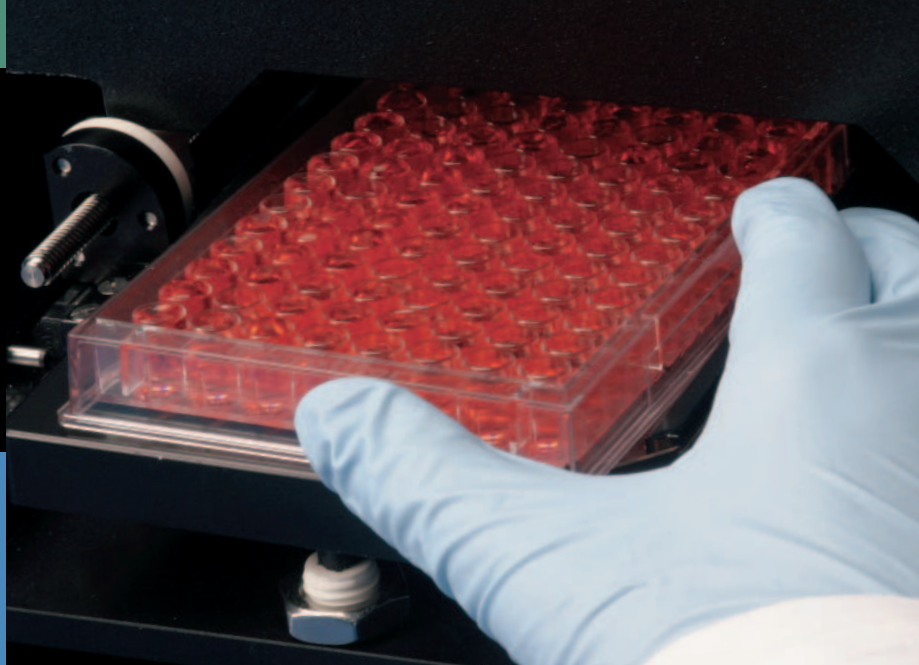


## Nicolet NXR FT-Raman Spectrometer



*Leading the Industry with Advanced,  
Easy-to-Use Instrumentation*



Fully Optimized FT-Raman Performance



Automated Operation



Micro and Macro Sample Handling

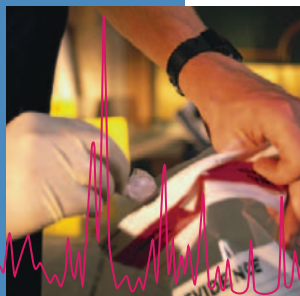


Flexible Sampling Options

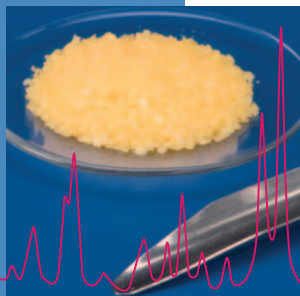
# THE RAMAN ADVANTAGE



Pharmaceuticals



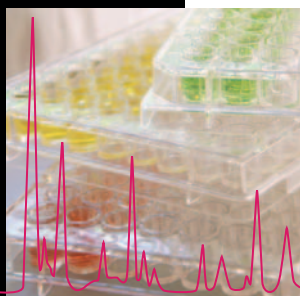
Forensics



Polymers



Chemicals



Microsampling

Raman spectroscopy is a powerful analytical technique which is finding increasing use in environments where its ease of use and non-destructive sampling methods make it a valuable addition to more traditional technology. Extensive spectral libraries, combined with sophisticated searching software, make sample identification easy. Raman is unique in its ability to identify physical differences, such as in crystalline structure.



