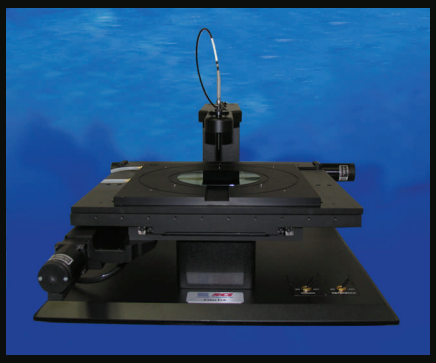
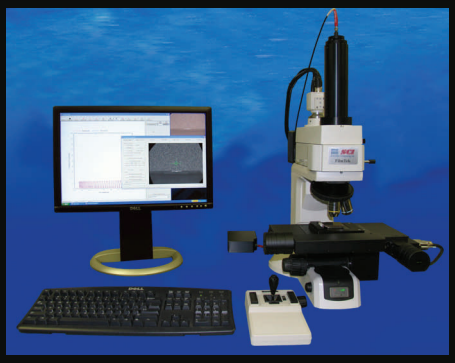
FilmTek™ 2000, FilmTek™ 2000M, and FilmTek™ 2000 PAR

DUV Spectroscopic Reflectometry



FilmTek™ 2000



FilmTek™ 2000M

FilmTek™ 2000 PAR-NIR

FilmTek™ 2000 is a breakthrough in thin film metrology technology. FilmTek™ 2000 combines a fiber-optic spectrophotometer with revolutionary material modeling software to provide an affordable and reliable tool for the simultaneous measurement of film thickness, index of refraction, and extinction coefficient. FilmTek™ 2000 provides unmatched accuracy, ease of use, and analytical power in a fully integrated package. Ideally suited for patterned device wafers, the FilmTek™ 2000M allows for measurement spot sizes as small as 2μm. The FilmTek™ 2000 PAR utilizes SCI's patented parabolic mirror technology developed for the FilmTek™ 4000EM-DUV to achieve a 50μm measurement spot size and simultaneously measure wavelengths from the deep ultra-violet to the near infrared.

FilmTek™ 2000 Features

- **Versatile:** FilmTek™ 2000 incorporates SCI's generalized material model with advanced global optimization algorithms for simultaneous determination of:
  - Multiple layer thicknesses
  - Indices of refraction [n(λ)]
  - Extinction (absorption) coefficients [k(λ)]
  - Energy band gap [Eg]
  - Constituent and void fraction
  - Surface roughness
- **Low Cost:** The cost of ownership of FilmTek™ 2000 is a small fraction of comparable instruments.
- **No Special Knowledge Required:** FilmTek™ 2000 software is designed so that minimal experience in personal computers, thin film optical design, or measurement techniques is required.
- Complete "turn key" System: A fully integrated spectrophotometer measurement system with calibration, acquisition, and analysis software.
- Non-contact and non-destructive.
- Flexible: FilmTek™ 2000 hardware and software can be easily modified to satisfy unique customer requirements.

Optional features:

- Computer controlled automated stage
-- Small spot size (2 microns)
- Cassette to cassette wafer handling

Applications

Virtually all translucent films ranging in thickness from less than 100 angstroms up to approximately 350 microns can be measured with high precision. Typical applications include:

- Semiconductor and dielectric materials
- Multilayer optical coatings
- Optical antireflection coatings
- Electro-optical materials
- Computer disks
- Coated glass
- Laser mirrors
- Thin metals
- Solar cells
- Biomedical

Example Films

- SiO_x
- SiN_x
- DLC
- SOG
- Photoresist
- Thin Metals
- a-Si
- a-C:H
- ITO
- Polysilicon
- Polyimide
- Low K Dielectric Films

Example Substrates

- Silicon
- SOI
- SOS
- PET
- GaAs
- Glass
- Aluminum
- Copper

FilmTek™ 2000 / 2000M / 2000 PAR Technical Specifications	
Film thickness range:	3nm to 350μm (5nm to 150μm is standard)
Film thickness accuracy:	±1.5Å for NIST traceable standard oxide 1000Å to 1μm
Spectral range:	190 to 1700nm (240 to 950nm is standard)
FilmTek™ 2000 measurement spot size:	2mm to 5mm (5mm standard)
FilmTek™ 2000M measurement spot size:	2μm to 50μm
FilmTek™ 2000 PAR measurement spot size:	25μm to 300μm (50μm standard)
Sample size:	2mm to 300mm standard
Spectral resolution:	0.3-2nm
Light source:	Regulated deuterium-halogen lamp (2000 hrs lifetime)
Detector type:	2048 pixel Sony linear CCD array / 512 pixel cooled Hamamatsu InGaAs CCD array (NIR)
Measurement time:	<1 sec (e.g., oxide film)
Data acquisition time:	0.2 sec

Films	Thickness	Measured Parameters	Precision (σ)
Oxide / Si	200-500 Å	t	0.5 Å
	500-10000 Å	t	0.25 Å
	1000 Å	t, n	0.25 Å / 0.001
Nitride / Si	200-10000 Å	t	0.25 Å
Photoresist / Si	200-10000 Å	t	0.5 Å
a-Si / Oxide / Si	20-10000 Å	t	0.5 Å