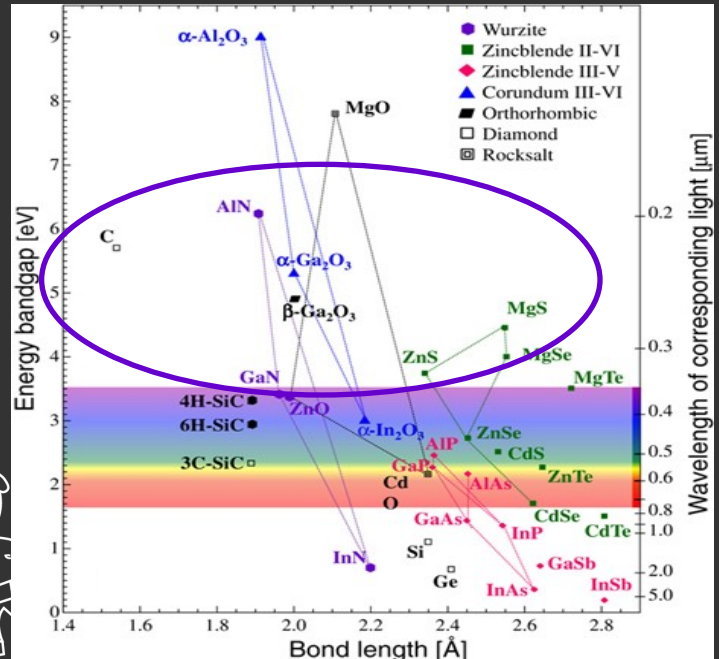


UV/VIS BandiT

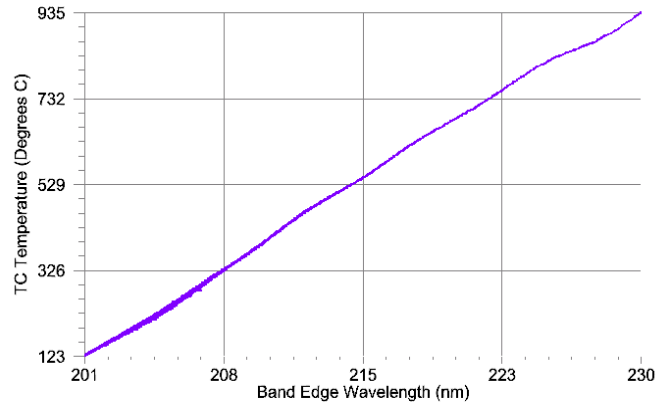
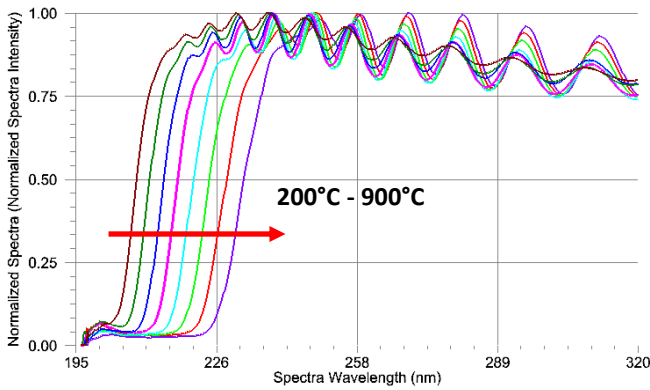
- Band Edge Temperature
 - Ga₂O₃
 - AlN
 - GaN
- Film Thickness
- Growth Rate
- Roughness



The kSA UV/VIS BandiT is a non-contact, non-invasive, real-time, wafer and film temperature monitor used for process monitoring and control during thin-film deposition and thermal processing. Using the temperature-dependent optical absorption edge inherent in semiconductor materials, kSA UV/VIS BandiT provides temperature monitoring in applications where pyrometers cannot, including substrates that are transparent in the IR, such as GaN, Ga₂O₃, and AlN. This is a direct measurement of the wafer or film temperature and not the temperature of a backside metal coating or the wafer carrier temperature. Unlike conventional pyrometry, BandiT's band edge temperature measurement technique is insensitive to changing viewport transmission, stray light, and stray light from substrate or source heaters.

