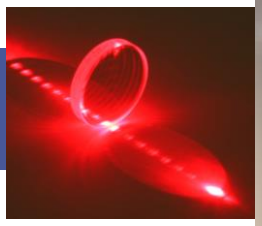
k-Space Associates, Inc.



kSA In-House Optical Metrology Services

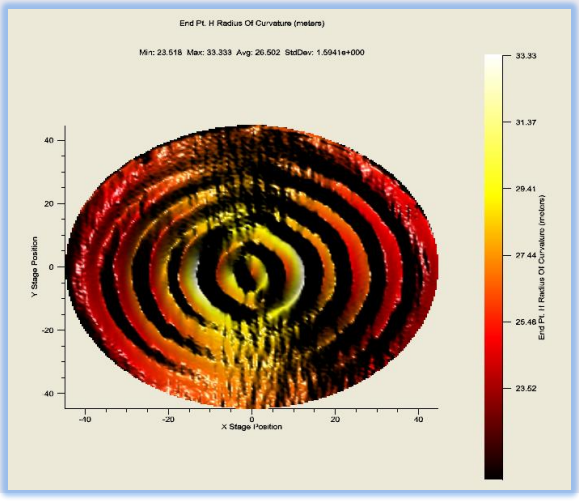
Rapid testing, powerful sample characterization

k-Space utilizes its world class metrology tools to offer in-house wafer and sample characterization services. We can perform full wafer/sample maps of curvature, bow height, tilt, and absolute laser reflectivity at 660nm. We can also perform spectral reflectivity, absolute transmission, optical absorption edge, and temperature-dependent optical absorption edge measurements. Whether you want to see how kSA metrology tools will work with your samples, or you need supporting data for proposal funding, or you need a bridge capability for metrology services before capital budgets are approved, kSA metrology services are a cost effective solution to obtaining the sample characterization you need now.

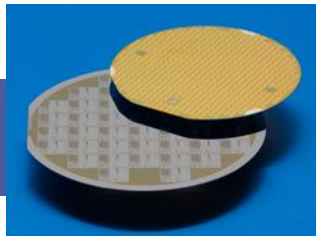
Turnaround time is typically 2-3 weeks and all characterization fees can be applied towards the future purchase of a new kSA metrology tool. Our in-house metrology capabilities and specifications are detailed below. Please don't hesitate to contact us at requestinfo@k-space.com with any questions. We look forward to hearing from you!

Wafer Curvature, Bow Height, and Tilt Characterization

- Standard Wafer Sizes: 2-inch, 3-inch, 100mm, 150mm, 200mm and 300mm. Wafers/samples must be mirror-like or near mirror-like surface quality (can see reflection in sample)
- Custom and larger sizes can be measured but may require machining of custom sample holders
- Scan Types:
  - line scan
  - Selectable area scan, up to full wafer with 5mm edge exclusion
- Scan resolution: 1um or higher
- Full area scans can be performed on wafer diameters to 300mm if radius of curvature is >= 10m.
- Curvature resolution: <= $2e^{-5}$ (1/m)
- Bow height resolution: <= 0.01um
- Tilt resolution: <= 0.01 arcsec

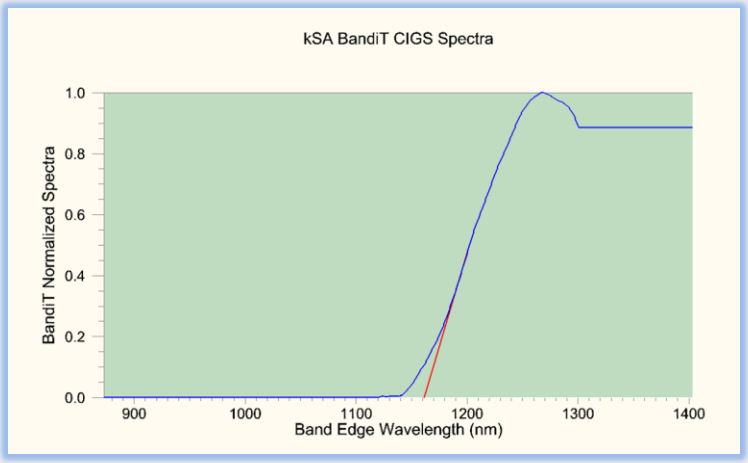


In-House Metrology Services



Semiconductor Optical Absorption Measurements

- Semiconductor optical absorption edge and temperature dependence of the optical absorption edge can be measured for semiconductors with band gaps in the range 0.8eV to ~3.35eV.
- Measurements can be made in high vacuum to approximately 800C or in a controlled atmosphere tube furnace (N2 or Ar) to 1000C

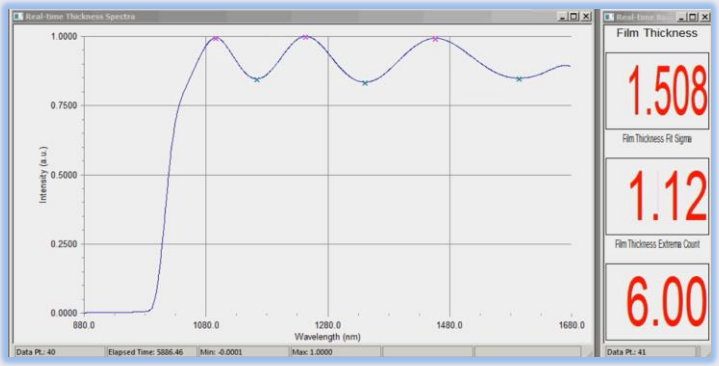


Spectral and Absolute Reflectivity Measurements

- Spectral Wavelength range: 380nm to 1700nm
- Regulated Quartz Halogen and Xe Light Sources
- Absolute reflectivity measurements can be made using in-house calibration standards over the 350nm-1100nm range with better than 0.5% absolute reflectivity accuracy
- Both absolute reflectivity and transmission measurements can also be via solid state lasers at 405nm, 532nm, and 660nm

Film Thickness Measurements

- Semi-transparent, heterostructure films (at least 1 interface, e.g. SiO2 on glass)
- Minimum film thickness of 5nm
- Need dispersion curve data on film material
- Only total film thickness measured, not individual layer thicknesses



Your Partner in Thin Film Metrology

k-Space Associates, Inc., is a leading supplier to the surface science and thin-film technology industries. Since 1992, we've delivered the most advanced thin-film metrology tools and software, thanks to close collaboration with our worldwide customer base.

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