## Raman is Well Suited to:

- Molecular characterization of organics and inorganics
- Conformational analyses such as crystallinity, phase transitions and polymorphs
- Analysis of solids, liquids, and in some cases gases
- Micro- and macro-sampling
- Qualitative and quantitative analysis

## Raman Complements FT-IR:

- Both provide spectra rich in information relating to vibrational energy states of covalently bonded materials
- Bonds that generate weak bands with one method typically provide strong signals with the other
- FT-IR usually provides more information relating to functional end groups
- Raman frequently provides more information relating to molecular backbone structures

## Advantages Offered by Raman:

- Non-destructive method
- Non-contact
- Typically no sample preparation – no need to dissolve solid samples, nor destroy physical and chemical properties prior to analysis
- Easy sampling through glass and plastic packaging
- Easy access to far-infrared vibrations
- Unlike other techniques, Raman is minimally affected by most molecular interactions. This typically results in spectra with sharp, distinct peaks suitable for spectral interpretation and successive subtraction.

## Dedicated or Modular

With choices in lasers, detectors, and sample handling, the Thermo Scientific Nicolet™ NXR FT-Raman spectrometer is designed for maximum flexibility, handling the full range of Raman applications, from routine analysis to cutting-edge research, and from simple compound identification to complex array analysis.

### Dedicated Spectrometer for Optimal Performance

The **Thermo Scientific Nicolet NXR 9650 FT-Raman spectrometer** is designed to deliver outstanding performance with no compromises.

- High-speed, LN<sub>2</sub>-cooled NXR Genie Ge detector for rapid scanning and maximum sensitivity
- High-resolution 1064 nm laser
- Dual detector option – NXR Genie Ge detector plus InGaAs detector
- Upgradeable to FT-IR

**NXR 9650 Dedicated FT-Raman Spectrometer**



**Nicolet NXR 9610 Dedicated FT-Raman Spectrometer**



### Performance at an Affordable Price

The **Thermo Scientific Nicolet NXR 9610 FT-Raman spectrometer** is intended for users who need robust performance in an economical package.

- Ideal for routine analysis
- Dedicated instrument
- Upgradeable to FT-IR

### Expanding the Capabilities of FT-IR

The **Thermo Scientific NXR FT-Raman module** adds FT-Raman capabilities to Nexus/Nicolet FT-IR spectrometers.

- Configurations for routine analysis or maximum performance
- Readily exploit complementary nature of infrared and Raman

### Micro- and Macro-Sampling

The **Thermo Scientific MicroStage FT-Raman microscope** offers unique micro- and macro-sampling capabilities in a single compact accessory.

- Convenient macro-sampling accessory – horizontally mounted sample holders
- Small laser spot size for excellent spatial resolution
- Video-imaging technology
- Crystals, polymorphs, powders, particle identification
- Automated 96-well plate analysis



**NXR FT-Raman Module with MicroStage Microscope and the Nicolet 6700 FT-IR Spectrometer**

# POWERFUL AND INNOVATIVE

*Thermo Fisher Scientific proudly presents  
the most powerful FT-Raman spectrometer*



*Laser Safe, Class II*



NXR GENIE  
Detector

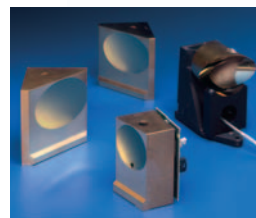
Thermo  
SCIENTIFIC

## Reliable, Reproducible, Robust FT-Raman

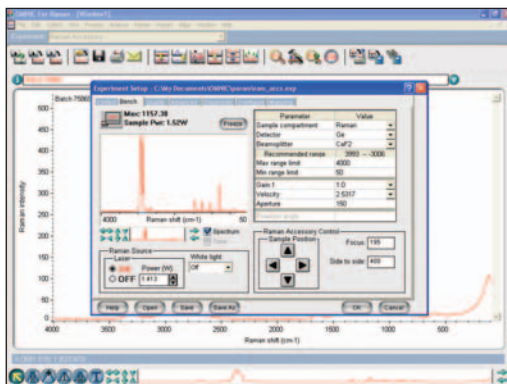
Every Nicolet NXR FT-Raman system is designed for maximum performance and flexibility. Options for excitation lasers, detectors, sampling geometries, and sample handling options are combined to provide a robust platform with pinned-in-place components and a precision-cast baseplate. The dual detector option combines the benefits of the fast startup InGaAs detector with the highest sensitivity NXR Genie detector. Gold-plated mirrors, high-throughput Rayleigh rejection filters, and a dynamically aligned interferometer enable applications ranging from high-volume routine screening to advanced chemical analysis and experimentation.

