OPTOSKY
Spectroscopy Solutions

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Film Thickness Scanning Mapper | SM230

Feature

- Wide film thickness range（5nm ~ 250um）
- Wide wavelength range （200-1700nm）
- Non-contact,non-destructive testing system;
- Ultra-long life light source, higher luminous efficiency
- Compact and affordable without compromising high precision
- High-resolution,high-sensitivityspectrometer,the measurement results are more accurate and reliable
- The software interface is intuitive, and the operation is convenient and time-saving
- The surveying and mapping speed is fast, and it supports multi-point surveying and mapping point map drawing
- Support drawing 2D/3D thickness distribution map of samples
- High-precision, long-life 3-axis rotary platform
- Optical constant analysis (n: Refractive index, k: Extinction coefficient) with Non-linear Least-Squares Method
- Analytical algorisms are Peak-Valley Method, Fast Fourier Transformation (FFT) Method, Non-linear Least-Squares Method and Optimization Method

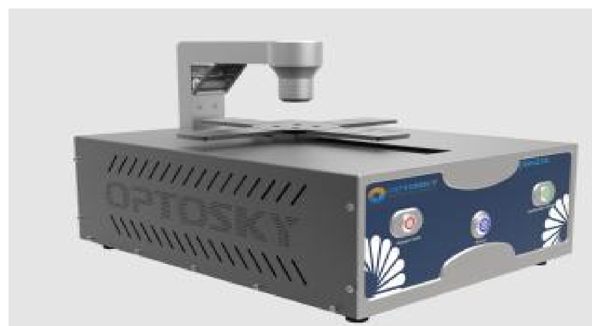
Description

SM230 is an automatic thin film thickness mapper developed by utilizing the principle of thin film reflected light interference. It uses the light with the widest wavelength range of 200-1700nm to vertically incident on the surface of the film. As long as the film has a certain degree of transmission, the SM230 can calculate the thickness of the film according to the reflected interference spectrum, as well as other optical constants such as reflectivity, refractive index and extinction coefficient, etc., the thickness of the maximum mapping range can reach 5nm ~ 250um. The SM230 automatic optical film thickness mapping instrument is constructed by the surveying and mapping host, the surveying and mapping platform, the Y-type optical fiber and the host computer software. technology, providing users with a new generation of leading automatic optical film thickness mappers.

Application

Virtually all smooth, translucent or low absorption coefficient films can be mapped, which includes almost all dielectric and semiconductor materials, including silicon dioxide,nitriding layer,diamond-like carbon,polycrystalline silicon,polycrystalline silicon,photoresist,macromolecule,polyimide,amorphous silicon,etc.

- Biomedical: medical equipment, Parylene
- Optical coating: hard coating, anti-reflection layer
- Semiconductor coating: photoresist, oxide, desalination layer, silicon-on-insulator, wafer back grinding
- Microelectronic system: photoresist, silicon film, printed circuit board
- Liquid crystal display: gap thickness, polyimide, ITO transparent conductive film;



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1. Work Principle

When the incident light penetrates the interface of different materials, part of the light will be reflected. Due to the fluctuation of light, the reflected light from multiple interfaces interferes with each other, so that the multi-wavelength spectrum of the reflected light oscillates. From the oscillation frequency of the spectrum, we can judge the distance of different interfaces and then obtain the thickness of the material (more oscillations represent larger thickness), and other material properties such as refractive index and roughness can also be measured at the same time, as shown on the Figure 1.

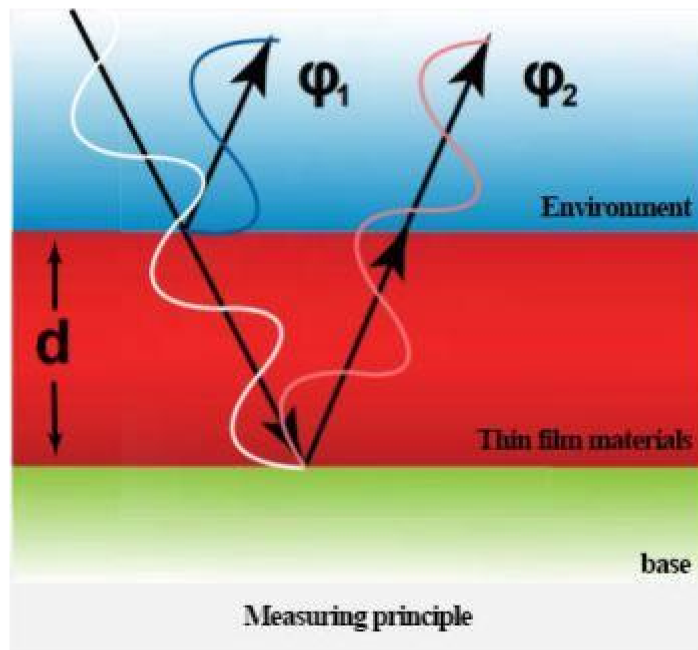

Figure 1 Measurement principle

Optosky fully absorbs the pain points of the industry, digs deep into the needs of customers, and is committed to building the leading automatic film thickness mapping instrument in China - SM230, which emits light from the host light source and illuminates the surface of the sample to be measured through a Y-type optical fiber. The Y-type fiber is composed of 7 thin fibers in a plum blossom shape. The outer 6 fibers emit light. The middle fiber guides the reflected interference light back to the spectrometer inside the host for measurement and calculation. The principle of the SM230 system is shown in the figure on the Figure 2.

