gaussian
- Drude
- Tauc-Lorentz
- Cody-Lorentz
- Bspline

Coatings on Glass

Patented technology allows accurate measurements on any substrate: metal, semiconductor, or glass. For transparent substrates, the alpha-SE® simultaneously measures depolarization to correct for light returning from the backside of the substrate. This unwanted light can confuse other ellipsometers, but the alpha-SE ensures accurate thickness and optical constants.

The high sensitivity of alpha-SE technology provides microstructural details that you cannot get from Reflectance measurements. A thin film of Zirconium Oxide is measured with the alpha-SE and its index is found to vary between the substrate and surface. A graded model with rough surface best describes this sample.
Easy Measurements

Measurements as easy as 1-2-3, with results in a matter of seconds!

1. Mount your sample and choose your measurement settings:
   - Angles
   - Sample alignment
   - Model that describes your sample

2. Press ‘Measure’
   - Sample is automatically aligned, measured and the data is analyzed

3. Your results are reported: film thickness, refractive index, .....
Spectroscopic ellipsometry is perfect for characterizing thin film thickness and refractive index. The alpha-SE measures films from just a monolayer to a few microns.

Dynamic measurements of a native oxide on silicon show very stable, sub-Angstrom precision.

This 5-micron thick oxide has a large number of interference features that are well-resolved by 180 wavelengths measured by the alpha-SE.

An organic layer on silicon is easily characterized by the alpha-SE to determine thickness and refractive index. Simulated values with (a) varied thickness and (b) varied index show the distinct changes that give ellipsometry unique results for both film properties.
Accessories

**Focusing**
Perfect for non-uniform or small samples.

- Reduce beam diameter to ~0.3mm
- Quick and easy magnetic attachment- optics snap into position
- No alignment or calibration required

**Camera**
View the focused beam measurement location.

- 10mm by 7mm field of view
- Integrated image within CompletEASE software

**Translation**
Fine-adjustment of the measurement location.

- Manually adjust 12mm XY range with .025mm resolution
- Integrated vacuum stage holds sample in place
- Position the focused beam spot anywhere on the sample
Liquid Cell

- Study samples in liquid ambients
- 500µL liquid capacity
- 70° angle of incidence
- Designed for glass slides & 1” or 2” wafers

Software accounts for window effects and index of ambient fluid.

QCM Cell

- Allows study of mechanical properties in liquid ambients
- Tilt stage designed to hold Q-Sense QCM-D (E-Series with E1 Chamber)
- Woollam provides mount only

Transmission Stage

- Holds sample vertically in the path of light beam to allow normal incidence transmission measurements
- Tip-tilt stage for easy sample alignment
- Integrated vacuum stage holds sample in place
Specifications

**Spectral Range**
380 nm to 900 nm, 180 wavelengths

**Angle of Incidence**
65°, 70°, 75° or 90° (straight-through)

**System Overview**
Patented rotating compensator technology with CCD detection

**Data Acquisition Rate**
3 sec. (Fast mode)
10 sec. (Standard mode)
30 sec. (High-precision mode)

**Weight**
18 kilograms excluding computer

**Beam Diameter**
Collimated: ~3 mm
Focused: ~0.3 mm