### Optics Optimized for Performance

- Gold-plated mirrors throughout deliver optimal throughput for FT-Raman spectroscopy
- Software control automates switching between FT-Raman and FT-IR



### Full Instrument Control with Thermo Scientific OMNIC™ Software



- Powerful and intuitive
- Automated detector switching
- Automated control of accessories
- Automated polarizer option
- Real-time data preview window enhances productivity
- Powerful search capabilities and the most extensive FT-Raman libraries available

### The Industry's Best Raman Detectors

- Our liquid nitrogen-cooled NXR Genie germanium detector delivers enhanced sensitivity and a ten-fold increase in detector speed, enabling trace analysis, rapid FT-Raman mapping, 96-well plate screening and kinetics studies
- The InGaAs detector is invaluable for sensitive detection that is available immediately upon power-up
- The dual detector option (InGaAs plus NXR Genie) combines instantaneously-available, sensitive detection, with the power of the NXR Genie Germanium detector for the ultimate in FT-Raman performance



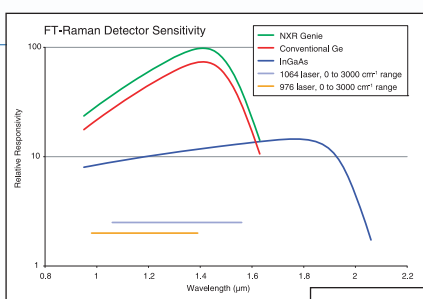
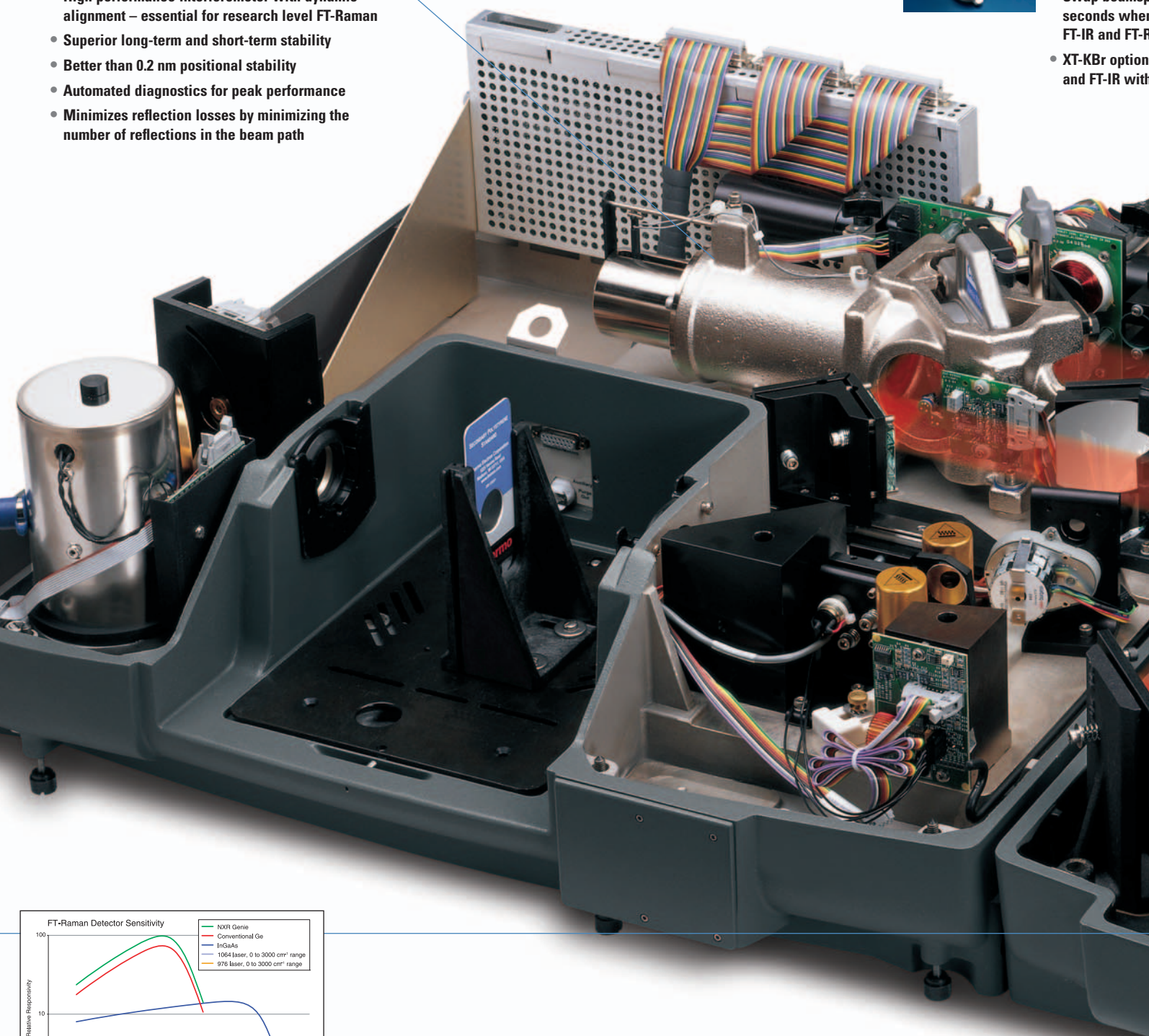
## High Performance Interferometer

