

SMITHS DETECTION

Adding a molecular
dimension to
your microscope

IlluminatIR™

Compatible Microscopes and
Raman Microprobes

- Leica
- Nikon
- Olympus
- Zeiss
- JY Horiba
- Kaiser
- Renishaw

Pharma
• Polymorphs
• API
• Excipients

Forensics
• Fibers
• Drugs
• Paints

Materials
• Solutions
• Identification
• Structure

Microanalysis
• Polarized Light
• Fluorescence
• Normarski DIC

smiths

The Power of Molecular Analysis at the Touch of a Button

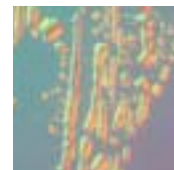
The IlluminatIR Infrared Microspectroscopy Accessory brings the power of molecular analysis to light microscopy. This compact, high-performance Fourier Transform Infrared (FT-IR) Spectrometer transforms a commercial light microscope into a versatile infrared microprobe. By interfacing to a modern infinity-corrected microscope, the IlluminatIR creates a system that provides instant molecular information and superior visual quality without compromising any of the microscope's original capabilities.

Before the IlluminatIR, molecular analysis of microsamples meant purchasing a specialized infrared microscope and interfacing it to a laboratory FT-IR spectrometer bench. Often, these IR microscopes compromised image quality for spectral analysis. The IlluminatIR overcomes this by interfacing to industry leading light microscopes. Just as EDX expands SEM's capability to do elemental analysis, the IlluminatIR expands your light microscope's capabilities into molecular analysis.

Retain Your Microscope's Full Optical Capability

All your traditional microscopy techniques and options remain fully functional, including:

- polarized light illumination
- fluorescence analysis
- Nomarski Differential Interference Contrast (DIC)
- image analysis
- superior visual quality



Simple Operation and Rapid Results for the Spectroscopist or the Microscopist

Simple Operation, Rapid Results

Whether your training is in traditional microscopy or spectroscopy, the IlluminatIR gives you the independence to easily and conveniently perform material characterization of samples as small as 10µm.



See Exactly What You Are Analyzing

The IlluminatIR provides a magnified digital image of the sample seen through both infrared objectives, allowing you to see the exact area of the sample that the infrared beam strikes. An optical element permits continuous viewing of the sample, even during IR data collection. By varying the sample area mask, you ensure that only the area irradiated is analyzed. In this way, you can selectively analyze portions of the sample.



Simple step-by-step analysis

The IlluminatIR's easy to use software, SynchronizIR, walks you step-by-step through a complete analysis process.

1. Decide which IR objective (ATR or ARO) to use
2. Choose an aperture based on sample size
3. Record a background
4. Record sample spectrum
5. View library search results
6. Generate a report

The whole process takes just a few minutes!

At the heart of the IlluminatIR's simplicity you will find the innovative ContactIR™, Diamond Attenuated Total Reflection (ATR) Objective and the All Reflective Objective (ARO).

The ContactIR™ Diamond ATR objective is a unique diamond internal reflection objective that operates like a standard objective but also allows spectral measurements. With little to no sample prep needed, collecting spectral information is simple.

Once data is collected simply remove the sample, wipe the ATR clean, and you're ready for your next sample.

Ideal for:

- Coatings
- Fibers
- Powders
- Glass
- Corrosives
- Particulates
- Hard Polymers
- Geological Material

The ARO Objective uses reflection absorption spectroscopy (RAS) for quick analysis. Samples can be analyzed directly, while mounted on an infrared reflective glass microscope slide, or while safely enclosed on specially designed sealed cell slides.

Ideal for:

- Coatings on metals
- Crystals grown from solution
- Toxic or pathogenic materials
- Samples you don't want to touch (hazardous materials or delicates)



Powerful Customized Software that Simplifies Data Collection

The IlluminatIR is driven by SynchronizIR software, a powerful customized software package which automates and simplifies spectral data collection, analysis and reporting. SynchronizIR was designed specifically to collect visible images and infrared spectra sequentially and store them together in a database format. This allows you to build detailed customized reports with supporting images and spectra in seconds.

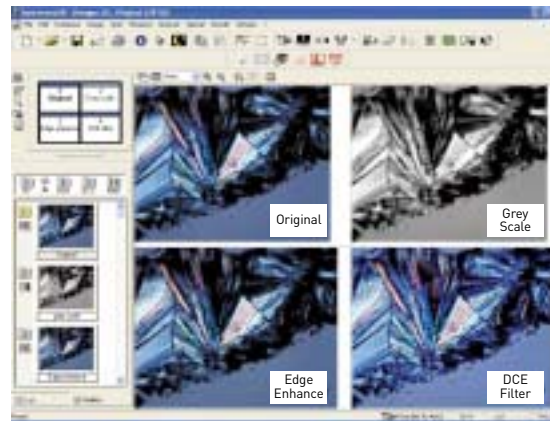
SynchronizIR also allows you to perform:

- Image calibration and measurement
- Video zoom
- Image filtering
- Display multiple images simultaneously
- Color and intensity balancing post collection



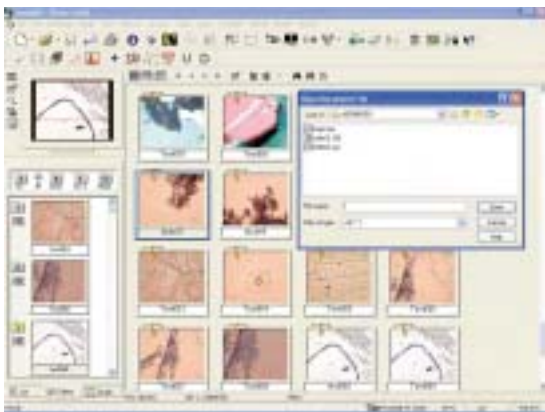
Video Zoom:

- Offers a detailed image of a magnified sample
- Scale automatically adjusts to selected magnification



Multiple Image Display:

- Displays multiple images for visual comparison
- Compare Samples



Database

- Stores image and all related data files including spectra
- Multiple image and spectral files can be saved within a single database
- Additional processed images can be added to entries



Reports:

- Displays visual and infrared data along with method parameters and library matches
- Customizable
- Exportable to .RTF format

Detect Identify Characterize

By combining light microscopy with infrared spectroscopy, the IlluminatIR opens the way to a new understanding of the relationship between sample morphology and molecular chemistry.

