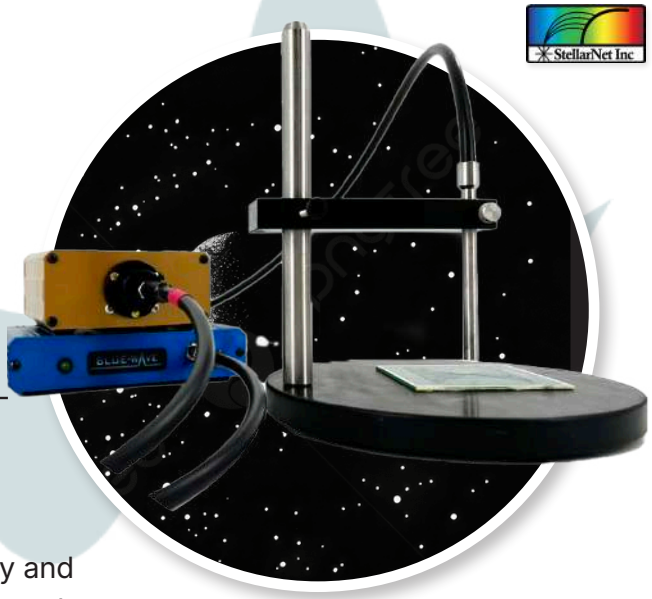
THIN FILM

NIR
UV-VIS
VIS-NIR



Thin Film Measurement Systems for Single and Multilayer Film Structures

StellarNet's Thin Film measurement systems measure thickness of multilayer films in less than a second. The non-contact thickness measurement systems come complete with instrumentation and software including a large library of materials data to support multilayer, freestanding, rough, and both thick & thin layer structures. With USB connectivity and the powerful, user-friendly StellarPro-TFC software, daily complex measurements are made quick and simple! Several configurations are available for measuring thin films with spectral response in UV-VIS, VIS-NIR and NIR wavelength ranges (details below).

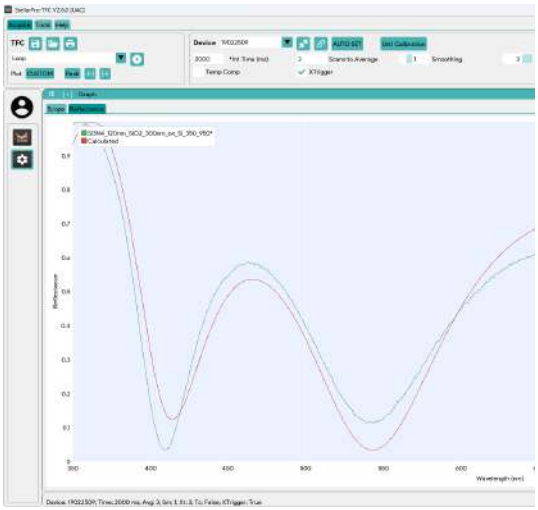


Fig 1: Dielectric Layer Graph

Thin Film Sytems are Ideal For:

- **Semiconductor Measurement** – Measure thin films, dielectric layers, and photoresists for process monitoring and quality control.
- **Solar & Photovoltaic Films** – Characterize multilayer photovoltaic films, including thin silicon, ITO, AZO, CdTe, CIGS, and TCO stacks.
- **Display Films** – Measure film thickness and cell gaps in LCD, OLED, and other advanced display technologies.
- **Photonic Device Measurement** – Characterize optical coatings and thin-film structures used in photonic and optoelectronic devices.
- **Optical Coatings** – Measure the thickness and uniformity of dielectric, anti-reflective, and protective optical coatings.