- High performance interferometer with dynamic alignment – essential for research level FT-Raman
- Superior long-term and short-term stability
- Better than 0.2 nm positional stability
- Automated diagnostics for peak performance
- Minimizes reflection losses by minimizing the number of reflections in the beam path



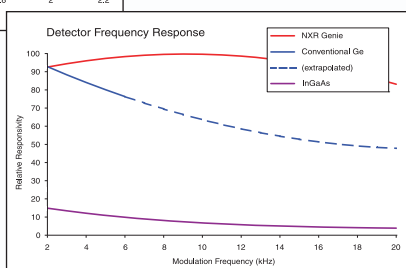
## Smart Beam

- Automated beam alignment
- $\text{CaF}_2$  for optimal performance
- Swap beams in seconds when switching between FT-IR and FT-Raman
- XT-KBr option for high-resolution FT-IR and FT-Raman



Improved sensitivity so that even trace samples can be analyzed

High-speed data collection with no compromise in performance permits rapid scanning, kinetics studies and high-speed spectral mapping



## NXR FT-Raman Module with the Nicolet FT-IR Spectrometer

## Beam Splitters

Beam splitter recognition  
Equal Raman performance  
Beam splitters in less than 10  
ms switching between  
FT-Raman analysis  
Combines FT-Raman  
with a single beam splitter

