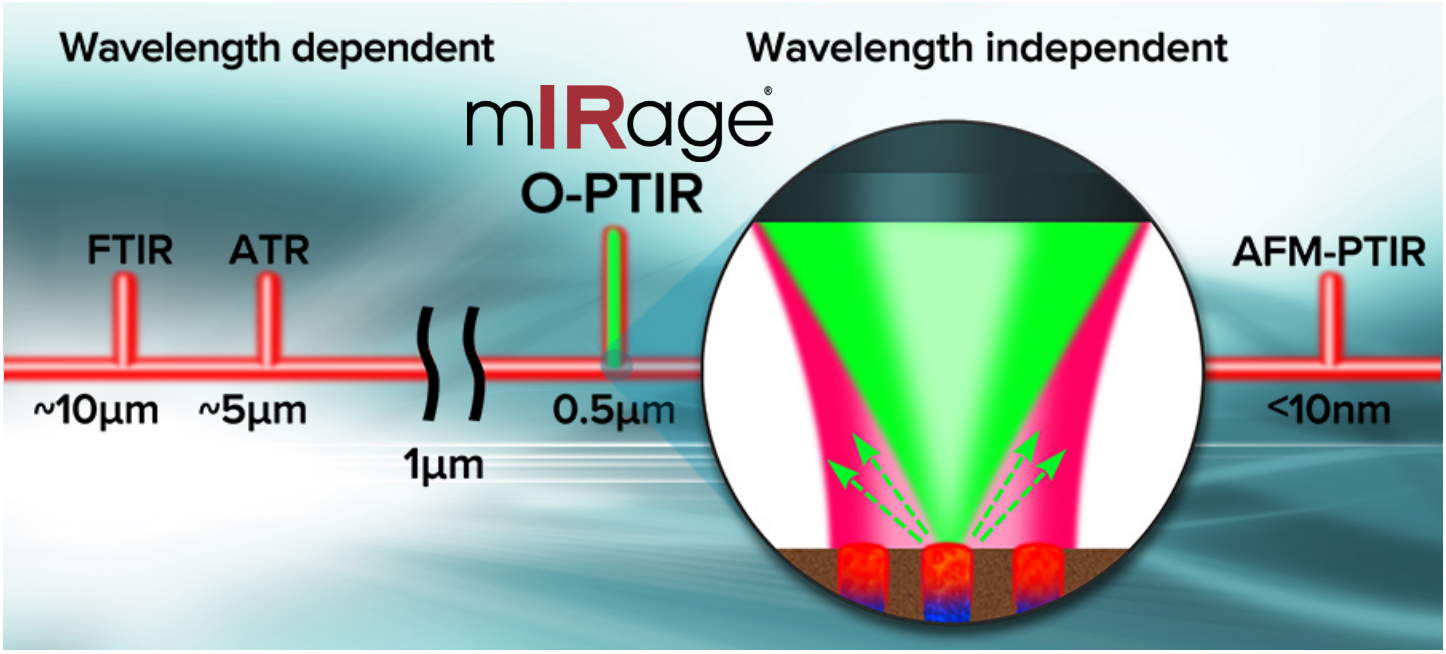
PHOTOTHERMAL
SPECTROSCOPY CORP

O-PTIR
Beyond the limits of traditional IR microscopy



- Simultaneous IR and Raman microscopy
- Submicron IR spatial resolution
- Non-contact measurement

The mIRage® IR Microscope

A system unlike any other

The mIRage® IR Microscope uses a proprietary technique based upon Optical Photothermal IR (O-PTIR) spectroscopy, breaking the diffraction limit and bridging the gap between conventional IR microscopy and nanoscale IR spectroscopy.

Submicron spatial resolution

See spatial and chemical detail down to the submicron level, a capability not possible with traditional IR microscopy.

Non-contact measurement

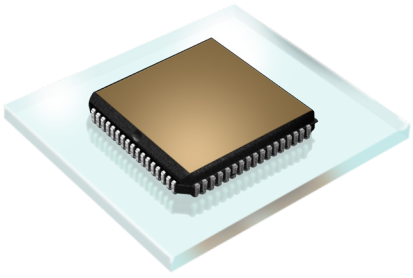
Unlike in ATR, no contact is required, hence no risk of damage to the sample or ATR, nor risk of contamination or sample carry-over. Furthermore, rough, hard, soft or sticky samples can be measured easily as well as points within sample valleys or crevices.

