Thermo Scientific
Nicolet iS50 FT-IR Spectrometer

smarter FT-IR
definitive answers

Thermo
SCIENTIFIC

materials analysis

beyond imagination

POLYMERS and RUBBERS

– run one-touch raw materials ID, blending, morphology, and kinetics
– multi-task in a single workstation – one setup, multiple answers

FORENSICS

– access two Class-A SWGDRUG methods in a small-footprint unit
– simplify GC-IR analysis of isomeric materials to one operation

PHARMACEUTICALS

– analyze formulations and polymorphs via an integrated system
– validate and deploy QA/QC methods for process or loading-dock use

PIGMENTS, PAINTS and INKS

– find inorganic fillers and additives in an organic base
– correlate visible colors with formulation

FOOD, FLAVORS and OILS

– identify isomeric fragrances and flavors
– analyze moisture, fat, proteins and extracted oils from seeds

GENERAL LABORATORIES

– bring one-touch consistency to complex analyses
– increase laboratory power with many techniques in a small footprint

The Thermo Scientific Nicolet iS50 FT-IR spectrometer gives definitive answers in your analytical laboratory where fast, easy workflows are essential. No other FT-IR goes beyond your expectations to offer one-touch simplicity, flexibility and integration in such a small, cost-effective workstation. The Nicolet™ iS™50 is so advanced you won't think of it as simply an FT-IR.

Go beyond FT-IR to answers.

beyond the ordinary

raise productivity while reducing manual operations

Touch Points

Collect, analyze and compile reports with one touch simplicity

As you add more capability, the Touch Points become more powerful, driving setup and checking performance so you don't need to.

- Select beam path, optical components and sampling module with one touch
- Create automated workflows with no programming
- Compile multiple spectra, analyses and images into one group file
- Track, organize and output information with auto-reporting

Touch Point operation:
collect, analyze and report –
you do science, not data processing!

Built-in ATR

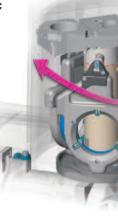**Engage your most powerful sampling technique anytime with built-in ATR**

ATR like it was meant to be. Rugged, fast and always ready to go. Powders, liquids, gels and pastes can be analyzed, with no setup, using the iS50 ATR. All reflective optics and proprietary detector allow you to analyze organic and inorganic materials with mid- and far-IR spectroscopy. The iS50 ATR leaves the main sample compartment free for other analyses, never requiring you to swap accessories or break system seals.

- Eliminate manual set-up procedures and instrument conditioning time
- Keep the main sample compartment clear for other experiments, such as Raman
- Examine hard, acidic or volatile materials with minimal sample preparation
- Analyze bulk polymers and fillers simultaneously

Automated Multi-range

Redefine analytical productivity with automatic beamsplitter changing

Automate your analysis with the iS50 ABX Automated Beamsplitter exchanger, which enables the Nicolet iS50 to set up the instrument with a single press of a Touch Point. Now, you can do the complete analysis including crystallinity, bulk analysis, and identification, using near-, mid- and far-IR by loading samples and letting the instrument do all the work.

- Measure multiple aspects of your sample automatically
- Enable setup changes without disturbing seals, desiccation or purge
- Eliminate manual handling of optical components

Across the full range of applications, the Nicolet iS50 provides you the flexibility to get your work done.

Visible

Near-IR

Mid-IR

Far-IR

Smart Flexibility

Target your analysis with the right accessory

Smart means getting the right tool for the job. It also means being able to use accessories you already have, with a spectrometer made to accept them.

- Get even more from your Smart Accessories through the Touch Points
- Use a full range of standard accessories
- Full-size sample compartment for large accessories

beyond FT-IR
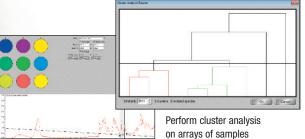
expand your analysis horizons

Integrated Raman

Add the power of Raman to complement your material characterization

The iS50 Raman accessory provides capabilities, like mapping and well-plate screening in a sample compartment mounted module. Never before has laboratory Raman analysis been so versatile, cost effective and easy to use.