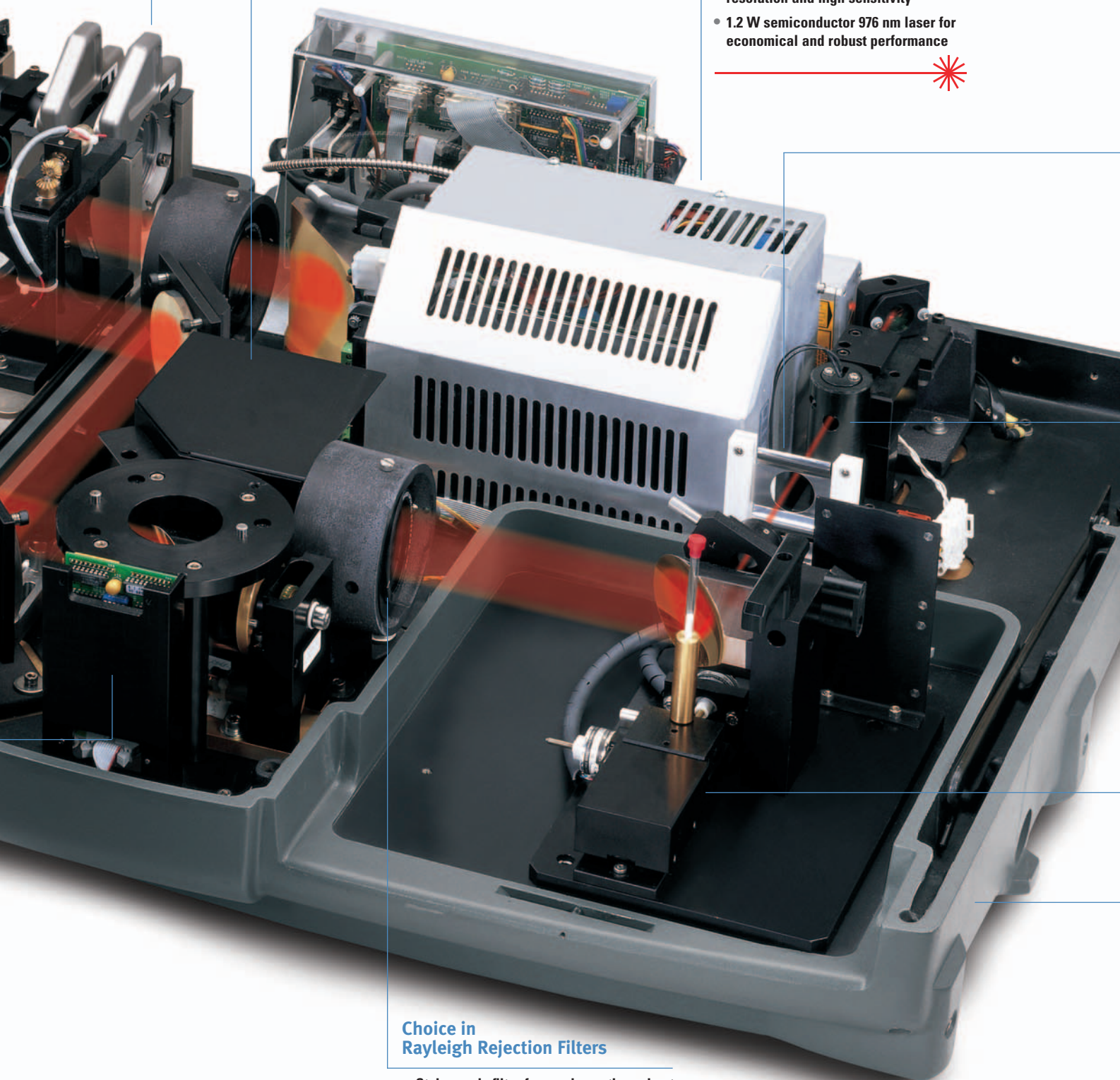
## Polarizer Accessories



- Automated polarization options enable advanced Raman polarization studies

## High-Performance Raman Lasers

- 2.5 W 1064 nm Nd:YVO<sub>4</sub> laser for high resolution and high sensitivity
- 1.2 W semiconductor 976 nm laser for economical and robust performance



## Choice in Rayleigh Rejection Filters

- Stokes-only filter for maximum throughput
- Stokes plus anti-Stokes filter for additional spectral information

## Laser Safety

Class II  
Laser Product

- Fully protected with interlock devices for Class II laser safety, the Nicolet NXR FT-Raman spectrometer can be used in unrestricted lab environments

## Optional Filters

- Neutral density filters to expand the range of laser power control beyond that offered by software



## FT-Raman System Qualification Package

Instrument qualification is a required part of regulatory compliance and good lab practice. Until now, users have had to develop and justify the selection of test methods, standard samples and test limits on their own.

