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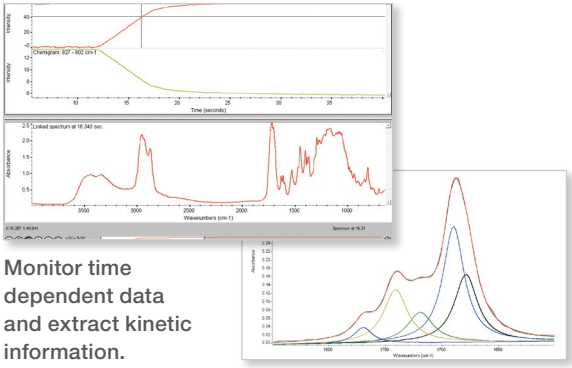
PRODUCT SPECIFICATIONS

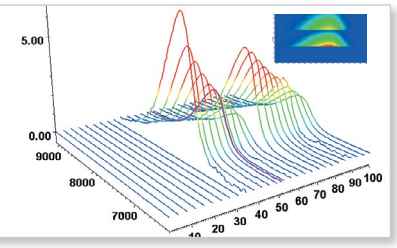
# Thermo Scientific Nicolet iS50R FTIR Spectrometer

## Our tools, your science.

Clear the path to discovery with the Thermo Scientific™ Nicolet™ iS50R Spectrometer and research tools.



**Monitor time dependent data and extract kinetic information.**




**Find underlying structure in complex, overlapped spectral features.**

**Step-scan time-resolve spectroscopy of reversible processes to nanosecond timescales.**

The Nicolet iS50R Spectrometer carries forward all the flexibility and performance of the Thermo Scientific™ Nicolet™ iS50 Spectrometer system, with the added capabilities for the research spectroscopist. The Nicolet iS50R includes dual sources and triple detector optics, multiple on-board digitizers and easy access to spectrometer data and control signals.

An expanded Thermo Scientific OMNIC™ Software suite bundles several advanced tools including Peak Resolve™, OMNIC™ Series, and SpectraCorr™.

A key upgrade found in the Nicolet iS50R is the Vectra-Plus™ Step-scan interferometer with associated SST control software. Step-scan data collection lets you take on experiments with complex time dependent signals that make standard scanning methods impractical.

Examples include emission signal from pulsed sources, experiments using choppers, microsecond and nanosecond time-resolved absorbance, photoacoustic and photocurrent responses.


**For research FTIR, think Thermo Scientific.**

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# Thermo Scientific
# Nicolet iS50R FTIR Spectrometer

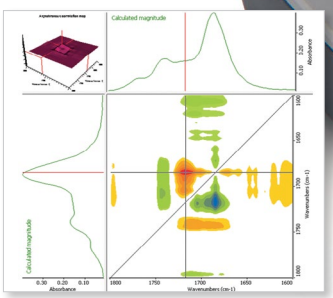
## Our tools, your science.

**iS50 ABX Automated Beamsplitter Exchanger**
Get full spectral range while maintaining continuous purge using automated beamsplitter exchange.

**Filter Wheel and Source Aperture**
Control spectral bandwidth, spectral resolution and source energy with automated filters and aperture.

**Multiple Beam Ports**
Interface to external sources and experiment modules with multiple input and output ports.

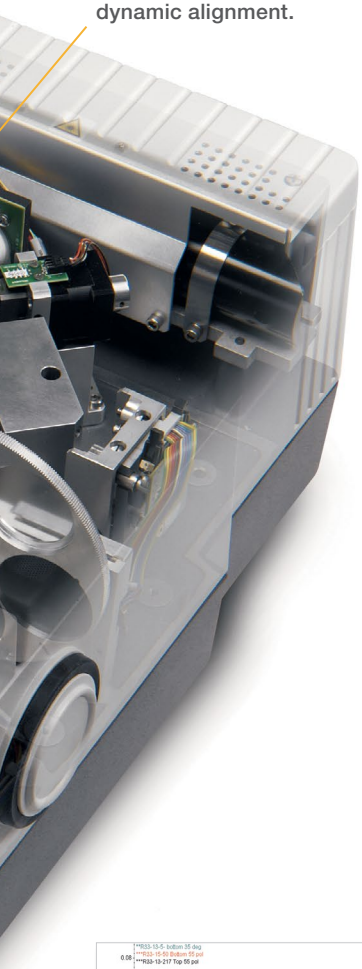
**Triple Detector Compartment**
User-replaceable detectors match the spectral range, frequency response and sensitivity to your needs.



