

Large-area wafer inspection
and characterization

alpha300 Semiconductor Edition



Optimized for your application

Materials



Graphene



Si



Perovskite



SiC



GaN



TMDs



GaAs



Layered
materials



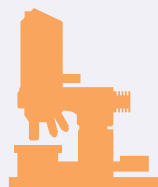
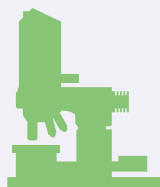
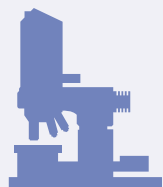
Compound
semiconductors



Wide-bandgap
materials

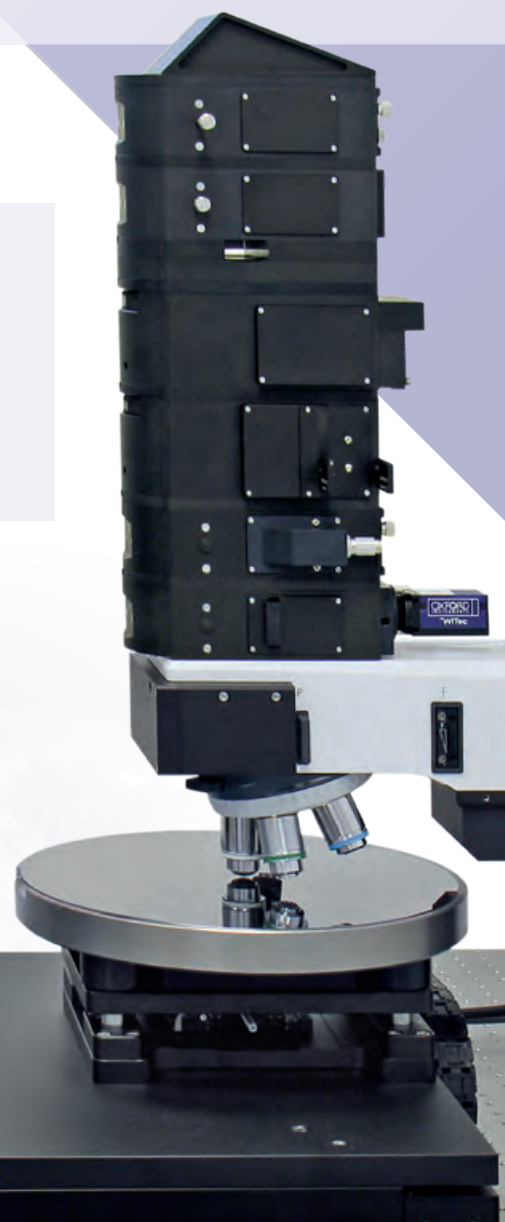


other
materials



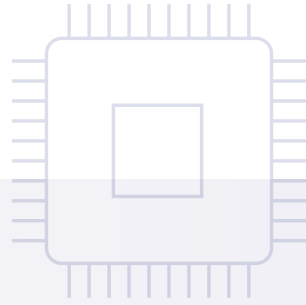
Configurations

Choose the microscope configuration package that best suits your research.