With the introduction of the FT-Raman System Qualification package, we have eliminated this costly and time-consuming



process. This unique package provides standardized and manufacturer-accepted test protocols to establish proper system performance. The qualification software runs the tests under OMNIC, reporting the results electronically in a selection of formats.

This represents a significant savings in time and in process standardization.

We have selected and fully verified the polystyrene standard included in the FT-Raman System Qualification Package. The qualification standard is designed to pin in place in the 180 degree reflective sample accessory for fully reproducible results. Its spectrum is consistent with the results reported in the ASTM Method E1840-96 (Reapproved 2002), *Standard Guide for Raman Shift Standards for Spectrometer Calibration*.

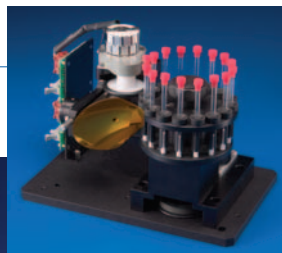
## Background Correction

- Software-controlled white light source for response correction



## Versatility in Sample Handling

- Macro and micro samples
- Liquids, powders, solids, films
- 96-well and 384-well plates
- NMR tubes, vials and cuvettes



## Rugged Design

- Solid base-plate casting minimizes thermal drift
- Reduces sensitivity to vibrations
- Enhances long-term performance and stability; dramatically reduces optical drift



# FT-RAMAN MICROSCOPY

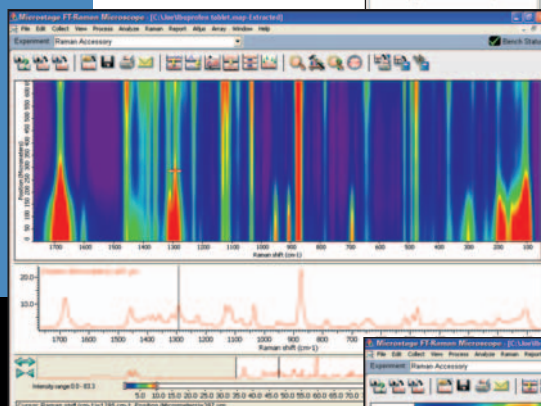
## The MicroStage FT-Raman Microscope

The MicroStage microscope is a powerful, simply designed accessory for FT-Raman. With free path optics for sensitive, high throughput data collection, the MicroStage delivers excellent spatial resolution for microscopic analysis of materials such as fibers, crystals, polymorphs and more. Based on our R&D 100 award-winning View Stage, the MicroStage is now able to accommodate standard 96-well and 384-well plates for rapid and routine sample screening.

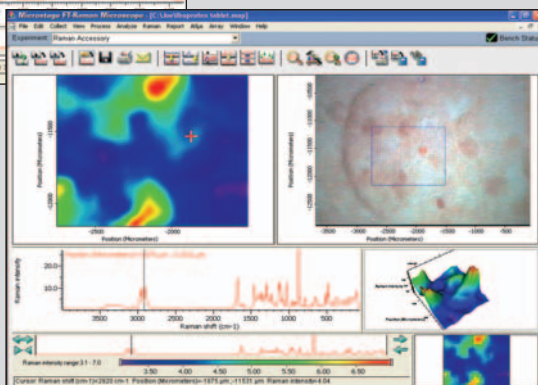
- Automated mapping and microanalysis capabilities
- Accommodates standard formats, including 96-well plates and microscope slides
- Total control with OMNIC™ software (joy stick also provided for manual operation)
- Conveniently installs inside the sample compartment
- Laser safe
- Integrated color video camera allows direct, real-time observation and sample alignment
- Horizontal x-y-z motorized stage with 50X magnification
- Mapping capabilities with OMNIC Atlas software
- Full 96-well and 384-well plate analysis with Array Automation software



Areas to map are easily defined with your mouse



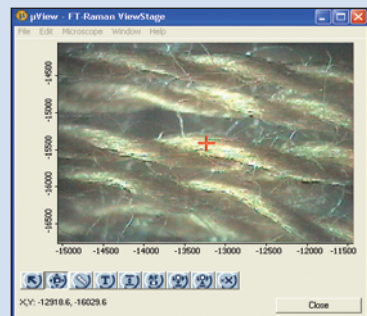
Extracted line map. A wealth of reprocessing options allows users to extract application-specific information.



