GMP
GENERAL
MICROTECHNOLOGY
& PHOTONICS

EDINBURGH
INSTRUMENTS

FTIR SPECTROMETER

IR5

EDINBURGH INSTRUMENTS

Edinburgh Instruments has been providing high performance instrumentation to the Molecular Spectroscopy market for over 50 years.

Our photoluminescence, Raman, FTIR, UV-Vis absorption, and transient absorption spectrometers are always designed with a focus on their applications, from routine analysis in industry to demanding research.

Whatever your needs, we always endeavour to meet them and continue to offer world-class customer support throughout the lifetime of your instrument.

MOLECULAR SPECTROSCOPY SINCE 1971 Photoluminescence • Raman • UV-Vis • FTIR • Transient Absorption

BIOSCIENCES **PHARMACEUTICALS** **CHEMICALS** **POLYMERS** **NANO-MATERIALS**

IR5 FTIR SPECTROMETER

The IR5 is a high-performance benchtop Fourier Transform Infrared (FTIR) spectrometer from the trusted Edinburgh Instruments brand.

The IR5 is the perfect choice for analytical and research applications such as polymer, semiconductor, and pharmaceutical samples, offering simple operation as well as fast and accurate results. IR absorption, transmission, reflectance, and infrared photoluminescence can all be measured in the IR5 using only one software package, Miracle™.

KEY FEATURES

- **Outstanding Performance –** High sensitivity and spectral resolution
- **Photoluminescence –** Fourier Transform Photoluminescence upgrade with a choice of laser source
- **Configurable –** Option for a second detector giving higher sensitivity at selected spectral ranges
- **User-friendly –** Simple to operate and suitable for all user levels, from beginner to advanced
- **Maintenance-Free –** No maintenance required with moisture control technology
- **Miracle Software –** Modern, powerful and intuitive software designed specifically for the IR5

> **A MODERN INSTRUMENT THAT IS BOTH VERSATILE AND USER-FRIENDLY**

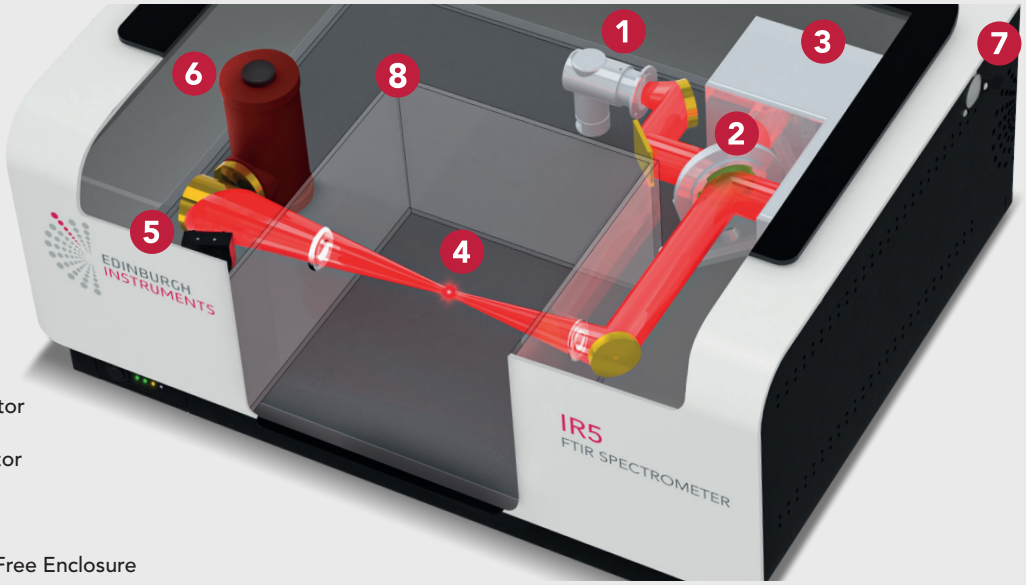
COSMETICS | SEMICONDUCTORS | ART & MUSEUM | FORENSICS | GEOLOGY

HIGH PERFORMANCE GUARANTEED

The IR5 is a modern benchtop FTIR instrument with guaranteed hardware and software performance. A robust interferometer is at the core of the IR5, which is built on an anti-vibration frame to minimise any influence from the environment. The interferometer features a solid-state reference laser with a long operating life. The combination of a stable high-intensity IR source and broadband DLaTGS detector ensures repeatability and accuracy. The result is a robust and reliable instrument giving data that you can trust.