- Perform analysis of crystallinity and inorganics
- Complement your material identification with Raman
- Switch in seconds between the iS50 ATR and iS50 Raman
- Screen multiple samples for cluster analysis

Perform cluster analysis on arrays of samples

Examine powders, tablets, films, fibers or particles
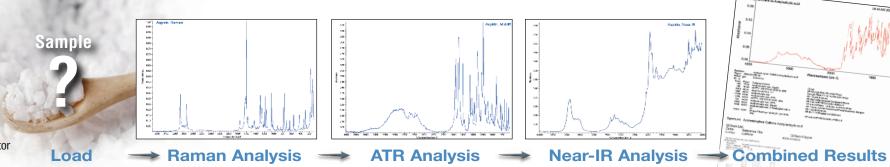
Capture video images to augment your reporting

Dedicated NIR

Develop QC methods for bulk samples

The iS50 NIR module provides integrating sphere and fiber optic options in one compact unit.
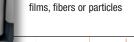
- Initiate collection with one touch
- Run samples through containers without preparation
- Obtain consistent spectra from heterogeneous solids
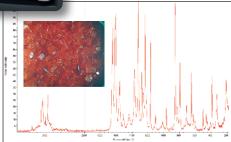- Sample solids and liquids in situ

Accessories optimize your near-IR sampling
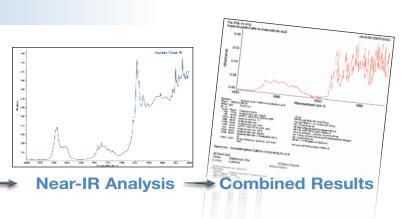
Complete Analysis in One Step

The Nicolet iS50 lets you automate your entire process even when combining techniques. Collect and analyze Raman, mid-IR ATR, near-IR and more in one Macros\Basic driven process. Walk away and come back to a combined report.

- Store images along with your data file
- Couple multiple data files and results for a project
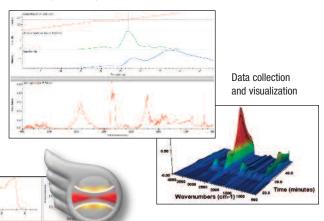- Build workflows for consistent results with any operator

Sample

?

Load → Raman Analysis → ATR Analysis → Near-IR Analysis → Combined Results

beyond results

bring simplicity and consistency to your operations
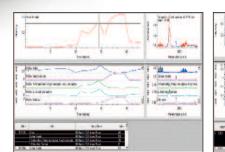
Definitive TGA-IR

Make deformulation a routine procedure for your materials laboratory

Complex gas mixtures evolved from the TGA experiment are automatically resolved and identified by the Mercury TGA software.

- Extract "what" and "how much" information from your material
- Get fast, consistent results easily with Mercury TGA software
- Probe starting and residual material via ATR to complete the picture

Data collection and visualization

Mercury TGA means TGA-IR is now a genuine analytical tool for any analyst in any laboratory. Put TGA-IR to work.

Compare outputs: the differences tell the story for failure analysis or reverse engineering

Streamlined GC-IR

Uniquely identify stereochemistry and trace chemicals

Get qualitative, isomer-specific analysis with no effort using the iS50 GC-IR modules and the Thermo Scientific OMNIC Mercury GC software. Your productivity can rise further using the industry standard Thermo Scientific Dionex Chromeleon chromatography data system software to drive autosamplers and simultaneous GC-FID and GC-IR detection. Add other features of the Nicolet iS50 to create the ultimate forensics laboratory workstation – Raman, ATR and GC – all integrated with the spectrometer.

