

**Thermo Scientific Nicolet Continuum**  
Infrared Microscope



## Infrared microscopy excellence

Crystal-clear visible microscopy • Superior purity infrared spectroscopy  
Extensive software toolkit • Comprehensive sampling solutions

**Thermo**  
SCIENTIFIC

# The power of infrared microscopy

We are your infrared microscopy partner. For decades, our innovative products have been chosen for more labs and solved more problems than any other manufacturer's. Our high-performance microscopes, combined with our powerful software and comprehensive sample preparation offerings, provide you with complete microscopy solutions. All of this, packaged with the support and the experience you expect from a world-class leader, offers you the ultimate microscope for your needs.

## Ensuring total confidence and error-free operations

The Thermo Scientific™ Nicolet™ Continuum™ infrared (IR) microscope is a research quality tool designed for today's multi-purpose labs. It provides both high-performance IR sampling and unparalleled visible-light microscopy.

Accurate sampling is assured with features like Thermo Scientific™ TruView™, which provides a continuous view of the sample simultaneous with data collection, ensuring total confidence in forensic science studies and error-free operation

in any application. The Thermo Scientific™ Reflex™ aperture provides redundant infrared masking, which minimizes the effects of diffraction. Optional configurations provide you with a microscope that fits the needs of your analysis at the time of purchase or enhancements whenever your needs change. The Continuum microscope utilizes powerful sampling technology – ready to assist you in unlocking the mysteries of your sample.

