nanometrics

advanced **process control** systems and solutions

Imperia™

Advanced Process Control for Compound Semiconductor and HB-LED

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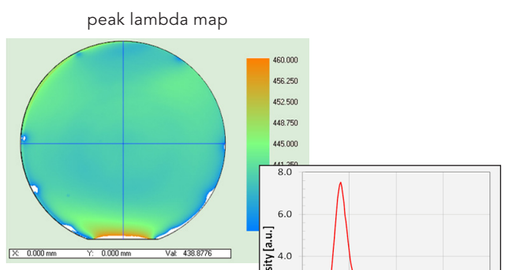
Imperia™

With its unique optical design technology, the Imperia detects and classifies yield-killing defects with the additional benefit of simultaneous state-of-the-art photoluminescence (PL) production monitoring.

There are significant economic savings to be gained by more accurately predicting MOCVD reactor yield and PM schedules. Combining these two post-epitaxial metrology screening functions into a single high throughput system minimizes valuable fab space use and cassette handling time.

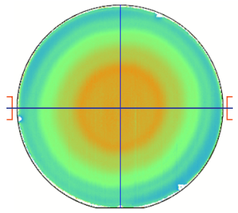
- Simultaneous photoluminescence measurement with defect inspection
- Defect analysis and classification software capabilities
- High throughput for large substrates, 90 WPH for 150 mm samples
- Fully automated platform with GEM/SECS II capabilities
- Illumination wavelength options at 532, 405, 375 and 355 nm
- Detection options at 350-850 nm and 400-1,000 nm



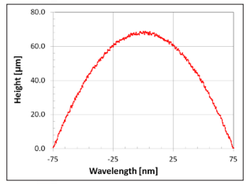
peak lambda map

spectral information at cross mark

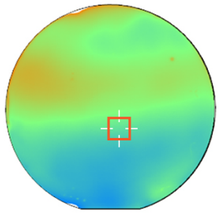
peak intensity map



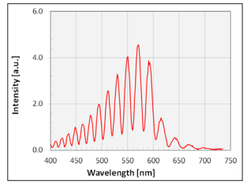
bow map



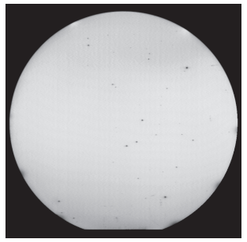
bow profile



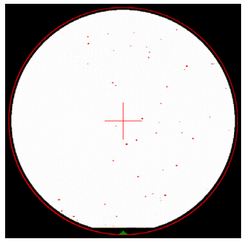
epi thickness map



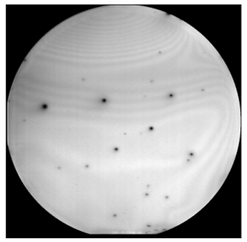
spectral information at cross mark



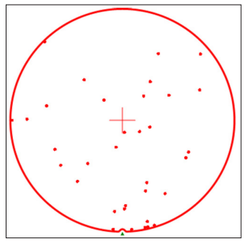
PL intensity map



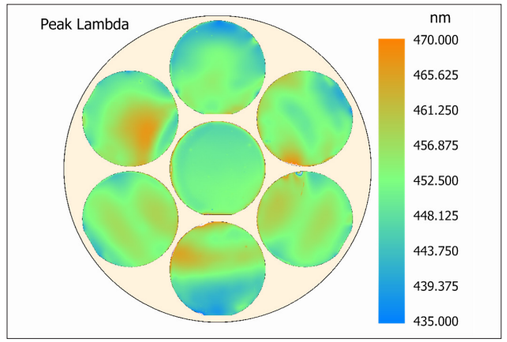
superimposed defect map



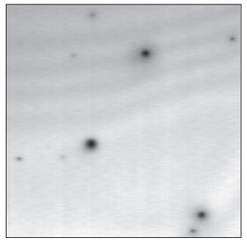
PL intensity map



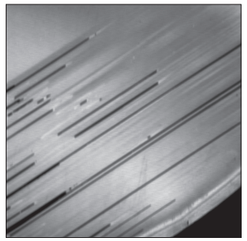
KLARF defect map



platen overview



electrically active defects



misfit dislocations

Photoluminescence Mapping

High density imaging of peak lambda, peak intensity, FWHM and other LED materials relevant parameters

Measurement accuracy and reproducibility (≤1 nm)

Capability of measuring bare and patterned wafers at resolutions down to 125 µm

Defect Inspection and Analysis

High resolution mapping for defect inspection down to 125 µm

Brightfield PL channel for detecting electrically active defects

Defect extraction, morphological analysis and quantification

Die-based yield binning capabilities allow yield prediction on a die level

Real-Time Defect Extractor (RDE) software with KLARF output

Epitaxial Layer Thickness

Epitaxial layer thickness and normalized reflectivity imaging at high resolution down to 125 µm

Excellent measurement accuracy (2% of nominal thickness) and reproducibility ($1\delta \leq 1\%$)

Wafer Bow

Wafer shape profiling at multiple angles and high resolution down to 125 µm

Full wafer 3D bow reconstruction via data interpolation and smoothing

±500 µm bow measurement range and ±6 µm reproducibility