alpha300

Semiconductor Edition

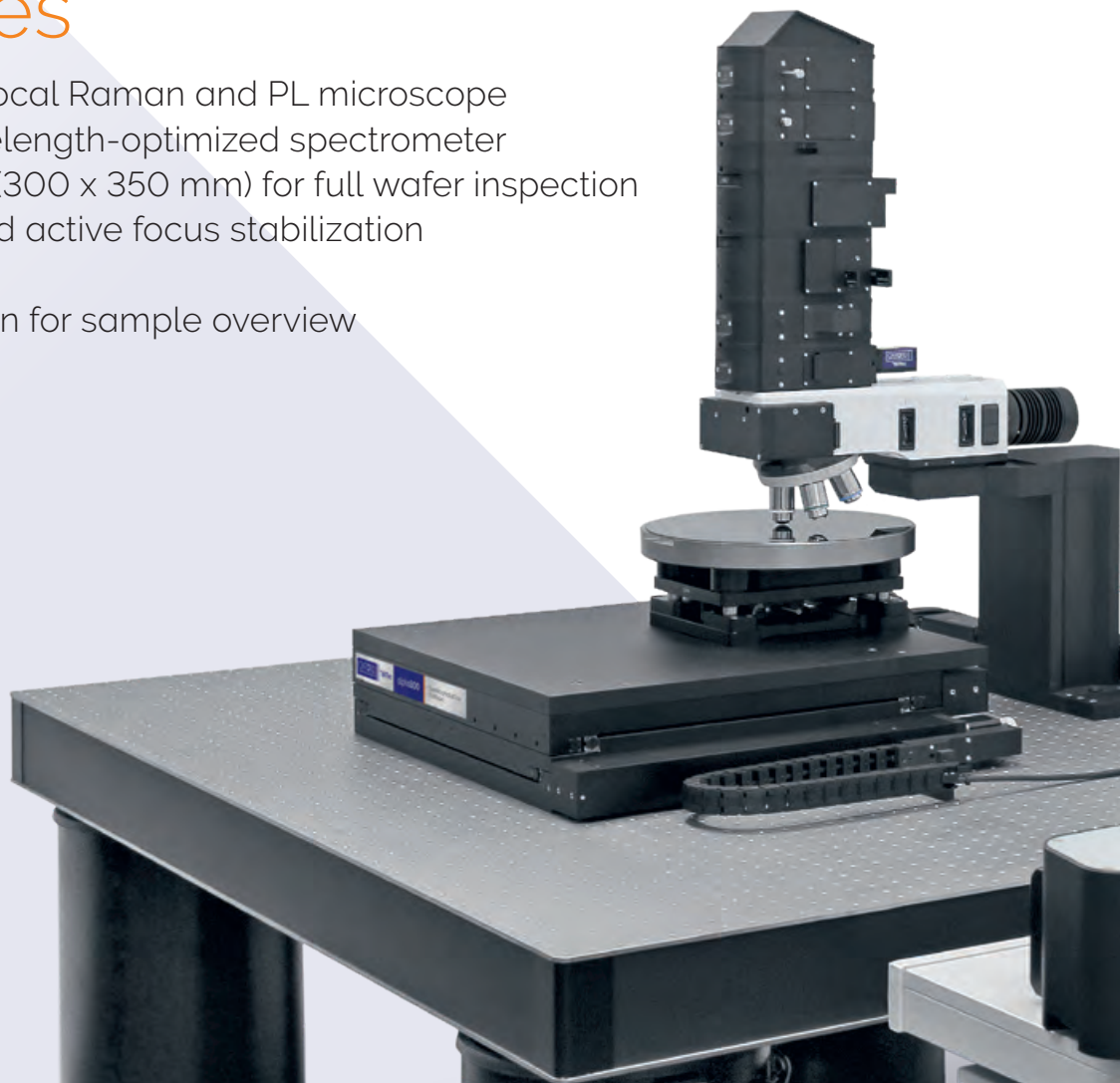


Large-area wafer inspection for the semiconductor industry

The alpha300 Semiconductor Edition is a high-end confocal Raman and photoluminescence (PL) microscope specifically configured for the chemical imaging of semiconducting materials. It helps you accelerate the characterization of crystallinity, defects, strain and doping over large sample areas.