*Exceptional visual  
observation quality*

*Best spatial resolution*

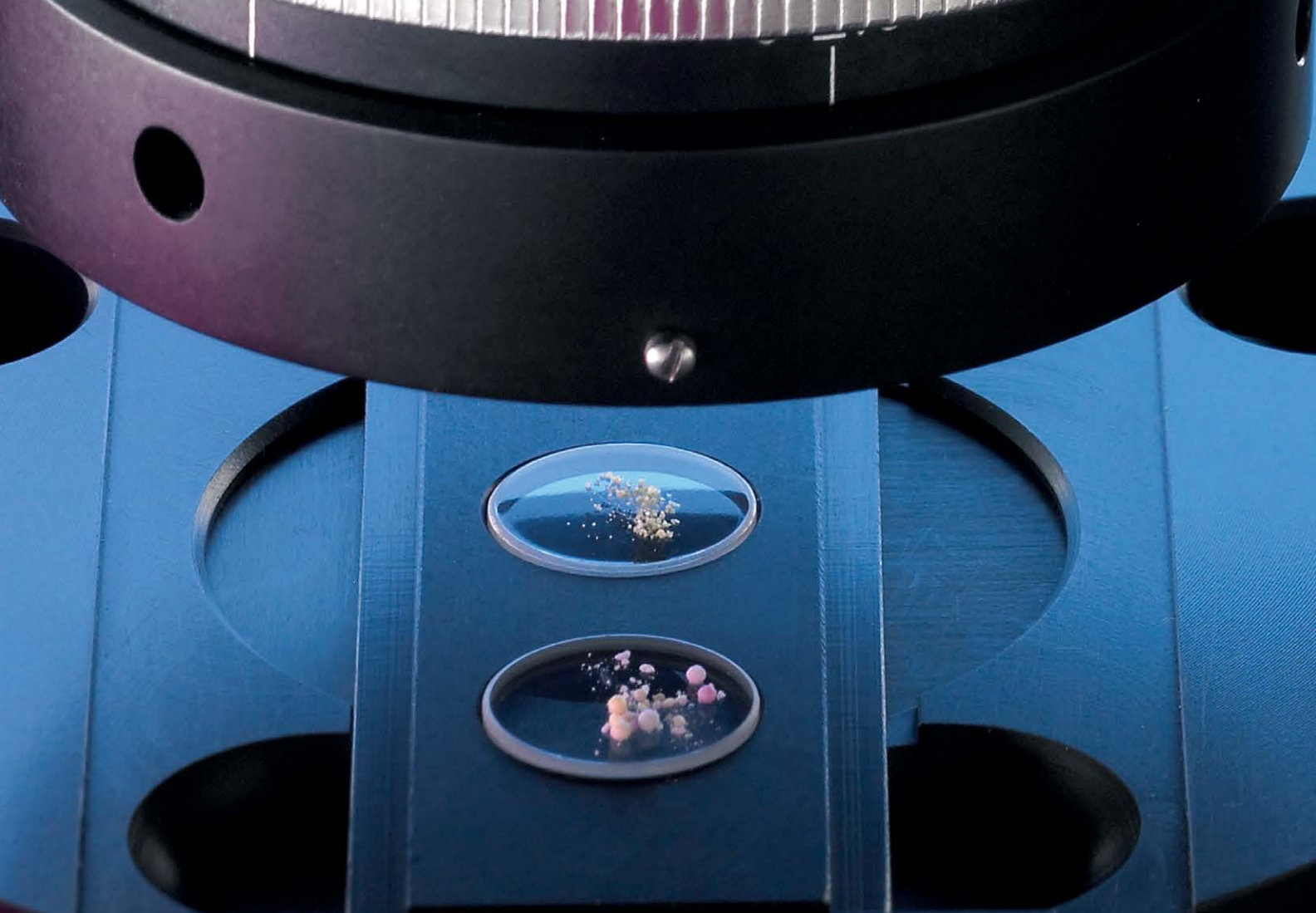
*Unsurpassed spectral purity*

*High sensitivity*

*Expandability*







## Your applications

Infrared microscopy is one of the most useful material characterization tools to get the right answer – no matter what the application or the sample. The characterization of micro samples is a common requirement for any quality control, analytical services or research laboratory in pharmaceuticals, polymers, packaging, coatings, chemical or textiles. Within these labs, infrared microscopy addresses many important steps in the process:

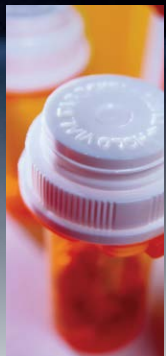
- Failure analysis
- Product consistency verification
- Reverse engineering
- Research and development

Infrared microscopy allows the measurement of bulk, surfaces, and composite structures expanding its powerful capabilities to unlimited material science applications including:

- Forensic analysis
- Surface analysis
- Art conservation
- Mineralogy
- Biochemistry
- Homeland security

The highest confidence in material characterization can be obtained from a wide range of samples including:

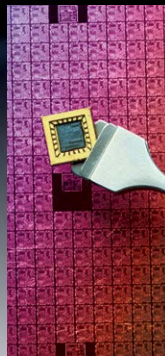
- Particles
- Fibers
- Inclusions
- Laminates
- Tissues
- Coatings
- Liquid traces



Pharmaceuticals



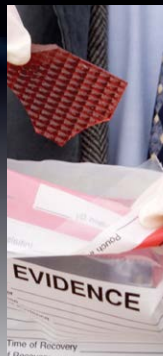
Polymers



Microelectronics



Chemicals



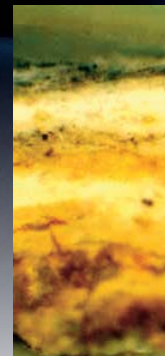
Forensics



Packaging



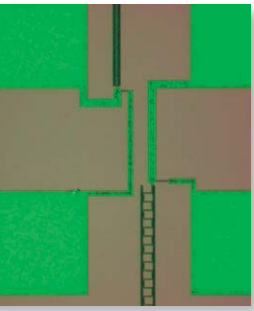
Textiles



Art Restoration



# High performance optical microscopy



Sharp sample images are essential for revealing fine structure in both visible and infrared microscopy analysis. The Nicolet Continuum IR microscope's optical design combines infinity corrected optics, the finest quality optical components, and visual enhancement tools for any kind of sample.

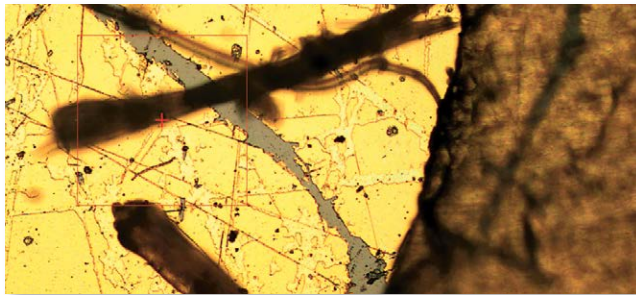
- **Infinity Corrected Optics** – provide a uniform sharp focused image.
- **Brightfield Köhler Illumination** – provides research-grade optical microscopy viewing for reflection and transmission independently.