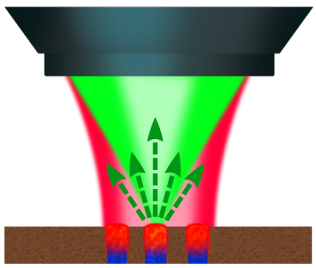
Distortion and artifact-free IR spectra

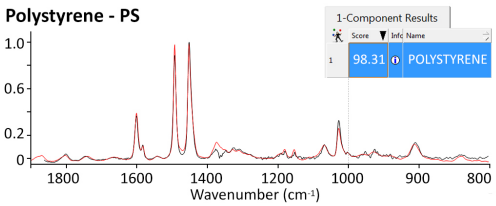
Spectra collected in non-contact reflection mode produce transmission quality IR spectra, free of distortion or artifacts (e.g. Mie scattering, Restrahlen bands). Spectra are also unaffected by sample shape or size, thereby allowing easy spectral library searching and interpretation.

Little to no sample preparation

Quickly and easily measure a range of materials, without needing to cut to thin sections or prepare the surface finish.







Easily mount any sample

Samples require little to no sample preparation. Above: a semiconductor chip ready for measurement.

Measure with O-PTIR

Spectra are rapidly acquired for numerous material types.

Analyze spectra

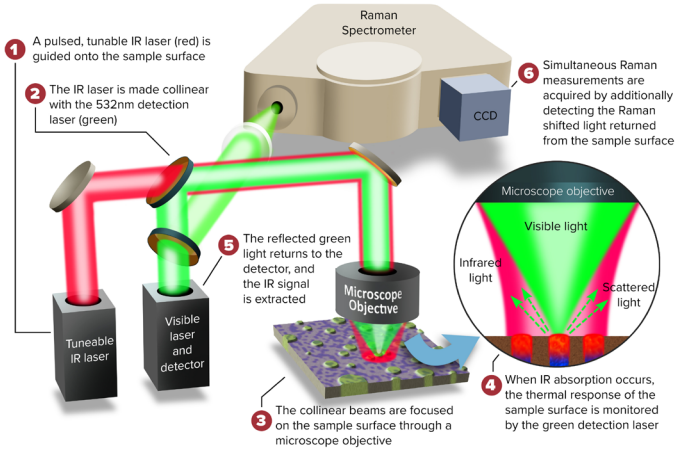
O-PTIR spectra can be easily searched against commercial IR spectral databases.

IRaman

Same time.
Same spot.
Same resolution.

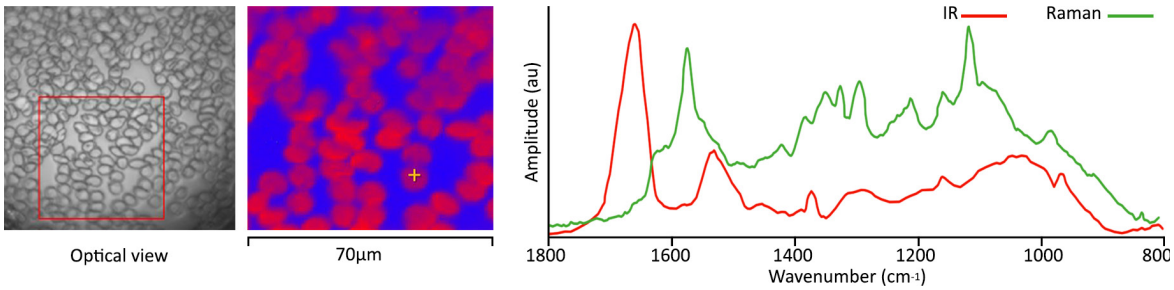
The world's first simultaneous **IRaman** (IR-Raman) microscopy system is a unique dual modality platform that combines all the advantages of O-PTIR with complementary Raman microscopy via simultaneous detection of the visible probe laser.

Spectra, line scans and 2D maps can now be collected from the same spot at the same time, opening up new research opportunities and a more thorough characterization of your sample.



