PHOTOTHERMAL
SPECTROSCOPY CORP

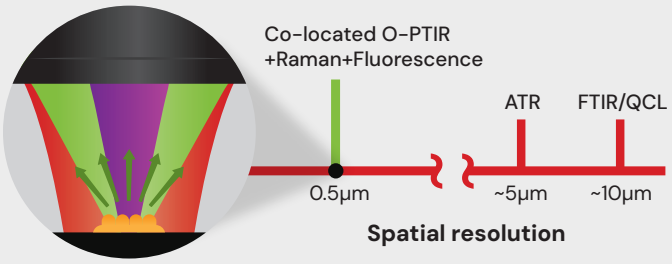
mIRage-LS

Sub-micron IR for failure analysis in semiconductor and microelectronics

- mIRage-LS overcomes the limitations of Raman and FTIR for failure analysis applications
- Non-contact, non-destructive, measurements with little to no sample preparation
- FTIR transmission-like spectral quality with compatibility to commercial IR libraries
- Optional co-located submicron IR and Fluorescence microscopy for identification of organic contaminants

featurefindIR™ automation software

featurefindIR provides rapid and automated detection, spectroscopic measurement, and chemical identification of contaminents and other particles. This significantly improves the productivity of measurement and provides a basis for measurements of large numbers of organic contaminants. Further information on featurefindIR can be found in data sheet number DS-004.



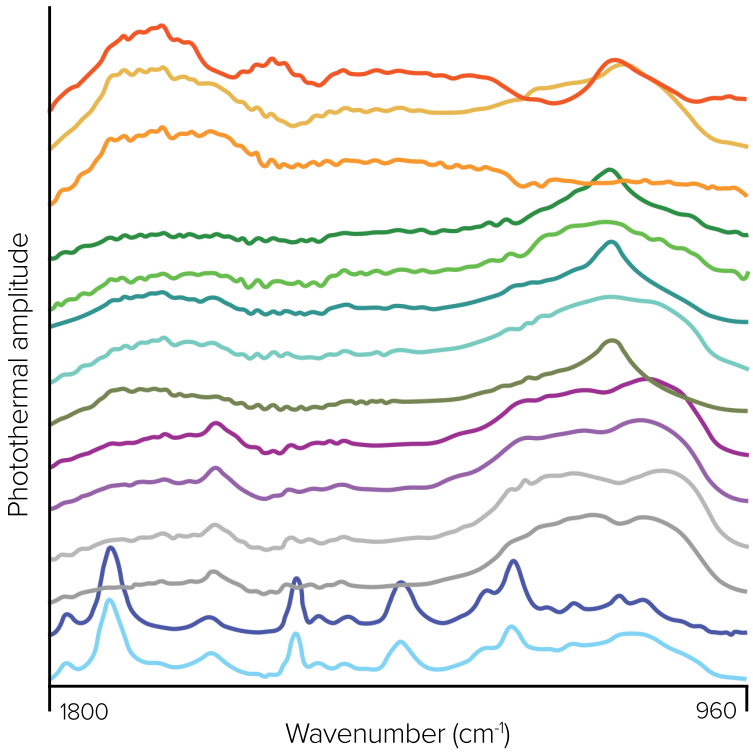
Sub-micron IR and multi-modal spectroscopy for faster time to data

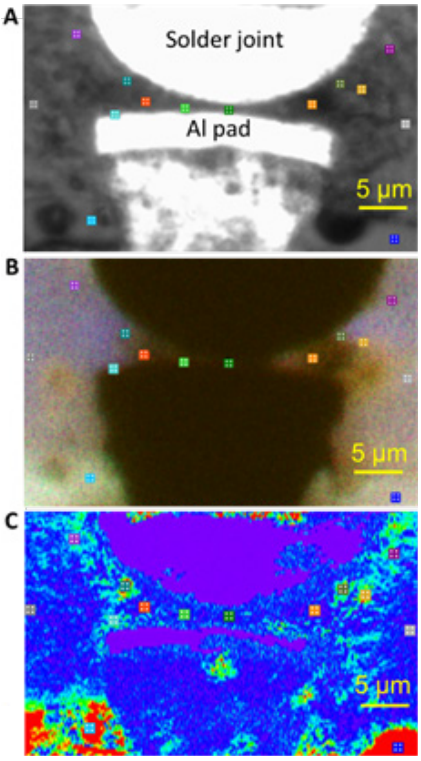
The mIRage-LS system provides sub-micron IR imaging resolution, and its unique reflection mode operation eliminates the dispersive scattering artifacts that arise with FTIR. O-PTIR resolution is 10-30x better than conventional FTIR or QCL based IR techniques and provides FTIR transmission-like spectral quality, which is searchable in commercial and custom IR libraries.

mIRage also overcomes the limitations of Raman, while providing higher signal to noise. This enables measurement of small, dark, and colored features of interest that Raman fails to image due to fluorescence issues. The mIRage-LS's higher spectral signal-to-noise is achieved with ultra-sensitive avalanche photodiode detector with no sample damage and provides higher signal to noise.

Additionally, the mIRage-LS provides an easy-to-use interface for users and automation capabilities, creating a highly productive experience for faster time to data.

The combination of these mIRage-LS features result in unique capabilities for failure analysis characterization in a variety of industries such as semiconductor, micro-electronics forensics and other industrial environments.





Fluorescence-guided O-PTIR analysis of the cross-section of a non-wetting solder joint due to the presence of organic matter on the aluminum pad; Inset A: brightfield image (A); Inset B: image after overlaying individual fluorescence images from excitation wavelengths of 497nm (blue), 578nm (green) and 628nm (red); Inset C: O-PTIR image taken at 1732cm-1; all data is taken with an low power detector. Spectra correspond to colored markers in the images.

System specifications

Sub-micron infrared and simultaneous Raman spectroscopy

Technique	Spatial resolution	Spectral range	Mode	Probe laser
IR (O-PTIR)	<1 µm with co-propogating 500 ≤500nm with counter-propogaing	1800-800cm-1 (a) 3600-2700cm-1 (b)	Co-propagating Counter-propogating	532nm 785nm (b)
Raman	≤500nm	3900-200cm-1 (c)	Reflection	

Co-located IR and widefield epi Fluorescence

Filter cubes	Objectives	Illumination	Camera
Standard filter cube options available	Standard optical objectives available	Combined 6 solid state white lights with liquid light guide	Sensor: back illuminated sCMOS monochrome Resolution: 2048 x 2048 Quantum Efficiency: up to 95% Spectral Range: 370 – 1100nm

(a) Other IR ranges available upon request, (b) Optional capabilities, (c) Other Raman gratings available upon request

PHOTOTHERMAL
SPECTROSCOPY CORP

325 Chapala Street, Santa Barbara, CA 93101 (805) 845-6568 info@photothermal.com www.photothermal.com