High spectral resolution from 0.5 cm^{-1} is available for measurements of narrow infrared lines, up to a resolution of 32 cm^{-1} for recording of fast kinetic processes.

All IR5 specifications are guaranteed and every unit goes through rigorous validation procedures to ensure that your spectrometer is up to the high standards of Edinburgh Instruments.

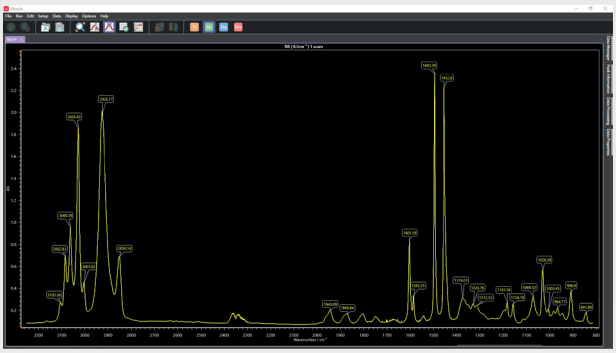


1. Source
2. Beamsplitter
3. Interferometer
4. Sample
5. Standard Detector
6. Optional Detector
7. Laser PL Port
8. Inner Moisture-Free Enclosure

MAINTENANCE-FREE

The IR5 does not require any consumables for routine operation and has minimal running costs. It has multiple features to help you maintain it:

- Built-in humidity control system so you don't need to exchange dessicant.
- Status indication lights on the instrument: on, off, standby, scanning.
- Hardware and software display of temperature and humidity for peace of mind.
- User-friendly software wizards for performance verification.
- Autocalibration of wavenumber.

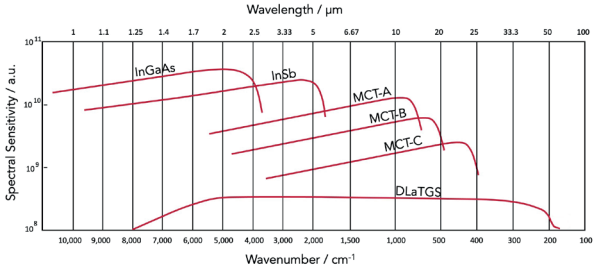


Performance is easily verified by the user with a polystyrene sample

SPECTRAL RANGE OPTIMISATION

Some applications require enhanced sensitivity in a particular spectral range. For this purpose a second detector can be added to the IR5.

Options include: Indium Gallium Arsenide (InGaAs), Indium Antimonide (InSb), or Mercury Cadmium Telluride (MCT).



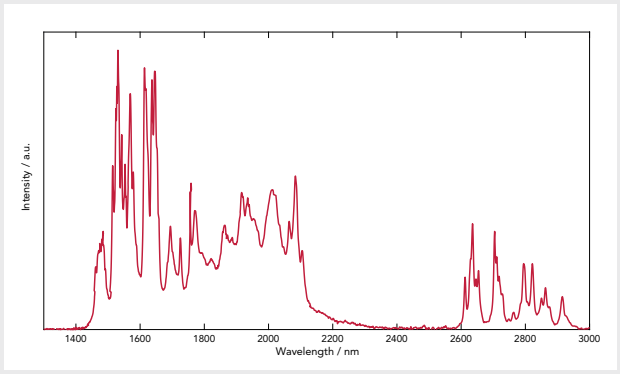
GO BEYOND FTIR ABSORPTION: FT-PL UPGRADE

The IR5 is the only spectrometer in its class offering a Fourier Transform Photoluminescence (FT-PL) option (patent pending). The FT-PL upgrade transforms your IR5 into a combined absorption and PL spectrometer in the MIR range, suitable for the most demanding research applications.