SpectraCorr 2D correlation software identifies chemical coupling of vibrations in dynamic experiments.

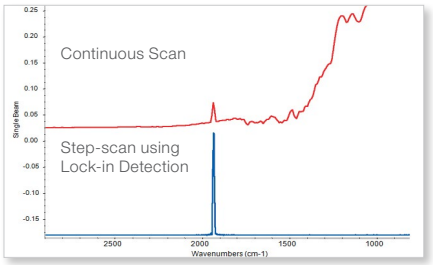
**Software Controlled Polarizer Option**
Add selectivity to surface reflectance, oriented polymer films and exploit Brewster's angle transmission properties.

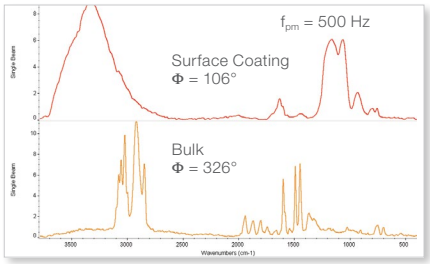
**Vectra-Plus Interferometer**
Expanded linear scan speeds and multiple step-scan modes under continuous, smart, dynamic alignment.

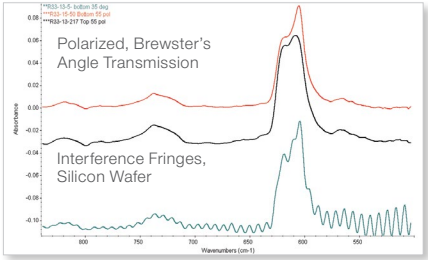


The iS50R Hub gives you access to detector and control signals for convenient interface to external signal processing tools, such as lock-in amplifiers, filters or external digitizers.

Detect weak periodic signals and eliminate background using step-scan data collection and lock-in detection.



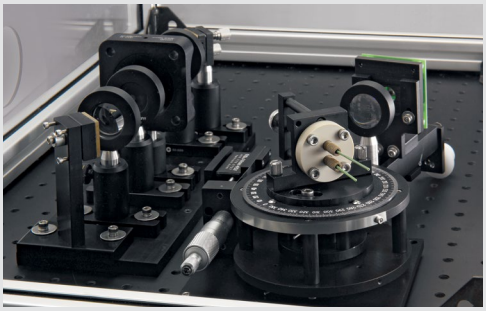



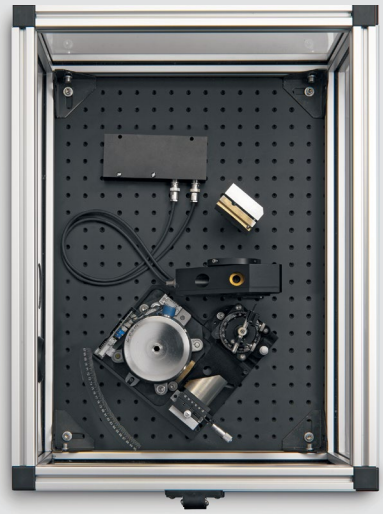

Separate phase-resolved signals with step-scan phase modulation collection mode.

Improve sensitivity and surfaces and suppress interference with polarized measurements.

# Advanced Applications



**iS50 Research Module**
Set up large or complex experiments in the optional iS50 Research Module. Pre-configured optics kits provide rapid set-up of popular experiments like PM-IRRAS.



**External Detector Port**
Extend performance with specialty detectors like a silicon bolometer for far-IR spectroscopy. Add purge shutters and the ABX option to complete a research far-IR package.