Key features

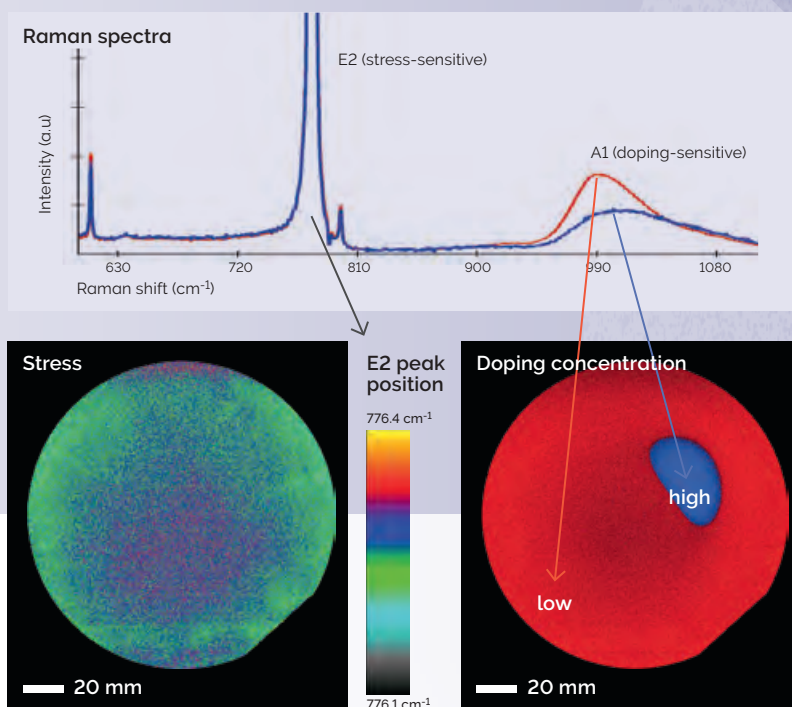
- Industry-leading confocal Raman and PL microscope
- Scientific-grade, wavelength-optimized spectrometer
- Large-area scanning (300 x 350 mm) for full wafer inspection
- Vibration damping and active focus stabilization
- Extensive automation
- White-light illumination for sample overview



Applications

Full-area wafer inspection

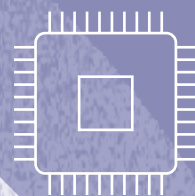
The microscope's extended-range scanning stage enables the inspection of up to 300 mm (12 inch) wafers. WITec TrueSurface technology keeps the surface in focus in order to obtain sharp Raman images of large areas. In this example, regions of strain and inhomogeneous doping in a 150 mm (6 inch) silicon carbide (SiC) wafer are revealed.



Benefits

- Full inspection of up to 300 mm (12 inch) wafers
- Characterization of crystallinity, defects, strain and doping
- Surface analyses, depth scans and 3D imaging
- Accelerated and automated workflows
- Analysis of conventional and wide-bandgap semiconductors

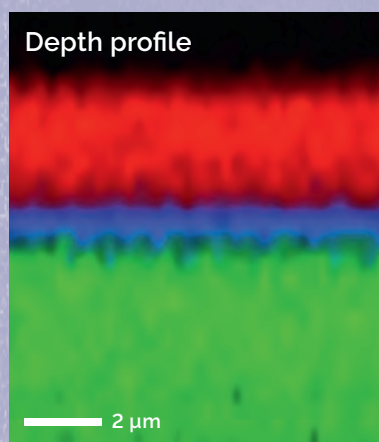




Layer characterization

Raman imaging provides insight into the sub-surface properties of semiconductors. This depth scan through an epitaxially overgrown SiC wafer visualizes the distribution of its different layers.

SiC wafers were provided courtesy of the Fraunhofer Institute for Integrated Systems and Device Technology IISB, Erlangen, Germany.