- **Infinity Corrected Visible Objectives** – provide multiple sample magnification, 1 micron visual resolution and perfect focus in a wide field of view.
- **Thermo Scientific™ Reflachromat™ Optics** – provide crystal clear and sharp images when using salt windows, support materials and compression cells.
- **Differential Interference Contrast (DIC)** – reveals the fine structure of low contrast samples with no need for staining.
- **Visible Polarization** – helps identify sample structures, crystal forms and distribution.

- **Fluorescence Illumination** – highlights sample areas active to chromophores.



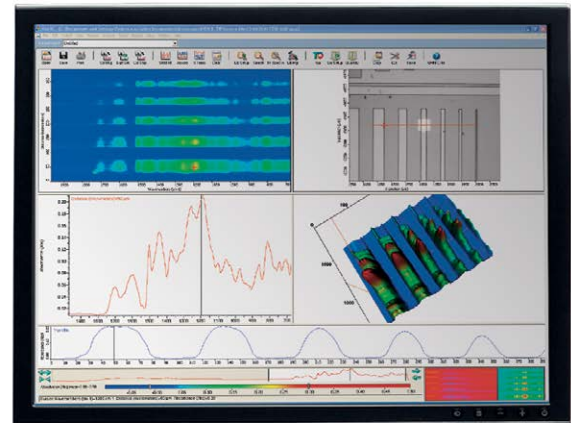
Defect on polyester fiber textile



## Unique Range of Objectives

The Nicolet Continuum IR microscope offers a wide selection of visible and IR/Visible objectives:

- **4x, 10x, 20x and 40x Visible Objectives** – Infinity-corrected objectives provide multiple magnification and best quality video-capturing image archiving.
- **15x and 32x IR/Visible Reflachromat Optics** – Infinity-corrected Cassegrain optics with proprietary spherical aberration compensation design.



Video image

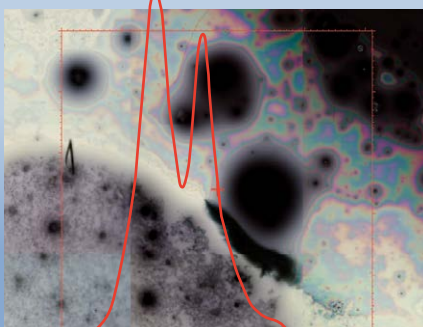
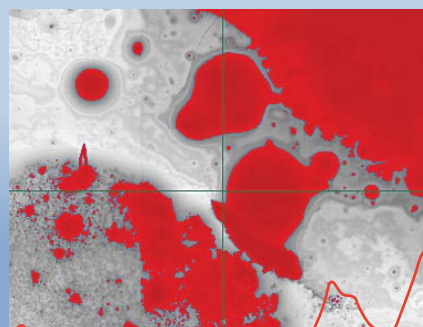
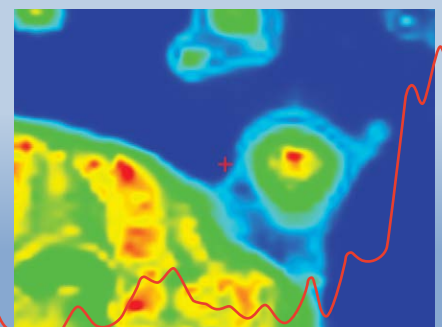
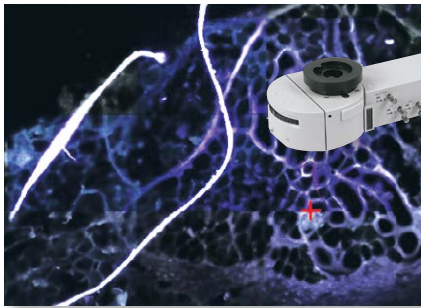


Image analysis



Chemical image of adhesive & ink contaminations





Fluorescence image of biological tissue



Polymer laminate (left) and scratched sample surface under DIC (right)