Collect 2D and 3D images that indicate component distribution within the sample



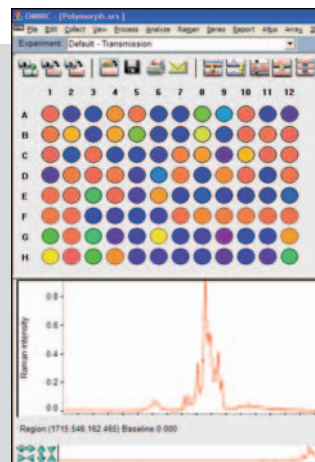
**Step 1:** Mount the unknown sample



**Step 2:** Select the sampling location (µView)

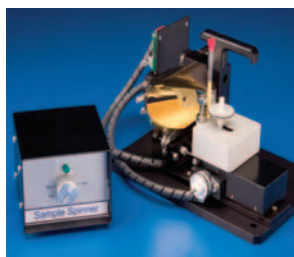


**Step 3:** Identify the unknown by matching spectrum with library



## Convenient Macro-Sampling

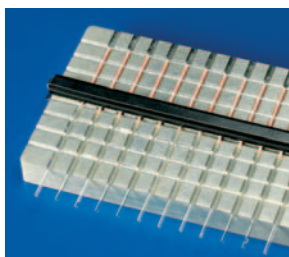
No company offers as many FT-Raman sampling options as Thermo Fisher Scientific. A large sample compartment accommodates a variety of precise, pre-aligned and drop-in-place sampling tools. Gold-coated mirrors provide efficient throughput for optimal sensitivity. In addition to providing general-purpose sampling devices, we offer a number of sampling- and experiment-specific configurations to meet specific application needs.



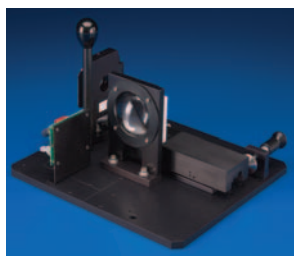
**FT-Raman Sample Spinner –**  
Spins the sample tube in order to capture a spectrum which represents the sample average. This accessory is used to eliminate variations in signal that result from sample heterogeneity.



**Bottle Holder Accessory –**  
Identifies a bottle's contents without opening the bottle.



**Capillary Tube Autosampling –**  
Adapter for use with the MicroStage FT-Raman Microscope. Allows you to mount up to 12 capillary tubes for automated sampling.



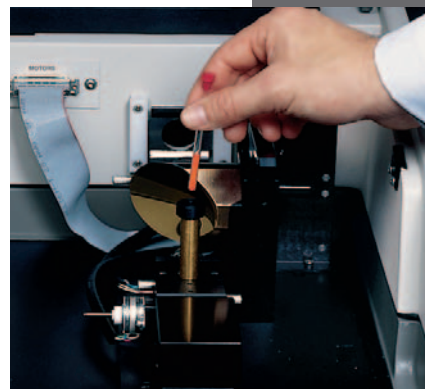
**90 Degree Reflective Accessory –**  
Is used in conjunction with the 180 degree reflective accessory for Raman polarization studies.



