

**HORIBA**

A photograph of a thin film inspection machine. Two bright laser beams converge on a central point above a circular sample stage. The machine's structure is metallic and industrial, with various components and a vertical support structure visible on the right. The entire scene is bathed in a blue light, creating a high-tech, scientific atmosphere.

Answer to  
Fully Automated  
Thin Film Inspection

# HORIBA Offers a Fully Automated Inspection System

HORIBA provides an extensive selection of fully automated systems designed for inspecting wafers, thin films, and photomasks.

Based on proprietary technologies, spectroscopic ellipsometry, Raman and photoluminescence spectroscopy and advanced data analysis, these systems provide accurate measurement of key parameters of the sample such as film thickness, optical properties, composition, crystallinity and defects.

## Wafer & Thin Film Inspection

### Load port

1 or 2

### Cassette types

Open cassette, SMIF, or FOUP

### Wafer size

2", 4", 6", 8" or 12"

### Technology & sensors

Spectroscopic Ellipsometry, Raman Spectroscopy, Photoluminescence, or any combination of sensors



## Film Thickness

- From few Å to several μm level
- Single layer or multiple layers analysis
- Small spot size measurement
- Applications: Oxides, nitrides, thin conductive oxides, silicon and compound semiconductors, 2D materials

## Stress

- High spatial resolution stress measurement
- Stress uniformity, residual stress
- Depth profiling
- Applications: Si, Si<sub>(1-x)</sub>Ge<sub>x</sub>, compound semiconductors (SiC), 2D materials

## Crystallinity

- Crystalline volume fraction
- Uniformity assessment
- Depth profiling
- Applications: p-Si and μc-Si, compound semiconductors (especially SiC)

## Composition / Stoichiometry

- Uniformity assessment
- Depth profiling
- Applications: Si<sub>(1-x)</sub>Ge<sub>x</sub>, compound semiconductors (AlGaIn, InGaIn, AlGaAs, etc), 2D materials, etc.

## Defects Inspection

- High-throughput defect and particle inspection
- Defect classification and identification
- Uniformity assessment
- Applications: Compound semiconductors (SiC, GaN, III-V, multiquantum wells), 2D materials

## Optical Properties

- Spectral range from 190 nm to 2,200 nm
- Accurate measurement of n (refractive index), k (extinction coefficient), and E<sub>g</sub> (bandgap)
- Applications: Photoresist, thin conductive oxides and compound semiconductors

## Photomask Particle Inspection

- Reticle inspection and particle removal in continuous sequence
- Advanced discrimination between patterns and particles
- Applications: DUV or EUV pellicle, blank substrate

### Technology & sensors

Laser scattering

### Reticle mask size

5", 6", 7", or 9"

Reticle/Mask Particle Detection System PD Xpation



For more details

HORIBA's metrology solutions are based on highly reliable sensor specifically designed and integrated to enable non-destructive and non-contact inspection of wafers, thin films, and photomask.

## Available Sensors

### Spectroscopic Ellipsometry

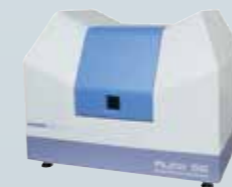


Spectroscopic Ellipsometer UVISEL Plus

- High accuracy measurements for all ellipsometric ( $\Psi$ ,  $\Delta$ ) values
- Excellent signal/noise ratio from the FUV (190 nm) to NIR (2,200 nm)
- Fully automated spot size selection



For more details



Spectroscopic Ellipsometer for Simple Thin Film Measurement Auto SE

### Raman Spectroscopy, Photoluminescence Spectroscopy



Raman Spectrometer

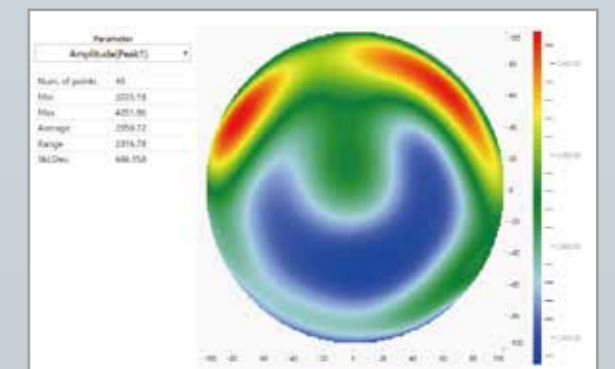
- Fast high spatial resolution mapping by QScan™ technology
- Fast macro mapping (10x faster Raman imaging) with proprietary SWIFT™ technology
- Fully automated laser selection function



For more details



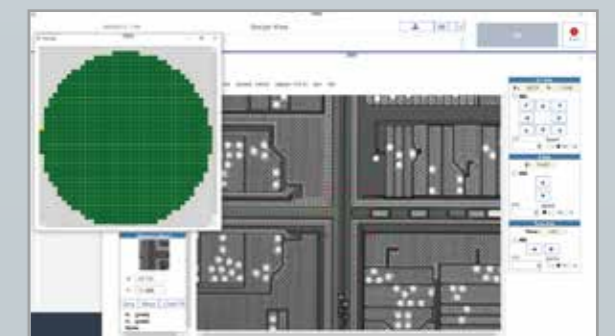
Recipe setting screen: Different sensors (spectroscopic ellipsometry, Raman spectroscopy, PL) can be operated from the same software platform



Measurement result screen: Peak distribution of a silicon wafer by Raman spectroscopy



Measurement in progress: The progress of the measurement is indicated in yellow during measurement, green after measurement, and gray before measurement.



Pattern recognition setting screen

# Global Network



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