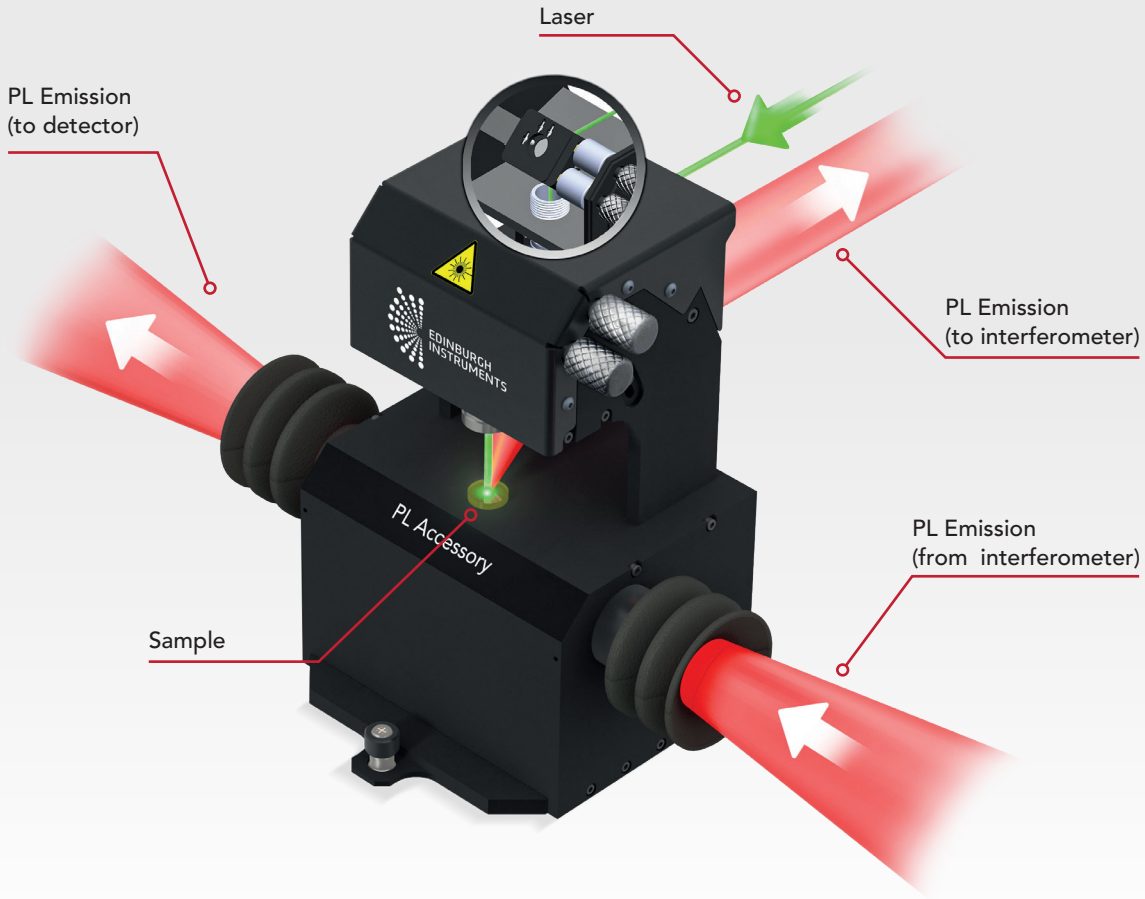
The FT-PL option utilises a laser attached to the side of the IR5 which you can easily exchange to access a wide range of excitation wavelengths. The PL sample holder focuses the laser beam on the sample and collects photoluminescence which is directed to the interferometer. PL can be detected with the standard DLaTGS detector, or with a second detector for higher sensitivity. A cover for the sample compartment protects the measurement from background light and provides laser safety.

With FT-PL spectroscopy, you can obtain emission spectra >100 times faster than with a standard scanning PL spectrometer. This saves valuable time characterising NIR and MIR emitters such as semiconductors and lanthanide-doped materials, and reduces sample laser exposure.