Every analytical challenge is unique. From needing to know if a specific material is present, "to chemical identification," all the way to seeking an understanding of molecular chemistry, the IlluminatIR provides a new tool offering rapid and reliable answers.

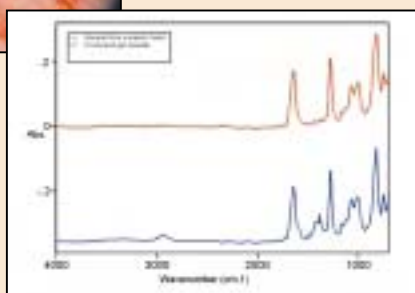
Application: Forensic

Sample: Black marks on a suspect's hand

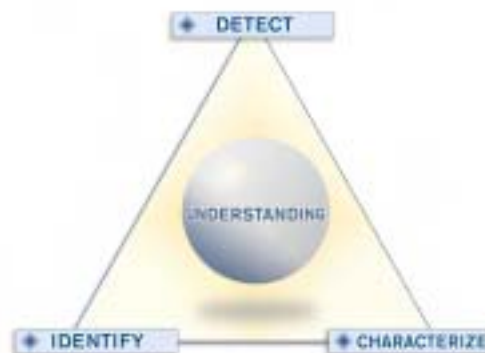
Problem Definition: A suspect, incarcerated for the death of his girlfriend, claimed that while he tried to talk her out of committing suicide there was a struggle for the gun, which went off killing her. The man had what appeared to be gun powder residue in both hands. By the location of the residue, the man could not have fired the weapon, however, the particles needed to be conclusively identified in a non-destructive manner.

Analysis Description: Initially, marks on the suspect's hands were not believed to be gun powder residue so they remained in the suspect's hands for over six months. Particles were later extracted, scraped from the skin cells and analyzed with the IlluminatIR

Results:



Conclusions: The spectrum of the particles removed from the suspect's body, showing some morphology gunpowder, matched the spectrum of gunpowder, supporting the suspect's claims of innocence.



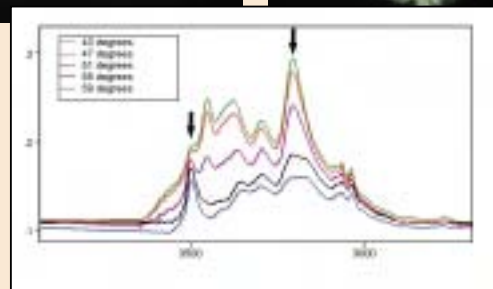
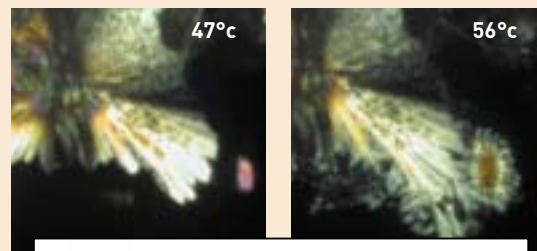
Application: Pharmaceutical Research

Sample: Carbamazepine (CBZ)

Problem Definition: CBZ exists as four distinct polymorphs as well as a dihydrate. The dihydrate has a reduced efficacy. Understanding the water loss and gain is vital to determining how to package and protect the drug from hydration.

Analysis Description: Single crystals of the dihydrate were synthesized. IR spectra of the crystal was collected as the temperature was raised. The temperature at which the water was lost can be observed from the IR spectra.

Results:



Conclusions: CBZ was found to lose water from the dihydrate at 50 degrees indicating the relative instability of the dihydrate.

IlluminatIR

Making Analysis Simpler

The unique union of spectroscopy and microscopy offered by the IlluminatIR may be new, but the company behind the innovation is not. Smiths Detection is a world leader in the development of systems and accessories that simplify the use of IR spectroscopy in real world applications. Smiths Detection provides solutions for customers who require absolute confidence in their analytical results for applications such as:

- Materials inspection
- Quality control
- Contaminant or unknowns analysis

Smiths Detection's mission Making FT-IR Useful™ is based on the belief that customers require solutions to problems and need their instrument to provide answers easily and reliably.

- Smiths Detection's Diamond ATR technology revolutionized the way analytical chemists prepared samples for infrared analysis.
- Smiths Detection's DuraSamplIR™ brought high-performance FT-IR into the reach of any analytical lab.
- The DuraScope™ made infrared microanalysis simple and affordable for labs not requiring a full-function infrared microspectrometer.
- The TravelIR™ mobile FT-IR, awarded an R&D Magazine Top100 Award, made FT-IR a powerful tool for field testing of many sample types.

And now, with the IlluminatIR, Smiths Detection has applied its expertise in infrared microspectroscopy to extend the molecular characterization power of FT-IR to the light microscopist.



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