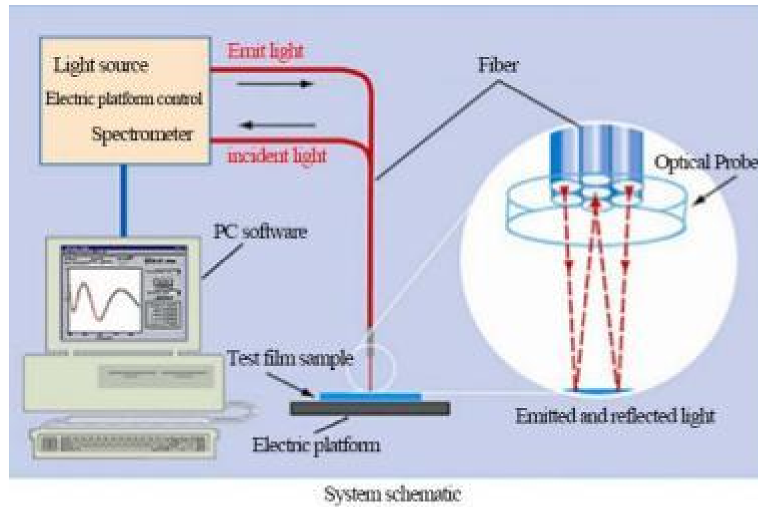

Figure 1 System principle

The surveying and mapping methods of SM230 can be polar, rectangular or linear. The built-in high-performance motion controller in the host enables the rotatable platform to support a variety of predefined surveying and mapping methods. The equipped host computer software supports users to create their own surveying and mapping methods without measuring The number of points is limited, the measurement results support 2D and 3D presentation, and the supported forms of the point map:

*Round/square

*Radial

*Center or edge exclusion

*Spot density

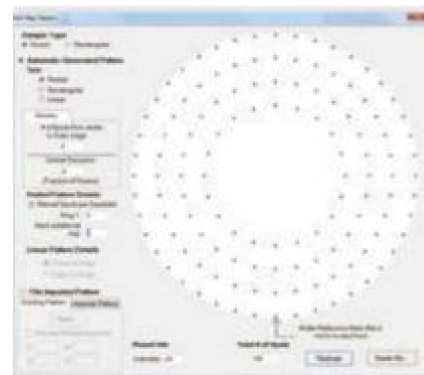

Figure 3 PC software point map drawing

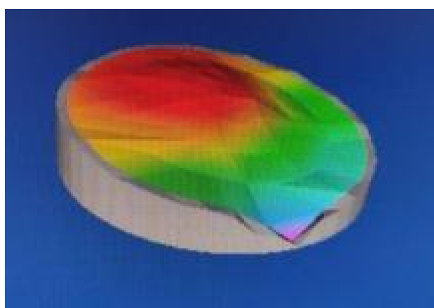

Figure 4 3D display of the film thickness value of PC software

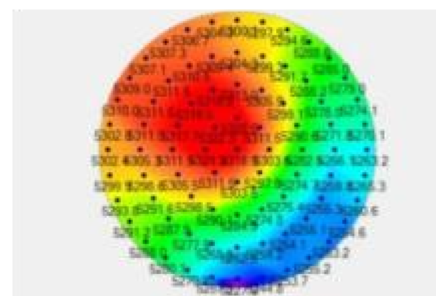

Figure 5 2D display of the film thickness value of PC software

2. Parameters

SM230 Automatic Optical Film Thickness Mapper

Model	SM230-LUV	SM230-HUV	SM230	SM230-NIR
General specifications				
Spectral range	200nm- 1000nm	200nm- 1000nm	400nm- 1000nm	900nm- 1700nm
Light source	Deuterium halogen Lamp		Tungsten halogen lamp	
Measurement specifications				
Thickness range[1]	5nm- 10um	5nm~30um	20nm-60um	100nm-250um
Accuracy[2]	±2nm 或 0.2%			±3nm 或 0.4%
Incidence angle	90°			
Film thickness layers	1~3			
Sample material	Transparent or translucent film			
Measurement mode	Single- point/ multi- point/ automated measurements			
Spot size[3]	2mm			
Sample size	Diameters from 1mm to 300mm or larger			
Basic requirements				
Operating system	Windows10/ 11			
Indicator light	Deuterium lamp indication, halogen lamp indication		Halogen lamp indication	
Button	Power buttons, deuterium lamps, halogen lamps		Power button, halogen power	
External interface	Power outlet, USB 2.0, RJ45			
Scanning platform	Rotate + X axis movement			
Movable stroke	150mm*360°			
Material	Aluminum alloy			
Power supply	100~240VAC , 50~60Hz			
Packing list	Mainframe, measuring platform, power cord, communication cable, optical probe, Y-fiber			

Remarks:

1. Depends on the material;
2. The larger one is the larger and depends on the material;
3. Optional up to 20um;