Enabling PL with your choice of side-mounted laser

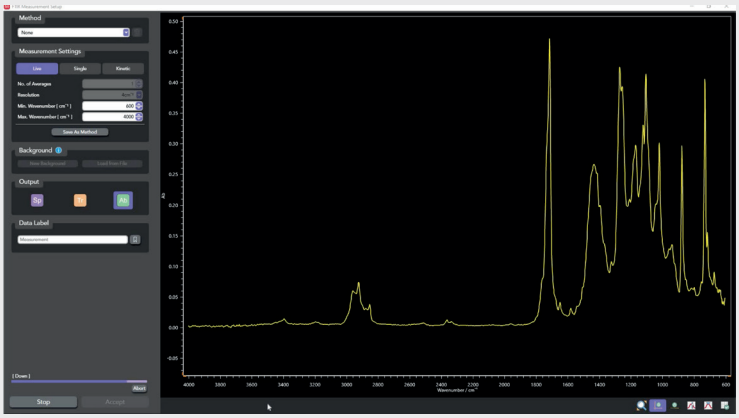


FT-PL spectrum of erbium-containing sample



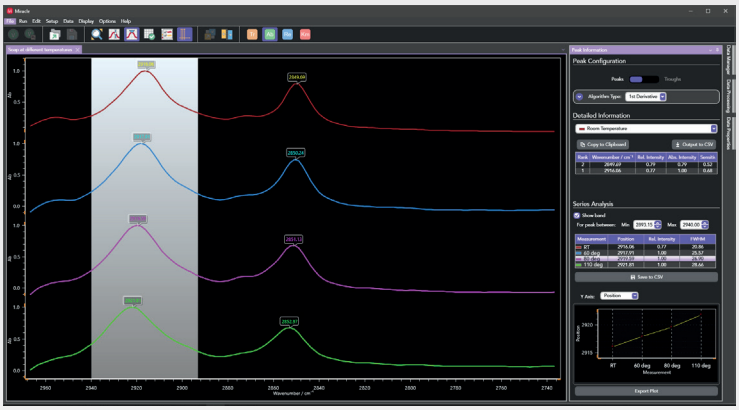
MIRACLE SOFTWARE

The Miracle software package is designed specifically for the IR5 spectrometer with a focus on ease of use and smooth workflow. Miracle controls every aspect of your experiment, from instrument setup to data acquisition, analysis and reporting, ensuring intuitive operation at every step.



Two user levels are offered in Miracle making it suitable to a wide range of applications. **Standard user mode** is optimal for analysis and teaching labs where routine experiments are carried out. **Advanced user mode** unlocks instrument configuration options and complex analysis functions, suitable for R&D and the most demanding applications.

Data analysis in Miracle is highly flexible: it is possible to undo or rearrange processing steps, so you can access the raw data and fine-tune your analysis. The software allows you to reapply apodization with a different function, for better comparison with other spectra.



MIRACLE KEY FEATURES

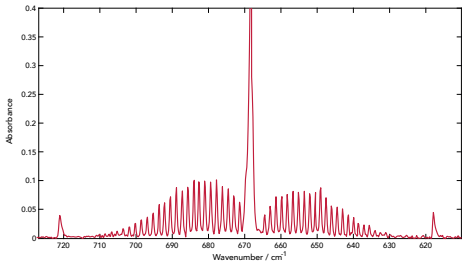
- Measurement types to suit every accessory: Transmission, Absorption, Reflection, Kubelka-Munk, Photoluminescence
- Selection of spectral resolution and wavenumber range
- Live signal monitoring, single scan, kinetic series
- Pre-programmed methods for repeating routine analysis
- Advanced user mode for complex applications
- Instrument validation wizards
- Autocalibration
- Data operations including choice of apodization, baseline subtraction, arithmetical operations, cropping, smoothing, interpolation, etc.
- Comprehensive peak analysis wizard with a range of peak parameters and fitting algorithms
- Photoluminescence measurement wizard included with FT-PL upgrade
- User-configurable layout and data presentation
- Export data into CSV and TXT
- File format compatible with FTIR databases

ACCESSORIES

Standard Sample Holder

Transmission sample holder for 50 mm x 50 mm filters and slides included with every IR5.

This holder also serves as a mount for a variety of vertical liquid and film holders and may also be used to support gas cells.

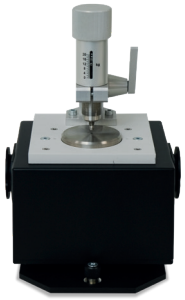


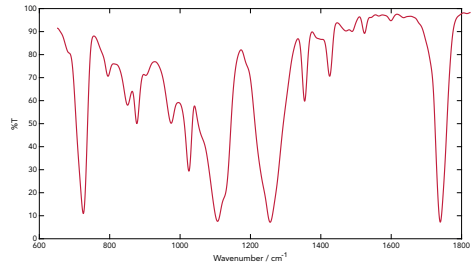
FTIR spectrum of CO_2 gas at low wavenumbers

ATR Sampling Accessories

A variety of ATR options are offered for powder, liquid, film and bulk samples.