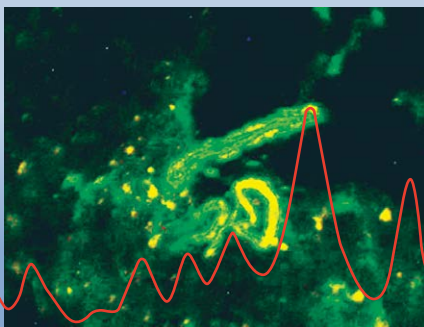


## Video Image Capturing

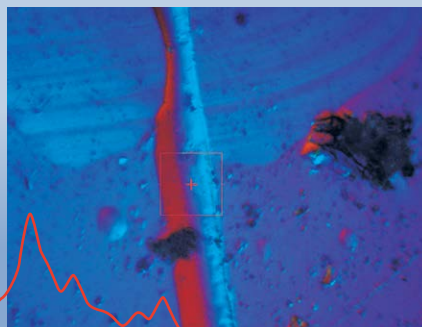
The Nicolet Continuum IR microscope uses a CCD color digital camera for video capturing which provides high resolution, high signal-to-noise, and the highest fidelity images of the sample's fine structure.



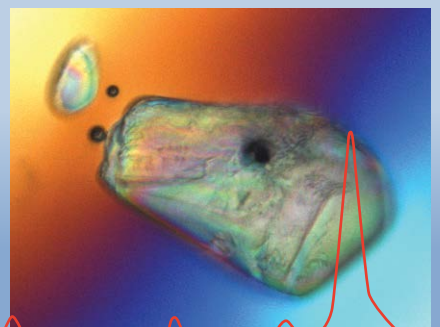
Fluorescence



DIC



DIC





# Unparalleled infrared performance

## Accurate Micro Sampling

The Reflachromat optics ensure perfect matching of the IR/Visible beams, which is an essential step for superior spectral purity and spatial resolution.

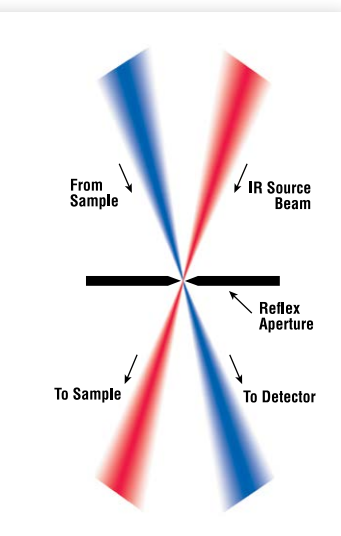
The Reflex aperture provides diffraction-limited spectra by masking both the pre- and post-sample image with one aperture assembly.

- Highest resolving power for the most challenging samples
- Easily position the aperture onto the sample image
- Redundant aperture performance through a single aperture

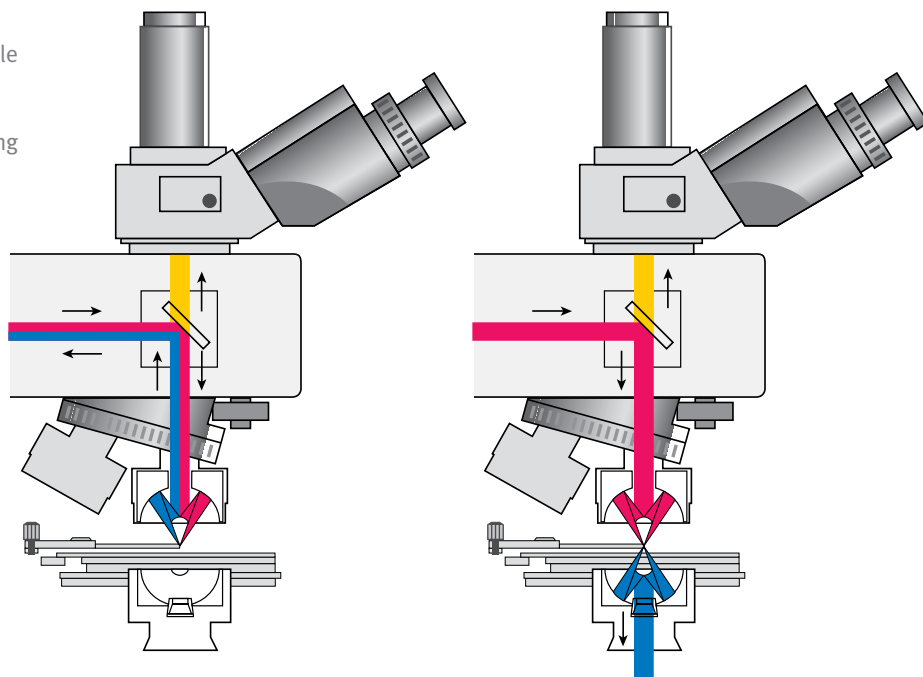
TruView optics (Simultaneous View/Collect) allow the simultaneous viewing and spectral collection of the sample providing the highest confidence in your results. What you see is what you get.