- Analyze fuels, chemicals and drugs definitively
- Present data meaningfully using waterfall or 3-dimensional plots
- Extract peaks and identify them automatically using Mercury GC software

Isomeric materials display unique spectra for identification

Mercury GC software finds your GC-IR peaks and analyzes them automatically
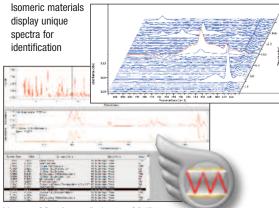
Unlimited Potential

Expand your horizons with the Nicolet iS50

As your needs grow, so can the capabilities of the Nicolet iS50 spectrometer. Whether you are studying microscopic structures, organic thin films, fast reactions or new light sources, the Nicolet iS50 spectrometer enables your research now and in the future.

Thermo Scientific
Nicolet iS50 FT-IR Spectrometer

The Materials Analysis Workstation

The Thermo Scientific Nicolet iS50 FT-IR spectrometer uniquely combines multi-tasking capabilities and high performance in an affordable, optimized footprint system. Extensive upgrade options include a built-in ATR, an automated beamsplitter exchanger and Raman, NIR, TGA-IR and GC-IR modules.

The main goal of the busy analytical laboratory, whether working with polymers, rubbers, pharmaceuticals, forensics or any other materials, is answering specific questions. The Nicolet™ iS™50 FT-IR spectrometer provides smarter tools – both in the instrument and in the software – to lead you to definitive answers.

The Nicolet iS50 couples multiple sources, sampling stations and detection options through Touch Point one-touch setup and operation, especially when driven by the iS50 ABX automated beamsplitter exchanger. Built-in tools leave open options, such as simultaneous installation of a sample compartment iS50 Raman module and the iS50 ATR multi-range, diamond sampling station.

All offerings you have come to know, like Thermo Scientific Smart Accessories and System Performance Verification, are supported on the Nicolet iS50.

In the most demanding laboratory situations, full validation is available along with hyphenated tools like the iS50 GC-IR module and the TGA-IR accessory. The Thermo Scientific OMNIC software contains new tools such as the Mercury TGA and Mercury GC analysis routines, auto-reporting and the archiving of analysis results when you save your data.

Experience FT-IR beyond the ordinary with the Nicolet iS50 FT-IR spectrometer.

Thermo
SCIENTIFIC

Go beyond your expectations

with the Nicolet iS50 FT-IR Spectrometer

The real meaning of "workstation" is getting the tools you need into the footprint you have available at a cost you can manage. The Nicolet iS50 FT-IR spectrometer solves all this by giving you…

- Dual sources: proprietary Polaris long-lifetime mid-IR source and ultra-stable Near-IR/Visible Tungsten-Halogen source

- Up to five detectors installed

- The proven, respected Thermo Scientific Vectra interferometer featuring dynamic alignment

- Motorized iS50 ABX automated beamsplitter exchanger mounting up to 3 beamsplitters

- Built-in all reflective, mid- and far-IR diamond iS50 ATR

- Sample compartment iS50 Raman module with x-y-z stage

- Touch Point operation for optics and data collection

- TGA-IR accessory for materials deformulation

- Two external output beams

- Two external source inputs, focused or collimated

- Easy to remove sample compartment cover with ports for tubing or wires

- Sample compartment KBr windows for mid-IR, near-IR and Raman

- Automated purge shutters

- Optical filters, polarizer, energy screens and traceable standards

- Full sized sample compartment for standard and Smart Accessories™

…all in a 63 cm by 70 cm footprint.

Nicolet iS50…beyond ordinary FT-IR!

Thermo Scientific
Nicolet iS50 FT-IR Spectrometer

The Materials Analysis Workstation

Beam Size and Optical Filters
- Continuously variable J-stop
- High-resolution standard, 0.09 cm^{-1}
- Filter wheel accepts up to five industry standard one inch filters for visible, far-IR etc.