**Microspectroscopy**
Isolate and identify chemically distinct domains like contamination particles on products or specific layers in complex polymer films. Improve your understanding of structures and phase relationships in all sampling modes, including ATR imaging. Combined with the Nicolet iS50R spectrometer, the Thermo Scientific Nicolet Continuμm microscope has wide spectral range.

## Nicolet iS50R Specifications

| Spectrometer | |
|---|---|
| Polaris High Stability, Long Lifetime Mid-IR Source | Standard |
| Tungsten-Halogen Near-IR/Visible Source | Standard |
| Four Position Source Mirror | Standard |
| Continuously Variable Iris Aperture | Standard |
| Gold Optical Coatings | Standard |
| Aluminum Optical Coatings | Option |
| DLaTGS Detector | Standard |
| Three Position Detector Mirror | Standard |
| 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 |
| iS50 Hub – External Signal Access | Standard |
| Dual Channel Digitizers | Standard |
| Extended Undersampling | Standard |
| Mirror Position Accuracy | ±0.2 nm |
| Amplitude Modulation (AM) Mode | Standard |
| Time-Resolved Spectroscopy | |
| On-board Digitizers | 1 MHz (1 µs), 18 bit |
| External Digitizer Option | 200 MHz (5 ns), 14 bit |
| Reference Monitor Channel | Included |
| Phase Modulation Option | |
| Modulation Frequency | 5–1000 Hz |
| Modulation Amplitude | 0.5–4.5 λ633 |
| Multiple Modulation Option* | |
| Dual Channel Inputs | Included |
| Reference Modulation Output | Up to 70 Hz |

### Advanced Applications

The Nicolet iS50R is compatible with both standard and Smart Accessories. In addition, we offer a full line of optional sampling modules and accessories including:

- PEM-Based Polarization Modulation, PM-IRRAS, VCD, VLD
- iS50 Research Module – Optics Breadboard
- iS50 ATR built-in module
- iS50 Raman sample compartment module
- iS50 NIR module
- iS50 GC-IR module
- Infrared microscopes
- TGA-IR sampling accessory

| 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, Multi-Range Optics | 28,000–10 $cm^{-1}$ |
| Optical Resolution, Mid-IR, Linear Scan | Less than 0.09 $cm^{-1}$ |
| Signal-to-Noise, 1 minute scan, Peak-to-Peak, 4 $cm^{-1}$ | 65,000:1 (typical), 55,000:1 (guaranteed) |
| Signal-to-Noise, 5 second scan, Peak-to-Peak, 4 $cm^{-1}$ | >13,000:1 |
| Ordinate Linearity | 0.07%T |
| Wavenumber Precision | Better than 0.0008 $cm^{-1}$ |
| Wavenumber Accuracy | Better than 0.005 $cm^{-1}$ |
| Scan Velocity (24 values) | 0.0063–8.86 cm/sec |
| Rapid Scan, Spectra Per Second | 90 (at 16 $cm^{-1}$), 130 (at 32 $cm^{-1}$) |
| MCT Dewar LN2 Hold Time | 18 Hours |

| Physical Characteristics | |
|---|---|
| Spectrometer Weight | 60 kg (132 lbs) |
| Spectrometer Dimensions (W × D × H) | 62.6 × 69.8 × 27.6 cm<br>25 × 27 × 11 in |
| Sample Compartment Dimensions (W × D × H) | 21 × 26 × 15 cm<br>8.3 × 0.2 × 5.9 in |

| Other | |
|---|---|
| Warranty | |
| Source | 10 years |
| Interferometer | 10 years |
| Laser | 5 years |
| Spectrometer Warranty | 1 year |
| Regulatory Approvals | CE, ETL C US |

| Software | |
|---|---|
| Operating System | Windows® 10 |
| OMNIC Software | Standard |
| Time-series, Kinetics, Curvefitting and 2D Correlation Software | Included |
| ValPro System Validation Software | Option |
| 21 CFR Part 11 Compliance Tools | Option |

* The Nicolet iS50R PM uses the Vectra-Plus Piezo™ modulator to permit Phase modulation.

Find out more at **thermofisher.com/is50R**

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