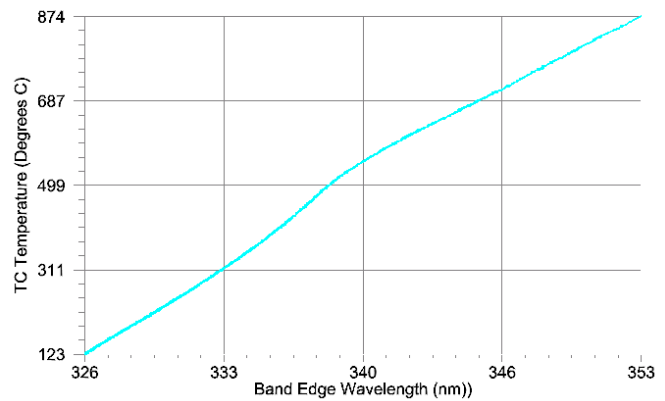
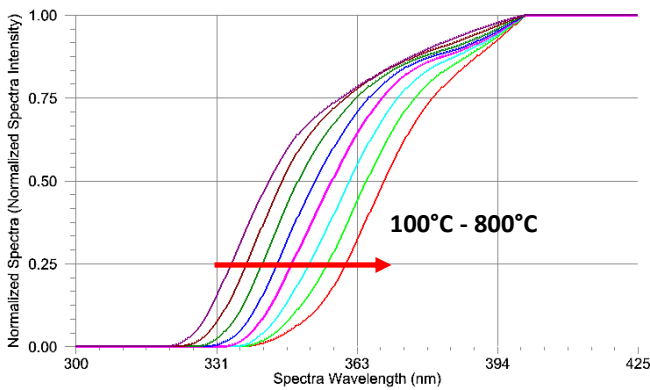
Model	Description
B-UV/VIS-MBE Spectrometer: 190-500 nm, 512 element Si array	<ul style="list-style-type: none"> • Measures band edge substrate temperature for GaN, GaN on sapphire, Ga₂O₃, AlN, and AlN on sapphire. • Measures real-time growth rate and film thickness for wide bandgap templates on sapphire.

AlN template on a sapphire substrate:



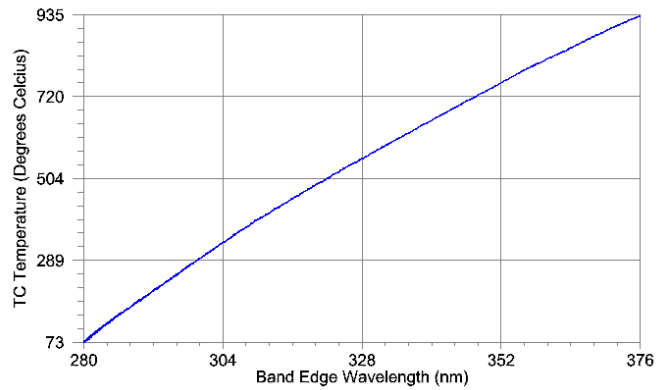
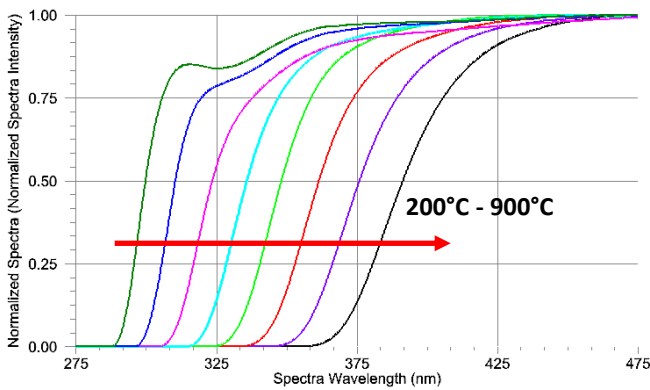
The data above shows band edge spectra measured from 200°C to 900°C on a 1 μm AlN template on a sapphire substrate manufactured by Dowa Electronics Materials Co. The associated BandiT calibration curve on the right indicates a band edge shift with temperature of $\sim 28^\circ\text{C}/\text{nm}$.

AlN substrate:



The data above shows band edge spectra measured from 100°C to 800°C on a 550 μm AlN substrate manufactured by HexaTech Inc. The associated BandiT calibration curve on the right indicates a band edge shift with temperature of $\sim 28^\circ\text{C}/\text{nm}$.

