PHOTOTHERMAL
SPECTROSCOPY CORP

mIRage®-LSR Raman microscope

Automated Raman microscopy today. Multimodal microscopy tomorrow.

- Automated image segmentation combined with high-performance Raman spectroscopy for chemical characterization of particulates in solid and liquid materials
- Sub-500nm spatial resolution of pre-dispersed samples of dry powders, wet suspensions, and particulates deposited on substrates
- Compatible with featurefindIR™ – for automated particle detection, selection, and automated measurement workflows
- Compatible with industry-standard Raman spectral libraries
- Applications include pharmaceutical particulate analysis, forensics, microplastics, life sciences, consumer products, polymers and materials science
- 532 nm and 785 nm single and dual mode configurations available
- 21 CFR PART 11 software and instrument qualification services (IQ, OQ, PQ) options to support regulatory compliance and quality management systems

mIRage®-LSR

Built for today's automated spectroscopy workflows. Ready for future multimodal spectroscopy

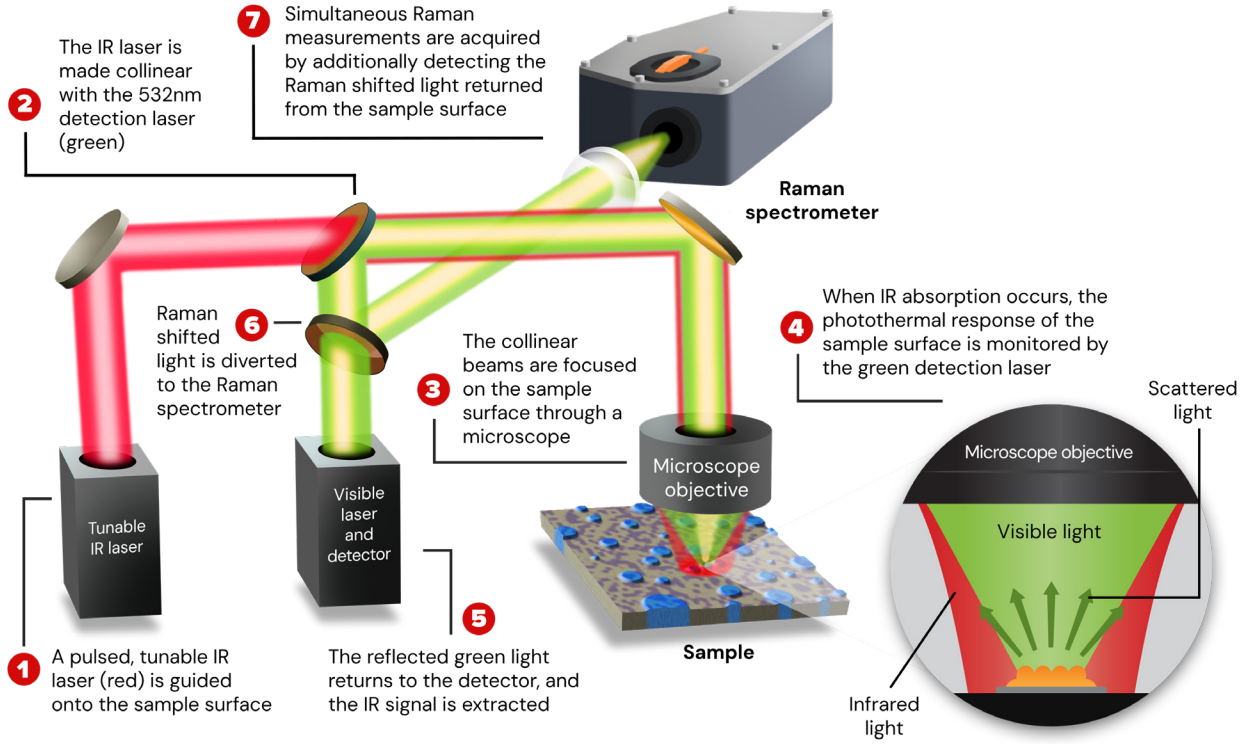
The mIRage-R, Raman microspectroscopy platform is a dedicated, high-performance Raman microscope designed for scientists and engineers in both development laboratories and manufacturing environments.

Designed on the proven mIRage-LS optical microscopy platform, it delivers high-quality Raman spectra and imaging across a wide range of applications including, pharmaceuticals, life sciences, microplastics, materials, and polymers. Capabilities such as featurefindIR™ enable efficient particle selection and characterization to streamline workflows and enhance productivity.