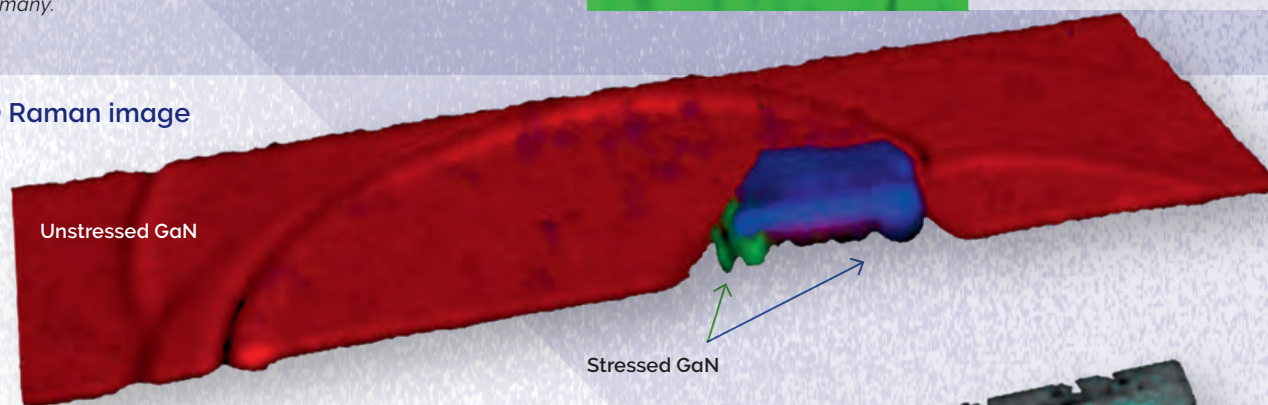


Epitaxial layer

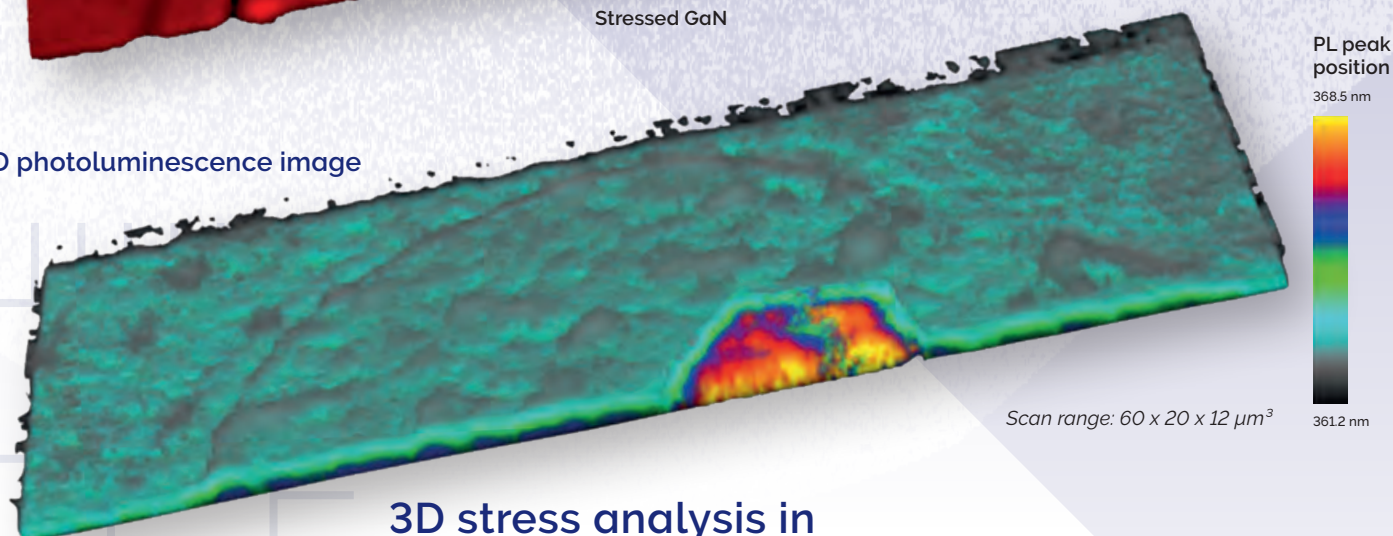
Interface layer

Wafer substrate

3D Raman image



3D photoluminescence image



3D stress analysis in wide-bandgap materials

The alpha300 Semiconductor Edition enables the combination of Raman and PL microscopy. This hybrid approach is applied here to investigating stress induced by a Frank-Read source in the wide-bandgap semiconductor gallium nitride (GaN). A 3D Raman image visualizes the distribution of stressed and unstressed GaN. The PL emission wavelength serves as an indicator for the bandgap and 3D imaging shows that it is changed within the Frank-Read source.

WITec Microscopes



alpha300 S
Scanning Near-field
Optical Microscope

alpha300 A
Atomic Force
Microscope

alpha300 R
Confocal Raman
Microscope

alpha300 Ri
Inverted Confocal
Raman Microscope

**alpha300
Semiconductor
Edition**

alpha300 apyrion™ Automated
Confocal Raman Microscope

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