Ga₂O₃ substrate:

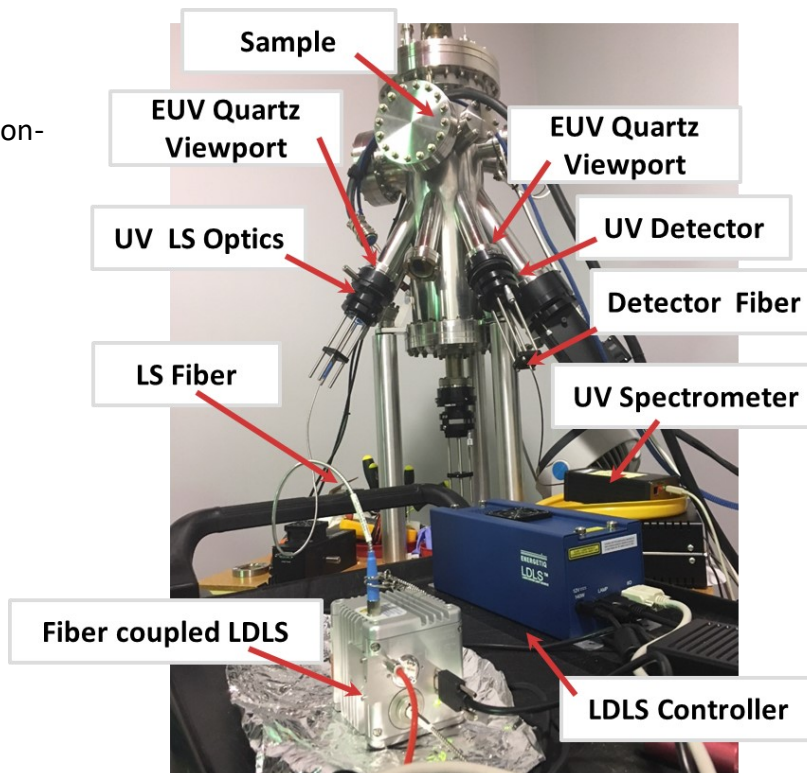


The data above shows band edge spectra measured from 200°C to 900°C on a Fe-doped Ga₂O₃ substrate manufactured by Tamura. The associated BandiT calibration curve on the right indicates a band edge shift with a temperature of $\sim 9^\circ\text{C}/\text{nm}$.



Hardware Configuration

- **Optical Access:** Operated in transmission with optical light pipe or reflection with use of two non-specular viewports.
- **Viewports:** Requires EUV grade viewports to minimize signal absorption.
- **Detector:** 190nm – 500nm spectrometer with a directly-coupled 0.5 m fiber. (Range may be customized upon request).
- **Laser Drive Light Source (LDLS):** Offers high intensity, uniform light flux in UV range with a long operational lifetime.
- **Ozone Mitigation:** UV/VIS BandiT detector and light source optics have nitrogen purge ports to mitigate ozone generation.
- **Blackbody/Pyrometry:** The addition of a NIR spectrometer offers the ability to measure the temperature of back-side metal coatings.



Computer Requirements

k-Space highly recommends purchasing a computer from k-Space for optimum use with kSA BandiT data acquisition and analysis software. Computers purchased from k-Space have all software, drivers, suggested settings, and required files pre-installed for fast and easy system set-up. Please refer to the kSA Computer Product Specifications for details.

Facilities Specifications

System Power: 120VAC with 10A max or 230VAC with 5A max, 50/60Hz compatible.