Combining TruView with the spectral collection preview mode, you can even get results “on the fly” while moving the sample. This is the most effective sample screening you can get from an infrared microscope.

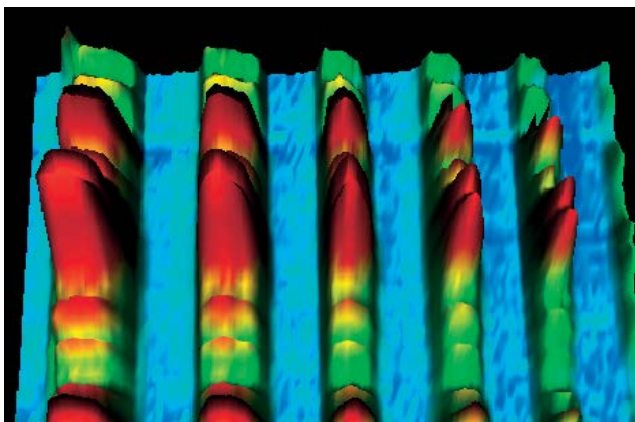
- Collect and view simultaneously
- Error-free operation
- Sample screening



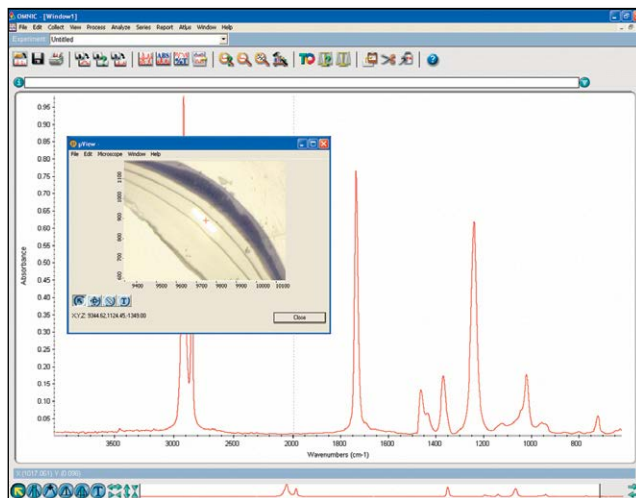
Dual masking is achieved with a single physical aperture – offering maximum resolution while being simple to use.



Infinity-corrected design and TruView optics allow sharp visible images to be seen while collecting IR data.

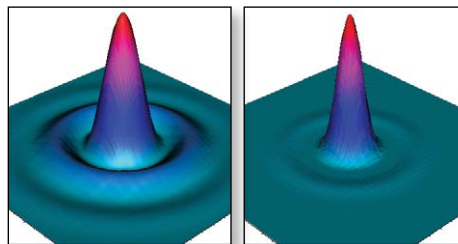


Spatial resolution achievable with the Slide-On Tip ATR Objective (Photoresist target. Latter profile <5  $\mu\text{m}$  wide)



Most samples can be easily measured with 15× optics and the mid-band MCT-A detector. However, the Nicolet Continuum IR microscope lets you increase its resolving power anytime by adding 32× optics and a 50 micron MCT-A detector for the characterization of samples smaller than 10 microns. When the spectral information in the low-frequency region is really important to fully characterize your sample, the Continuum's dual detector stage allows you to expand the range down to 400  $\text{cm}^{-1}$  enhancing your analytical power by adding a wide range MCT-B. This allows you to examine inorganics, fillers and other materials which may reveal the difference you were looking for.

- Optimize your microscope for your most frequent samples
- Increase sensitivity for very small samples
- Expand the spectral range for full sample characterization



Energy profiles of single and dual aperture designs. Dual aperture design (right) eliminates most of stray-light.