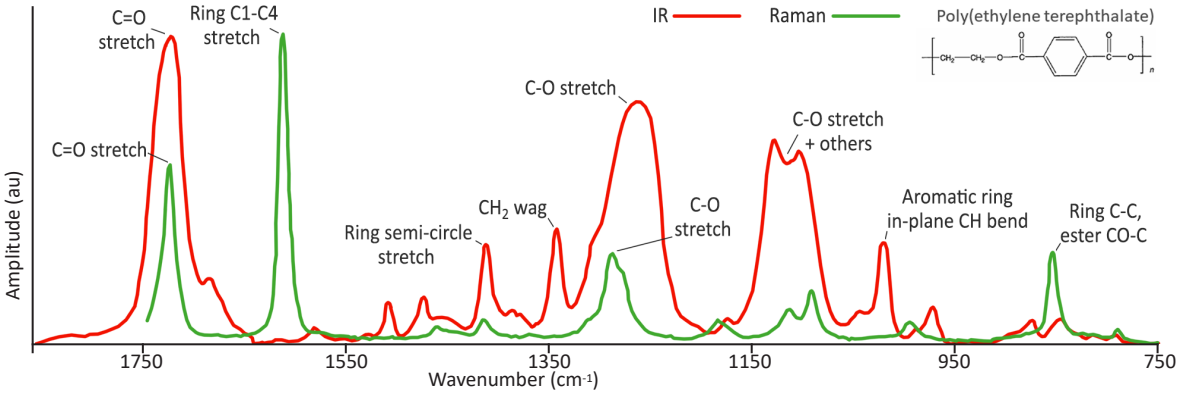
See what you've been missing

IRaman analysis of red blood cells



Left: Optical image with selected 70 x 70 µm. Middle: Subsequent Raman image taken at 1583 cm-1. Right: IRaman spectra collected off of a selected red blood cell (~500 nm resolution).

Simultaneous submicron IR and Raman spectroscopy of PET



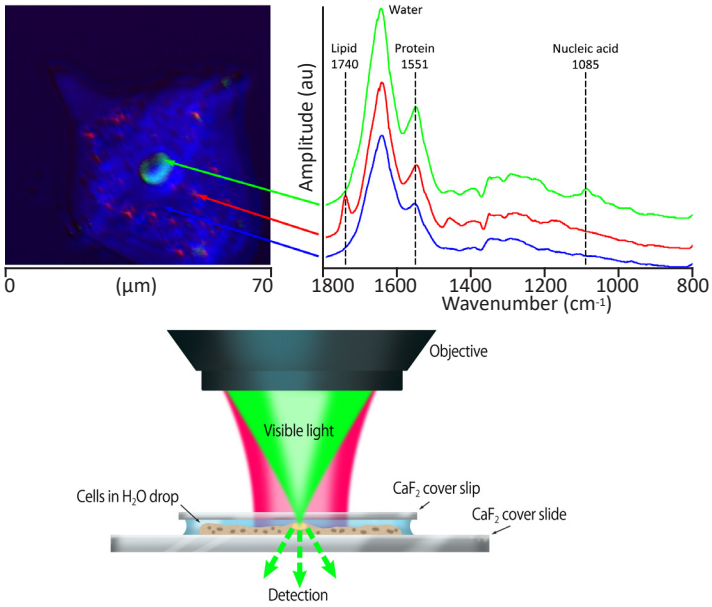
Simultaneous O-PTIR and Raman spectra from a film of polyethylene terephthlate (PET) collected from the same spatially resolved, submicron spot.

A wide range of applications

O-PTIR provides unique data for a wide range of sample types, including:

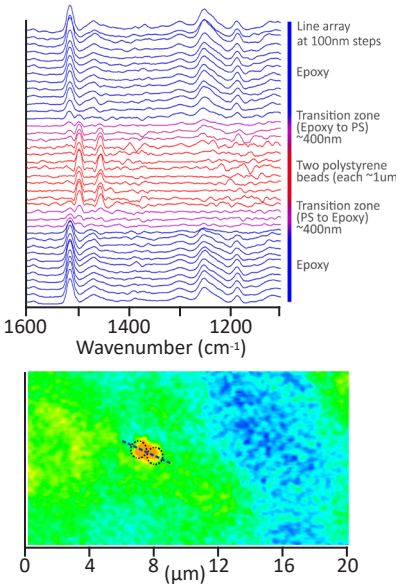
- Polymers
- Composites
- Defect identification
- Geological sciences
- Pharmaceutical
- Microelectronics
- Life science
- Forensics

Submicron O-PTIR imaging of live cells in water



Top left: Optical image of hydrated epithelial cheek cells in water. Top right: Key macromolecules are easily spectrally discerned and spatially isolated, with lipid inclusions as small as 0.5-1 µm being easily resolved. Spectra are not corrected for water and therefore inclusive of water absorbances. Images were collected at 500 nm step size. Bottom: The measurements were collected using a 0.5 µm step size in transmission mode.

Submicron polymer and defect imaging



Bottom: Demonstration of ~400nm spatial resolution as determined from a line scan (at 100nm steps) across 1 µm diameter polystyrene beads embedded in epoxy and sectioned to ~300nm thick. Top: A sharp boundary of only ~400nm is observed on both sides of the polystyrene beads as the IR spectral features transition between the two components.

System specifications

Spectral range		Mode	Probe laser (mIRage/Raman)	Stage minimum step size	Stage x-y travel range
IR	1850-800 cm^{-1} (a) 3600-2700 cm^{-1} (b)	Reflection Transmission (d)	532 nm (e)	100 nm	110x75 mm
Raman	3900-200 cm^{-1} (c)	Reflection			

(a) Other IR ranges available upon request
(b) Requires selection of optional OPO laser
(c) Other Raman gratings available upon request
(d) Requires selection of optional transmission path
(e) Other Raman lasers available upon request

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