Importantly, the mIRage-LSR shares the same platform, accessories, and workflow as the full mIRage-LS system, ensuring a seamless upgrade path to submicron infrared spectroscopy in a single IR/Raman multimode instrument.

By investing in the mIRage-LSR laboratories gain a high performance Raman solution today, knowing that expansion into submicron IR (O-PTIR) for simultaneous submicron IR and Raman and/or widefield epi flfluorescence imaging is easily possible in the lab.

From Raman to Simultaneous Raman+submicron IR: Same Spot. Same Time. Same Resolution.



How it works: Simultaneous submicron IR+Raman

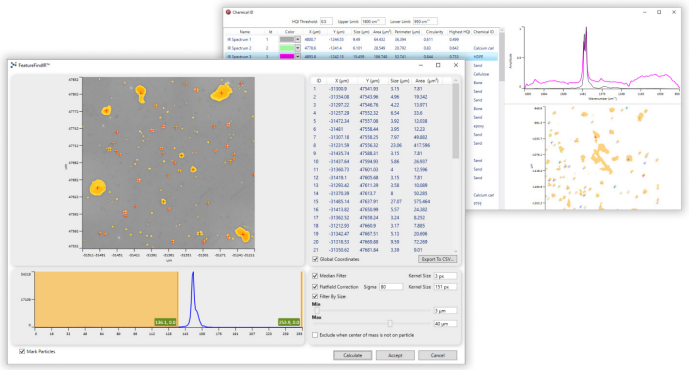
Future-proof your investment with O-PTIR upgrade

When your research requires complimentary submicron infrared spectroscopy, the mIRage-Raman platform can be seamlessly upgraded to submicron O-PTIR to enhance productivity.

- Continue using your Raman workflows and data while adding the unique capabilities of O-PTIR (submicron IR spectroscopy, no scattering artifacts, FTIR-database compatible spectra).
- Shared accessories and features: co-located fluorescence, and sample stages including featurefindIR™ and micro-ChemID.
- One platform, two powerful techniques – eliminating the need for separate Raman and IR instruments.

featurefindIR™ - Detect, Select, Measure

- Automatically measure Raman spectra and combine with particle morphological parameters for hundreds and thousands of particles using featurefindIR.
- Optional micro-ChemID provides support for Raman spectra and allows for user-created Raman libraries.
- Exports as needed to KNOWITAL and other industry standard Raman spectral libraries.

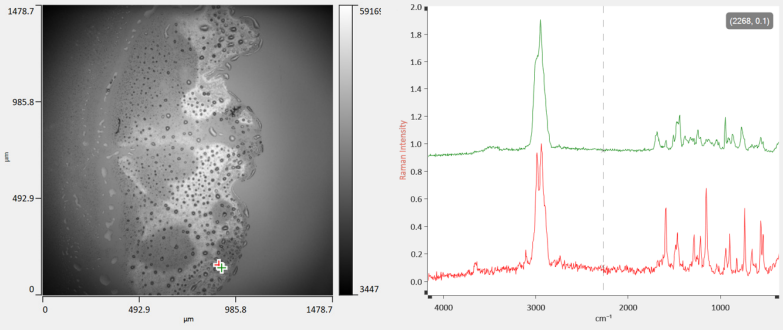


Automatically measure the chemical ID 100's of small particulates

Wide range of applications

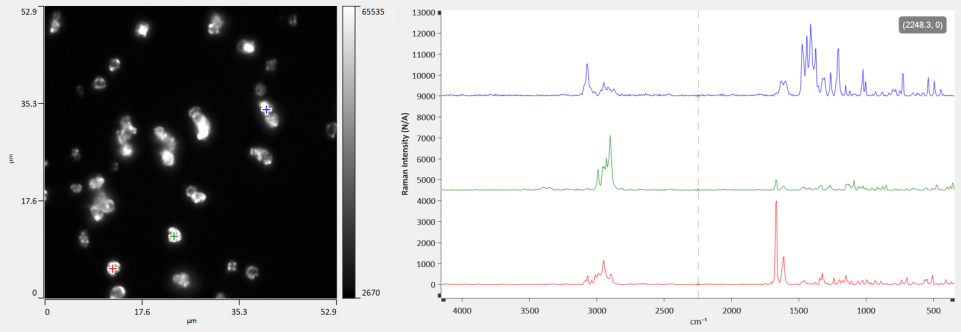
mIRage-Raman provides unique Raman and spectroscopy data for numerous material types and research areas, including:

Pharmaceutical particulates



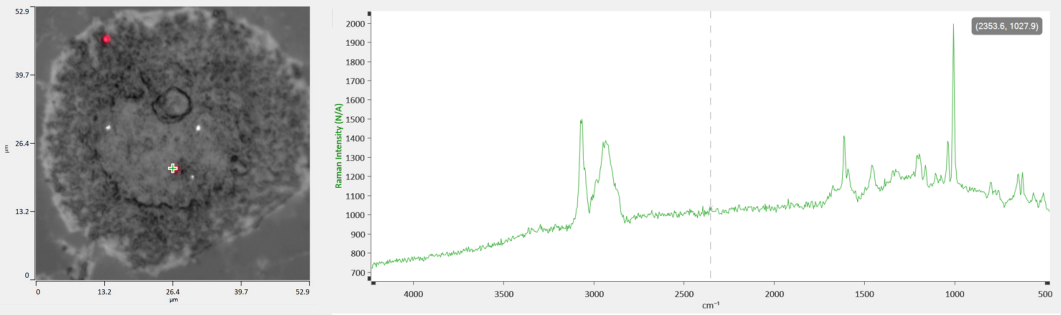
Amorphous Solid Dispersion (ASD). Brightfield image and Raman spectra.

Orally inhaled and nasal drugs



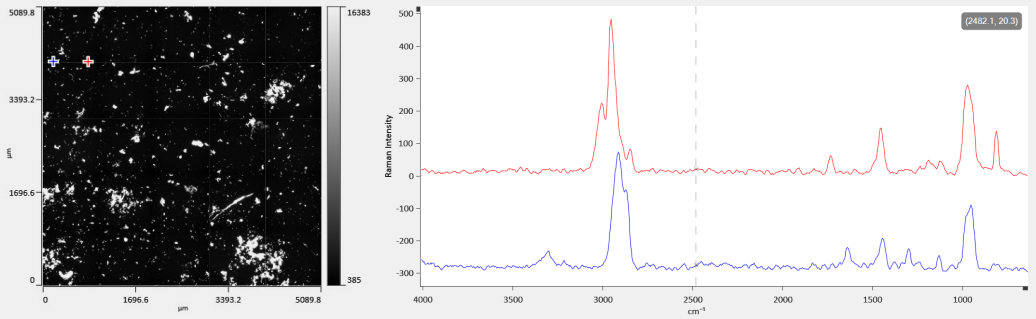
Cross-polarizer image and Raman spectra of APIs and excipients.

Particulates in cell and tissue



Brightfield image and Raman spectra of FL labelled PS beads (1um) in cells (dried).

Microplastics



Cross-polarizer image and Raman spectra of microplastics (red: PMMA, 13µm, blue: Nylon, 11µm)

Product specification overview

Spectral range and resolution **532nm Excitation**	• 532nm laser with 600 l/mm 500nm blaze grating spectrometer • Raman spectral range approximately 3800-200 cm^{-1} • Four position automated grating turret • Average resolution is typically 4 cm^{-1} • 532nm laser with optional 1200 l/mm 500nm blaze grating enables higher spectral resolution of approx. 2 cm^{-1} with corresponding reduction in spectral range of approximately 2000 cm^{-1}. Range will reduce when working at higher wavenumbers.
Spectral range and resolution **785nm Excitation**	• 785nm laser with 300 l/mm 1200nm blaze grating • Raman spectral range approximately 3350-350 cm^{-1} • Four position automated grating turret • Average resolution is typically 4 cm^{-1} • 785nm laser with optional 600 l/mm 1000nm blaze grating enables higher spectral resolution of approx. 2 cm^{-1} with corresponding reduction in spectral range of approximately 2000 cm^{-1}. Range will reduce when working at higher wavenumbers.
Dual 532 and 785nm laser **Options**	• System provides for dual laser configuration, with user capability to switch between the 2 laser options for optimum raman performance. • Additional optional laser excitation wavelengths are available.
Automated image analysis	• Olympus Brightfield/Darkfield, co-propagating automated turret system • 4x, 10, 20x and 50x objectives • Over 20 Particle Morphological parameters

PHOTOTHERMAL SPECTROSCOPY CORP

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

For full references to the data highlighted in this document, please refer to our website.

DS6 - Oct 2025