## Exceptional Versatility

- Removable Nosepiece
- Köhler Illumination for Reflection and Transmission
- Manual, Mapping and Heated Stage
- Brightfield, Darkfield and Polarized Light
- 4×, 10×, 20× and 40× Visible Objectives
- 15× and 32× IR/Visible Optics
- Slide-On ATR and ATR Objectives
- Grazing Angle Objective
- DIC and Fluorescence Illuminations
- Wide and Mid-band MCT Detectors
- 50  $\mu\text{m}$  MCT and InGaAs Detectors
- Side Port Reflectance



# Expand your sampling capabilities

## ATR, Slide-On ATR, Grazing Angle, and Side Port Objectives

### Versatility

The Nicolet Continuum IR microscope's removable nosepiece provides the capability to exchange different objectives designed to best fit your sample depending on its size, shape, and thickness. Many samples can even be measured with no sample preparation.

The unique design of the Slide-On ATR Objective allows simple in situ exchange of crystals with different materials available for specific sample types and provides the following benefits:

- Sample position reproducibility
- Easy cleaning to avoid cross-contamination
- ATR survey mode
- Cost effective, replaceable crystals
- Uncompromised transmission, reflection and ATR in a single objective
- Infinity-corrected optical design
- Proprietary spherical aberration compensation

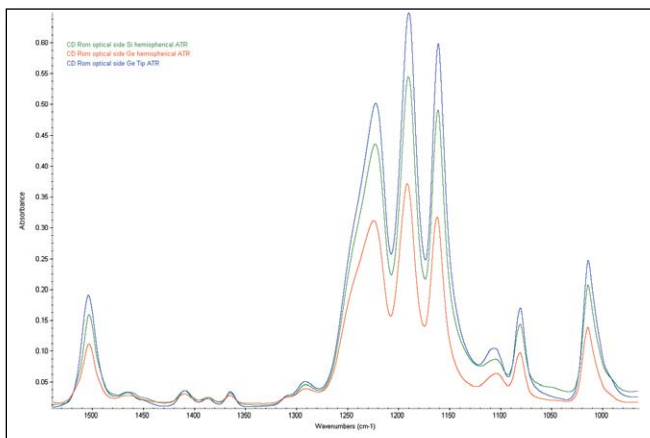
The Slide-On ATR Objective is a perfect choice for several applications including:

- Surface analysis/depth profiling
- Coatings on non-reflecting substrates
- Inclusions in resins, polymers and rubber materials
- Art and historical artifacts
- Microelectronics
- Forensics
- Defect analysis
- Residuals inside depressions



*Analyze your sampling needs and find the perfect match.*





Depth of penetration of the Slide-On hemispherical and Tip ATR crystals. The Tip ATR crystal angle of incidence provides the greatest depth. The combination of the three crystals provides a depth range, depending on the sample, from 0.4 to about 0.8 micron at 2000  $\text{cm}^{-1}$ .

## Power and Flexibility

The ATR Objective adds the power of seeing the sample through its ZnSe or diamond crystal. The grazing angle objective allows the measurement of sub-micron thickness layers, while the Side Port Reflectance Accessory (which works in conjunction with the 15 $\times$  Reflachromat or the Slide-On ATR Objective) allows the measurement of large samples which will not fit on the stage.

Improve your spatial resolution with the powerful combination of the 50 micron MCT-A and 32 $\times$  Reflachromat. And for imaging microscopy capabilities, add the fast mapping stage and the Thermo Scientific™ OMNIC™ Atlas™ software to your configuration.



The Nicolet Continuum IR microscope comes standard with a set of tools which allows you to manipulate fibers, particles, and other objects including blades, tweezers, slides, roller knife, support windows and probes.

## Sample preparation accessories

Sample preparation is the secret behind the scenes of successful infrared microscopy analysis. Some samples can be measured with no need for preparation. When preparation is required, knowing and having the right tools makes you an expert in infrared micro sampling, no matter what the sample is.