High Efficiency Sealing System
- Sealed and desiccated standard
- Purge connections standard
- Small volume

Four Position Source Mirror
- Polaris™ Long-lifetime mid-IR source
- Tungsten-Halogen NIR/Vis source
- Raman InGaAs detector
- Focused emission port

Source	High (cm^{-1})	Low (cm^{-1})
Polaris IR	9600	20
NIR/Vis	27,000	2000
External	Custom	Custom

Three Position Detector Mirror
- User replaceable, LN$_2$ cooled
- DLaTGS (standard)
- User replaceable, room temperature

Detector	High (cm^{-1})	Low (cm^{-1})
DLaTGS-KBr	12,500	350
MCT-High D*	11,700	800
MCT-A	11,700	600
MCT-B	11,700	400
Time-resolved MCT	11,700	650
Silicon	27,000	8600
PbSe	11,000	2000
InGaAs	12,000	3800
InSb	11,500	1850
DLaTGS-CsI	6400	200
DLaTGS-Polyethylene	700	50
Si bolometer	600	15
Photoacoustic	10,000	400

Full Sized Sample Compartment
- KBr or CsI windows
- Motorized purge shutters
- Compatible with standard and Smart Accessories

Small Footprint

System	Weight	Dimensions (W × D × H)
Base	60 kg 132 lbs	62.6 × 69.8 × 27.6 cm 25 × 27 × 11 in
With ABX	64 kg 141 lbs	62.6 × 69.8 × 50.8 cm 25 × 27 × 20 in

- *No added footprint for Raman and dedicated ATR*
- *Only 27.9 cm (11 in) more with iS50 NIR module*

Motorized ZnSe Wire Grid Polarizer, in/out and rotation controlled

Optional iS50 ABX Automated Beamsplitter Exchanger

- Up to three beamsplitters
- Cover far-mid-near, far-mid-vis or other combinations
- Less than 25 seconds per exchange
- 52 mm beamsplitter diameter

Multiple Beamsplitter Options

Beamsplitter	High (cm⁻¹)	Low (cm⁻¹)
KBr	7800	350
XT-KBr	11,000	375
Quartz	27,000	2800
CaF₂	14,500	1200
CsI	6400	200
Solid-Substrate	700	20

CsI is offered as a dedicated system

Sample Compartment

Fluorescence-Free FT-Raman

- 1064 nm diode laser
- Weight: 7.6 kg (16.8 lbs)
- Full validation for regulated environments available
- Built in x-y-z stage
- Point and collect, area map, well plates
- Driven by µView, Atlµs and Array Automation
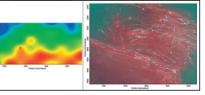- Screening and cluster analysis

Dynamically Aligned Interferometer

- Thousands of field-proven installs
- Durability and speed
- Tilt and shear full mirror control

Easy Laser Replacement

- Modular design
- Externally mounted

Validation / Attenuation Wheel Standard

- NIST traceable 1.5 mil polystyrene
- NIST traceable NG-11 glass
- Two selectable energy screens

Far-infrared spectrum of acetylferrocene

Optional iS50 ATR
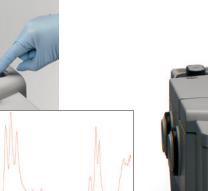
- Built-in, all-reflective diamond ATR
- Mid- to far-IR capable: 80 to over 5000 cm⁻¹
- Monolithic diamond for durability
- Software-controlled activation
- Pressure applied to 60 lbs
- Removable tray for cleaning
- Liquid/volatiles cover available
- Full validation for regulated environments available

iS50 Raman Module

Built-in USB Video Camera

- 5 mm field of view
- View and collect
- Archive images

Quick Lock Connections

- Cable free installation

Raman map and video image of fiber

External iS50 NIR Module

Integrating Sphere and NIR Fiber Port

- Supports sample cup spinner, viscous sample accessory, and more
- Fiber optic SMA in/out ports
- Optional Thermo Scientific SabIR probe
- Full validation for regulated environments
- Available in integrating sphere only configuration

External iS50 GC-IR Module

Heated Flow Cell and Transfer Line

- 300 °C continuous operation
- 15 cm × 1 mm diameter gold-coated light pipe
- Splitter (10:1) for FID/IR or MS/IR detection
- Driven by OMNIC™ Series software

Infrared data management and autosampler control when equipped with Thermo Scientific TRACE 1310 GC and Thermo Scientific Dionex Chromeleon chromatography data system software.