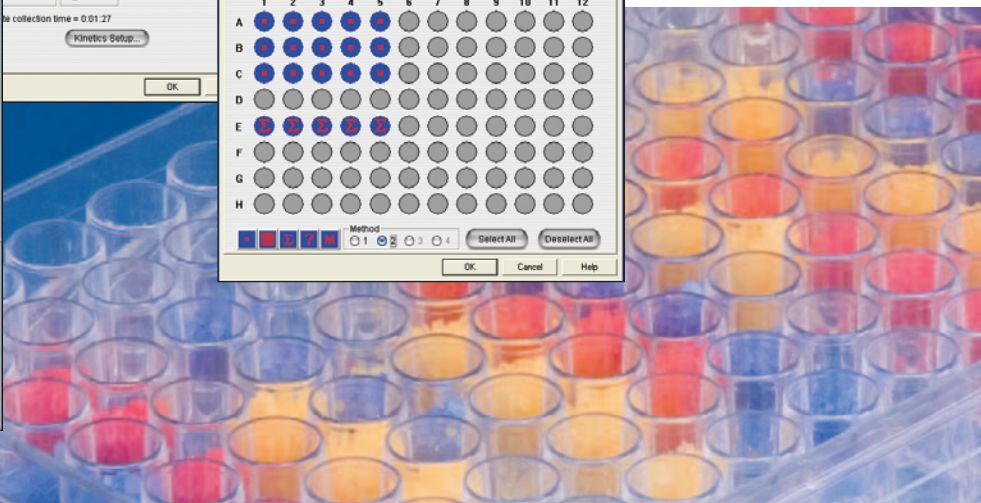
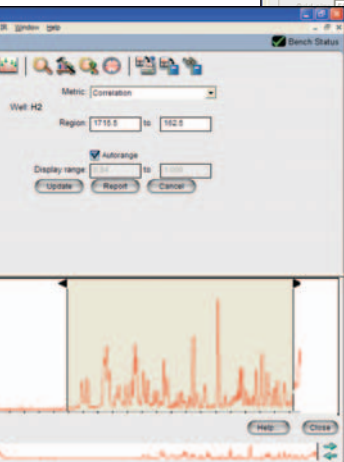
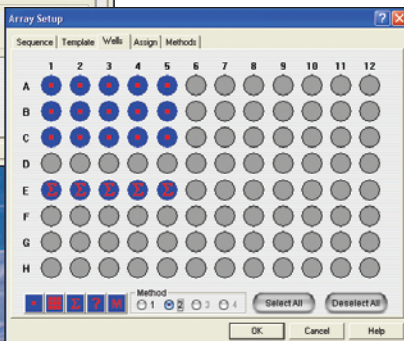
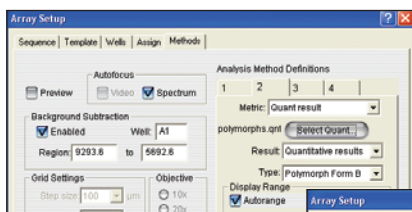
**FT-Raman Carousel Autosampler –**  
Accommodates NMR tubes and 13-mm vials. Automated sampling and data collection are controlled by OMNIC.



**180 Degree Reflective Accessory –**  
This popular accessory accommodates a variety of pin-in-place holders such as gold-plated NMR and capillary tube holders, and holders for powders and solids.



Array Automation software provides a powerful toolset to simplify collection and analysis of well plate samples



# Thermo Fisher Scientific – The Leader in Raman

Thermo Fisher Scientific, the leader in Raman spectroscopy, offers the broadest range of Raman instrumentation for research and routine analysis across a wide spectrum of industries. Offering FT and dispersive Raman solutions for more than a decade, we work directly with our customers to find optimal solutions for their analytical challenges. Over the years we have developed the expertise in all aspects of molecular spectroscopy to ensure that we will help you select the most appropriate technology for your application.

## Worldwide Service and Support

Nicolet NXR FT-Raman spectrometers are backed up by the support staff of the largest analytical instrumentation company in the world – Thermo Fisher Scientific. Service and support are available almost everywhere. We have more Raman-trained field service engineers and Raman-trained applications people to support you than any other company. Meeting all of your support needs is our highest priority.

## Comprehensive Support for Your Raman Needs

- On-site visits from factory-trained field service engineers
- Technical phone support
- Internet-based technical support
- Performance maintenance programs
- Classroom and on-site training programs
- Contract method and application development programs



*In addition to these offices, Thermo Fisher Scientific maintains a network of representative organizations throughout the world.*

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