Some materials can be measured by placing them on a reflective substrate. Samples which are too thick for transmission analysis – or not ideal for ATR analysis – require compression while microscopic drops of liquid require a compatible support material. That's why we offer a wide range of tools specifically designed to let you become an expert in sample handling:

- Sample manipulation kit
- Support windows – for transmission analysis and compression cell
- Aluminum and gold coated slides with multiple spots – for particles and liquids
- Compression cell – for fibers, particles, laminates
- Diamond compression cell – for rigid or thick samples
- Diamond knife – for multilayer film preparation
- Diamond Micro-plane – for preparation of laminates from polymers, wood and other bulk or coatings



Compression cell and fiber sample preparation



Sampling slides and fiber sample rolling preparation

# Locate, identify, and quantify

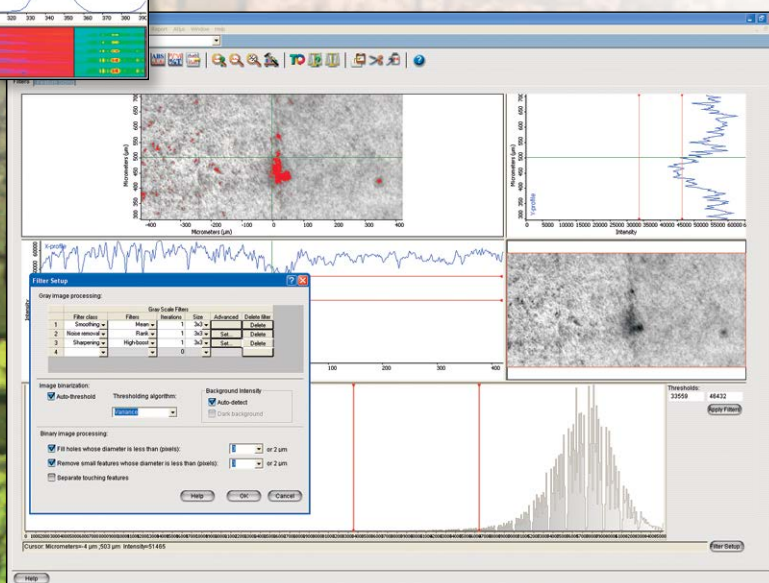
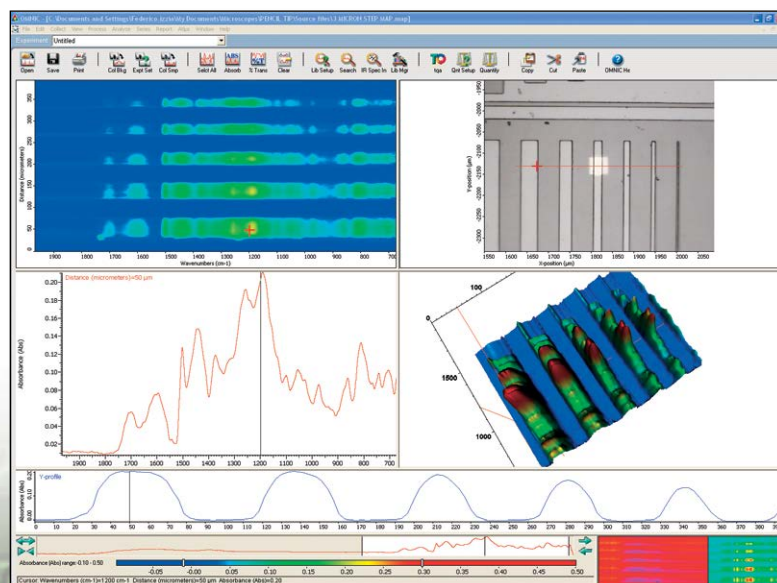
## OMNIC Atlas Imaging Software

The Nicolet Continuum IR microscope's superior performance is augmented by the exceptional capabilities of OMNIC Atlas software and the fast mapping stage. OMNIC Atlas software provides the most powerful infrared chemical imaging tools available on the market for the extraction of physical, chemical and spatial information from your sample.

OMNIC Atlas software provides data collection, processing and visualization in one powerful, yet easy-to-use software package. The software is fully integrated with the OMNIC Professional Software Suite from Thermo Fisher Scientific, providing the very best in spectral manipulation, database searching and chemometrics.