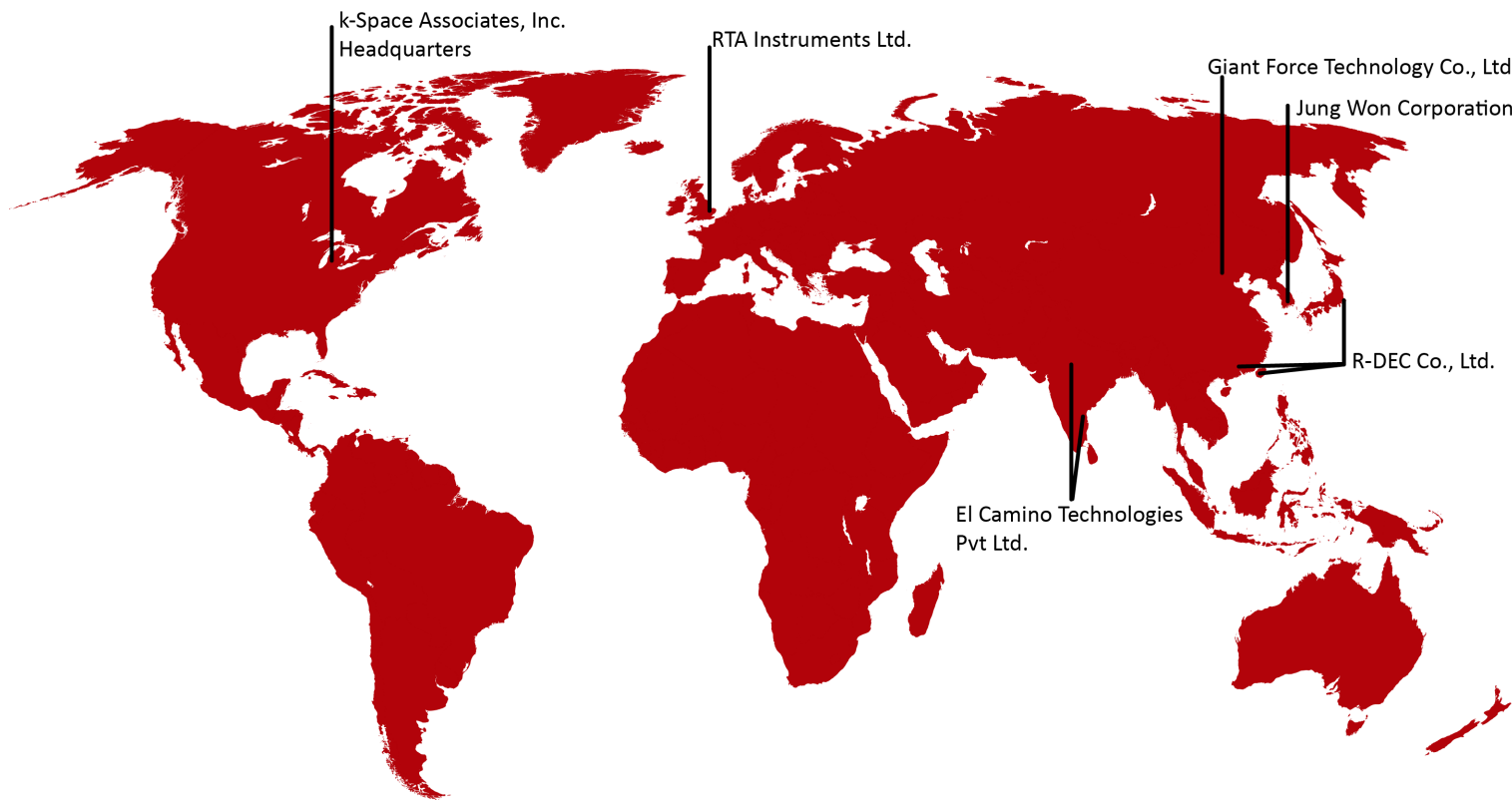
System Gas: Grade 6 Nitrogen or better gas purity is recommended for LDLS. Supply pressure should be 20 psig (0.14 MPa) (relative pressure). House nitrogen required to purge optics heads.

Installation and Training

A minimum of 2-3 days of on-site customer installation and training are required with system purchase.

Warranty

All kSA systems and integrated components are warranted against defective materials and workmanship for a period of ONE YEAR from the date of delivery to the original purchaser.



k-Space has an expansive network of distributors to best serve our worldwide customer base.

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About k-Space Associates, Inc.

k-Space Associates, Inc., is a leading metrology supplier to the semiconductor, surface science, and thin-film technology industries. Since 1992, we've delivered the most advanced thin-film characterization tools and software, thanks to close collaboration with our worldwide customer base. We realize the best products are developed with our customers' input, so we're good listeners. For your real-time surface analysis, curvature/stress, temperature, deposition rate, or custom project, we look forward to helping you with your thin-film characterization needs.

Specifications are subject to change without notice. While due caution has been exercised in the production of this document, possible errors and omissions may occur.