SpecEl-2000

The spectroscopic ellipsometry system

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The SpecEl-2000 is part of the Mikropack line of thin film metrology systems. The SpecEl-2000 is a user-friendly, bench-top thin film measurement system utilizing spectroscopic ellipsometry. Ideal for flat, multi-layer, semi-transparent samples such as wafers or glass plates. The Spec-El-2000 is designed to be affordable, compact and convenient, with easy placement of the sample and one button operation.

Applications

Ellipsometry is a preferred method for characterizing thin films – relying on two aspects of the interaction of light with dielectric materials - firstly, that the polarization of light is altered upon reflection from a surface, and secondly that the transmission of light through a transparent layer changes the phase according to the refractive index of the material. For all layers in a transparent thin film stack, light reflects and refracts at each interface. Multiple beams result with varying polarization and phase, all of which interfere. Ellipsometry is used to characterize film thickness ranging from a few tenths of a nanometre to several micrometers with excellent accuracy.

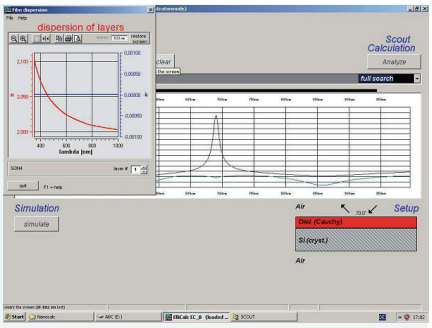
Features

- Film thickness accuracy 1 nm, resolution down to 0.1 nm
- Measures multi-layer stacks up to 25 layers
- Single film thickness up to 10 µm
- Spectral ranges 300 to 1000 nm
- Standard spot size 0.4 mm x 1.2 mm
- Ideal for flat, semi-transparent samples such as wafers, glass, films and foils
- 3D mapping, reference wafers, accessories and other options available - custom solutions on request
- Accompanying software allows generation and recall of measurement recipes for one-step, repetitive measurements accessories for thickness mapping

Specifications

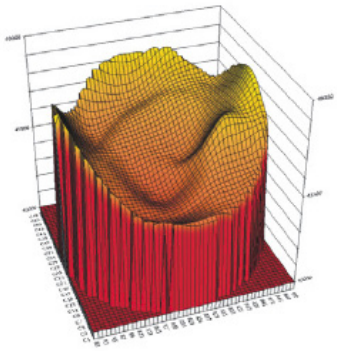
SpecEl-2000

PERFORMANCE	
Thickness	1 nm - 10 µm
Resolution	0.1 nm
n & k analyzer	values calculated for complete spectral range
Mathematical models	Constant refractive index, harmonic oscillator, Cauchy, Sellmeier, dielectric, KKR Drude, imported dielectric functions, Brendel, Kim, OJL interband transition model, Tauc-Lorentz, Campi-Coriasso, heterogeneous materials (multi-phase composites), effective medium concepts for inhomogeneous materials, Maxwell-Garnett, Bruggemann, Looyenga formula, Bergman representation and more ...
Measurement speed	7 - 13 seconds
Repeatability	70nm for SiO2 on Si, cos(Delta) ±0.0003, tan(Psi) ±0.0002
OPTICAL	
Spectral range	300-1000 nm (UV/VIS/NIR) or 400 - 1000 nm (VIS/NIR)
Spectral resolution	1 nm
Beam diameter	400 µm - 1200 µm
Angle	70°
PHYSICAL	
Dimensions	52 cm x 33 cm x 24 cm
MECHANICAL	
Sample size	Desktop up to 150 mm diameter, Mapping up to 300 mm diameter
Sample thickness	Max. 5 mm
COMPUTER	
Software	Windows XP™ software included, recipe structure, administrator/user compatible
Hardware	IBM compatible PC with Windows XP™ OS included



The system

The SpecEl-2000 features an integrated broadband light source, guiding optics, a rotatable polarizer, the sample table, a second rotating polarizer (analyzer), further optics and finally a miniaturized spectrometer with a CCD array as a detector. The system comes with a Windows PC as standard, complete with powerful software offering a range of modelling possibilities such as Cauchy, OJL, Tauc-Lorentz, Drude, EMA and different types of oscillators. The software also stores specific measurement routines, reducing the tedium of repetitive measurements and easing integration. System options include reference wafers and 3D mapping accessories, with custom, multi-functional solutions.



Mapping options for the SpecEl-2000 allow high resolution3D scans of film thickness

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