Nicolet iS50 Specifications

Spectrometer

Polaris High Stability, Long Lifetime Mid-IR Source	Standard
Tungsten-Halogen Near-IR/Visible Source	Option
Four Position Source Mirror	Option
Continuously Variable Iris Aperture	Standard
Gold Optical Coatings	Standard
Aluminum Optical Coatings	Option
DLaTGS Detector	Standard
Three Position Detector Mirror	Option
Attenuation Wheel	Standard
Validation Wheel	Standard
Automated Polarizer	Option
Automated Filter Wheel	Option
Automated Beamsplitter Exchanger	Option
Automated Sample Compartment Purge Shutters	Option
A/D Converter	24 bit
Interface	USB 2.0

Software

Operating System	Windows® 7
OMNIC Software	Standard
ValPro System Validation Software	Option
21 CFR Part 11 Compliance Tools	Option

External Beam Capabilities

Dual Side External Beams	Option
Collimated Emission Port	Option
Focused Emission Port	Option
Side External Detector Port	Option

Performance Specifications

Spectral Range, Standard System	7800–350 cm^{-1}
Spectral Range, CsI Optics	6400–200 cm^{-1}
Spectral Range, Multi-Range Optics	27,000–20 cm^{-1}
Optical Resolution, Mid-IR	Less than 0.09 cm^{-1}
Signal-to-Noise, 1 minute scan, Peak-to-Peak, 4 cm^{-1}	55,000:1
Signal-to-Noise, 5 second scan, Peak-to-Peak, 4 cm^{-1}	13,000:1
Ordinate Linearity	0.07%T
Wavenumber Precision	Better than 0.01 cm^{-1}
Scan Velocity (15 values)	0.158–6.28 cm/sec
Rapid Scan, Spectra Per Second	65 (at 16 cm^{-1}), 95 (at 32 cm^{-1})
MCT Dewar LN$_2$ Hold Time	18 Hours

Physical Characteristics

Spectrometer Weight	60 kg (132 lbs)
Spectrometer Dimensions (W × D × H)	62.6 × 69.8 × 27.6 cm / 25 × 27 × 11 in
Sample Compartment Dimensions (W × D × H)	21 × 26 × 15 cm / 8.3 × 10.2 × 5.9 in

Other

Mid-infrared Source and Interferometer Warranty	5 Years
Spectrometer Warranty	1 Year
Regulatory Approvals	CE, ETL

Optional Application Modules

In addition to the application modules listed below, a full line of accessories are available, including: infrared microscopes, TGA-IR, and Linear-scan Dual-channel Collection. The Nicolet iS50 is compatible with both standard and Smart Accessories.

iS50 ATR Module

Crystal	Diamond
Spectral Range	5000–80 cm^{-1}
Down Force of Pressure Device	60 lbs
Detector	Proprietary DLaTGS

iS50 Raman Module

Laser	1064 nm diode
Laser Power	>450 mW at sample
Laser Spot Size	60 microns
Sampling Plates	48 well, 9 well, vials, microscope slides
Stage Resolution	5 micron steps
Weight	7.6 kg (16.8 lbs)
Compliance	Class 1 laser product

iS50 NIR Module

Integrating Sphere Window	Sapphire
Interior of Integrating Sphere	Gold coated
Integrating Sphere Detector	InGaAs
Fiber Optic Connections	Standard SMA
Fiber Optic Detector	InGaAs
Validation Wheel	Standard

iS50 GC Module

Gas Cell	15 cm × 1 mm gold-coated light pipe
Temperature	300 °C max transfer line and cell heaters, USB controlled
Detector	LN$_2$-cooled MCT-A
Exhaust Line	Passes through activated charcoal filter to rear panel fitting

Thermo SCIENTIFIC — Part of Thermo Fisher Scientific

beyond tomorrow

the most trusted FT-IR in the industry is…

backed by world-class service and applications expertise. Equipped with tools to facilitate regulatory compliance. Field upgradable to ensure best fit to your future needs.

Our commitment to you ensures your ability to provide definitive answers…today, tomorrow and beyond.