System	Range	Resolution	Thickness	Lamp Type
TF-VIS	400-1000nm	<2nm	10nm-75um	Visible/NIR
TF-UVVIS	200-1100nm	<2.5nm	1nm-75um	UV + Visible/NIR
TF-NIR	900-1700nm	<5nm	100nm-300um	Visible/NIR
TF-VIS-NIR	400-1700nm	<2nm, 5nm> 1000nm	10nm-300um	Visible/NIR
TF-UVVIS-NIR	200-1700nm	<2nm, 5nm>1000nm	1nm-300um	UV + Visible/NIR
TF-Micro	StellarNet configured Microscope equipped with 4,10, & 40x objectives, CMOS 1.3 Mpixel Camera, optical switch, and required coupling accessories			
TF-Micro-AM	StellarNet configured Auto-Mapping Microscope equipped with 4,10, & 40x objectives, CMOS 1.3 Mpixel Camera, optical switch, and required coupling accessories			

StellarPro-TFC Features:

+ Real-time spectral capture and instrument control for reflectance and transmittance measurements.
+ Includes an extensive material data library.
+ Supports multilayer, freestanding, rough, thick, and thin-film structures.
+ Easily add new materials by measuring samples or importing data files.
+ Supports parameterized material models, including Cauchy, Sellmeier, EMA (Effective Medium Approximation), Harmonic Oscillator, Tauc-Lorentz Oscillator, and Drude-Lorentz.
+ High-Speed Parallel Processing Engine – Multi-threaded computation for faster modeling and optimization of complex multilayer thin-film stacks.
+ Automated Thickness Mapping – Automatic stage and microscope control for 2D thickness maps and 3D surface profile measurements.

The operating software includes a large library of refractive index (n) and extinction coefficient (k) values for the most common metallic, dielectric, amorphous and crystalline substrate materials. Analyze simple and most complex filmstacks - graded layers, periodic structures, very thick films, films on thin substrates, multi-sample measurements, etc.

Measurements are made using reflectance/transmittance spectroscopy which measures the optical response of the layer structure. The user creates an optical model of the layer structure and uses data analysis to determine physical properties and the results are inferred from the best fit of measured & modeled data.

Simulation and error-estimator tools allow user better understand data and the expected precision. During in-situ, in-line or other long running measurements, conditions including surface roughness, ambient light, etc. may be changing. StellarPro-TFC supports roughness and scaling correction that allows factoring in these effects.

StellarPro-TFC also supports Parameterized materials e.g. Cauchy, Sellmeir, EMA (effective-medium approximation), Harmonic oscillator, Tauc-Lorentz oscillator, Drude-Lorentz and many more approximations. These approximations represent optical dispersion of materials in desired spectral range using few coefficients that can be adjusted. For example, oxides are frequently represented using New materials can be added easily by measuring corresponding sample or importing data from the text file.

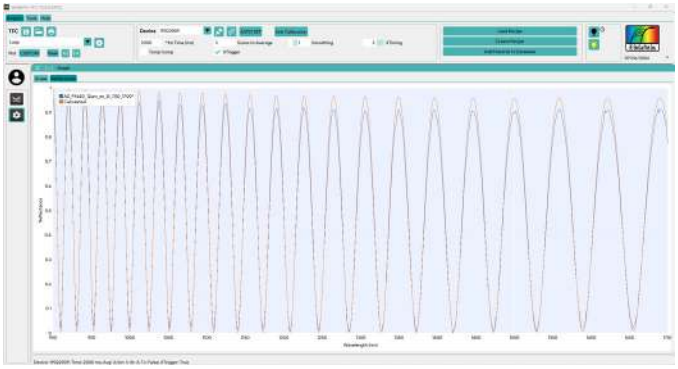


Fig 2: Thick Photoresist

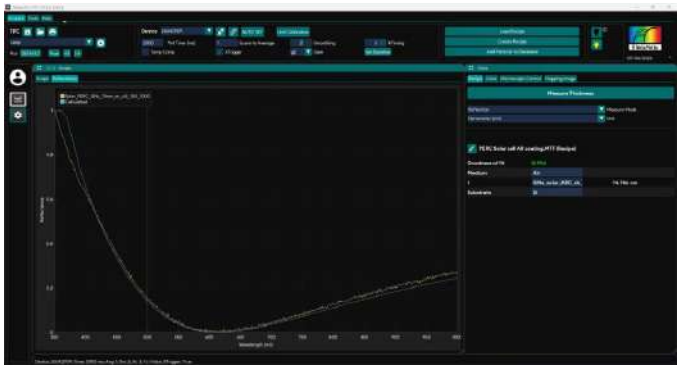


Fig 3: Silicon Nitride (SiNx) Anti-Reflection Coating

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Developing **Intelligence** from **Light**

StellarNet Inc