While image analysis is widely used in microscopy to provide dimensions, shape, and the distribution of sample features, OMNIC Atlas extends this powerful capability by applying image analysis to both video and chemical images of the sample. The information extracted from the video image is comparable to what can be obtained from a research-grade optical microscope. The image analysis applied to chemical images extracted from the sample provides physical and chemical information specifically for each component, including:

- **Number and size of sample features** –  
Particles, fibers and irregularly shaped objects
- **Physical information** –  
Length, diameter, area and much more
- **Image analysis of a chemical image** –  
Specific information for each material identified in a matrix
- **Total distribution of each material** –  
Semi-quantitative information with no need for calibration





Data acquisition includes video image mosaic collection, discrete points, line maps and area maps in reflection, transmission or ATR. OMNIC AtPlus provides contour display, 3D display, video image and spectrum pane in a seamless, combined and easy-to-use user interface. Several data-processing tools are available for the extraction of chemical images from your area map experiments:

- **Frequency location –**

Just move the scroll-bar across the spectrum to get a single-frequency based chemical image in real time

- **Functional group –**

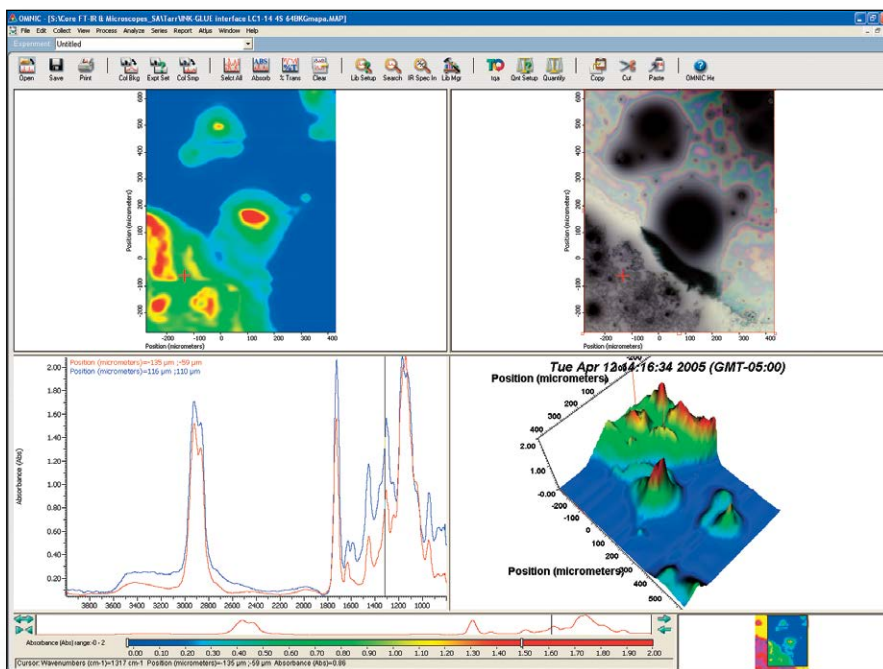
Get the chemical image by available functional groups or from your own created ones

- **Correlation –**

Select a reference spectrum from your area map and get its distribution in the whole area

- **Chemometrics –**

Create chemical images based upon your TQ-Analyst Quant methods (PLS, CLS, and more), Principal Component Analysis or the fully unattended Multivariate Curve Resolution



# Multiply your productivity with a Thermo Scientific Nicolet FT-IR spectrometer

Partnering your Continuum with a Nicolet FT-IR spectrometer adds analytical power

## Thermo Scientific™ Nicolet™ iS™10 FT-IR Spectrometer

*Workhorse FT-IR for regulated, fast-paced QC, and analytical support laboratories*

The ideal spectrometer where FT-IR is critical to monitoring product consistency, troubleshooting or reformulating complex materials. If your industry requires compliance to stringent regulations, the Nicolet iS10 is there for you at every step.

- Highest confidence for raw materials, impurities and compound identification
- Continuous performance verification
- Complete regulatory compliance tool set
- Electronic SOP authoring
- Expanded sampling capabilities (TGA/IR, Near-IR, microscopy)
- Award-winning OMNIC software



## Thermo Scientific™ Nicolet™ iS™50 FT-IR Spectrometer

*Highest flexibility, productivity and performance for world-class analytical services and research laboratories*

One-touch simplicity, flexibility and integration in a compact, cost-effective workstation. Fully automated, the multi-spectral range iS50 FT-IR spectrometer system dramatically improves productivity in analytical laboratories focused on understanding complex materials.

- Touch Point operation simplifies instrument setup and operation
- ATR, Raman, TGA and NIR modules at the touch of button
- Integrated modules provide flexibility to analyze multiple sample types
- Automation allows unattended multi-range operation
- Powerful OMNIC software ideal for method development, analytical support, and research



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