Single and multiple reflection ATR crystals are available such as diamond, germanium and ZnSe, as well as sandwich materials including ZnSe/diamond.



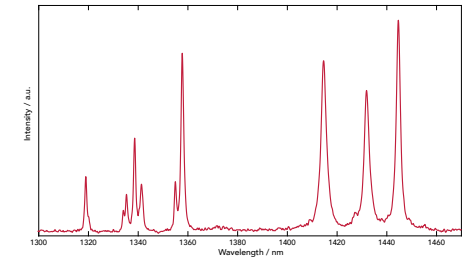


ATR-FTIR spectrum of PET film

PL Sample Holder

A sample holder accessory is available for photoluminescence measurements using laser excitation.

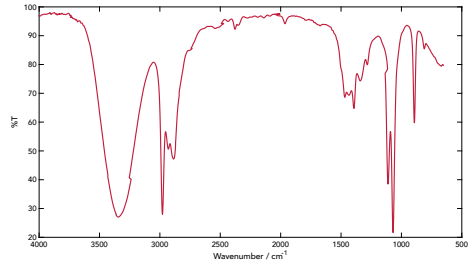
The PL sample holder is placed in the sample position of the IR5 spectrometer. The laser used for excitation of the sample is mounted on the side of the IR5.



FT-PL spectrum of Nd:YAG (selected emission lines)

Liquid Sample Holder

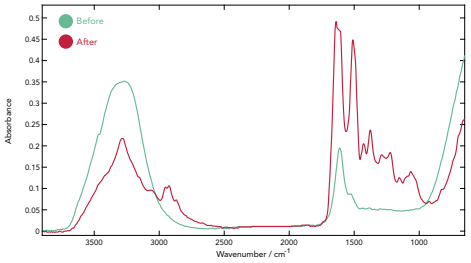
Accessory for routine measurement of liquids which accommodates horizontal liquid holders with a variety of optical path lengths.



FTIR spectrum of ethanol with a 50 µm path length

Temperature-Controlled ATR

Temperature-dependent FTIR measurements on films, liquid, powders and bulk samples can be performed using temperature-controlled ATR accessories, from room temperature up to >100°C.



ATR FTIR of human serum albumin before and after drying at 50°C

SPECIFICATIONS – IR5

STANDARD CONFIGURATION	Spectral Range	8000 - 350 cm^{-1}
	Sensitivity	SNR ≥ 20,000:1
	Resolution	0.5 cm^{-1}, 1 cm^{-1}, 2 cm^{-1}, 4 cm^{-1}, 8 cm^{-1}, 16 cm^{-1}, 32 cm^{-1}
	Accuracy	0.5 cm^{-1}
	Source	High-intensity ceramic source
	Detector	DLaTGS
	Beamsplitter	Germanium coated KBr
	Hygroscopic Integrity	Integrated desiccants, electronic dry-membrane, embedded LCD and software hygrometers for maintenance-free operation
	Windows	KBr window exchangeable by user
	Operating Voltage	Universal mains input 100-240 VAC, 47-63 Hz
DETECTOR UPGRADE	Second Detector	Additional detector fitted to the instrument optimising its spectral range Detector options include InSb, InGaAs, and MCT
PL UPGRADE	Fourier Transform Photoluminescence Capability	External PL excitation laser mount, laser is freely exchangeable Dedicated PL sample holder for maximum signal-to-noise ratio Intuitive photoluminescence acquisition wizard in software
SAMPLE ACCESSORIES	Transmission Sample Holder	Compatible with films and cuvettes
	Attenuated Total Reflectance (ATR)	Basic and advanced ATR models available with a choice of crystal (diamond, Ge, ZnSe)
	Photoluminescence Sample Holder	Suitable for solid samples, powders, and liquids
	Others	Diffuse reflectance, custom and third-party accessories available
SOFTWARE	Miracle	Powerful and intuitive software for data acquisition, analysis and presentation, full control of all interferometer, amplifier, temperature and humidity monitoring
	Measurement Types	Transmission, Absorption, Reflection, Kubelka-Munk, FT-PL
	Acquisition Modes	Live signal monitoring, single scan (including user-defined methods), kinetic series
DIMENSIONS	W x D x H	660 mm x 540 mm x 300 mm
	Weight	37 kg