

## IRT-5000/7000S/7000 Specifications

	IRT-5000	IRT-7000S	IRT-7000
Principle	FT-IR microscope with cassegrain optical system		
Measurement method	Transmittance / Reflectance measurement		
Standard detector	Single mid-band MCT (7800 - 650 cm <sup>-1</sup> )	Single mid-band MCT (7800 - 650 cm <sup>-1</sup> )	Linear array MCT (7000 - 750 cm <sup>-1</sup> ) (1 × 16 element) Single mid-band MCT (7800 - 650 cm <sup>-1</sup> )
Detector exchange	Dual detector capability (software controlled), user exchangeable single element detectors are available as an option.		
Optional detectors	Single element detector	Narrow-band MCT (7800 - 750 cm <sup>-1</sup> ) Wide-band MCT (7800 - 450 cm <sup>-1</sup> ) DLATGS (7800 - 400 cm <sup>-1</sup> ) InSb (15000 - 1850 cm <sup>-1</sup> ) InGaAs (12000 - 4000 cm <sup>-1</sup> )	Narrow-band MCT (7800 - 750 cm <sup>-1</sup> ) Wide-band MCT (7800 - 450 cm <sup>-1</sup> ) DLATGS (7800 - 400 cm <sup>-1</sup> ) InSb (15000 - 1850 cm <sup>-1</sup> ) InGaAs (12000 - 4000 cm <sup>-1</sup> )
	Linear array detector	MCT (7000 - 750 cm <sup>-1</sup> ) (1 × 16 element) MCT (7000 - 750 cm <sup>-1</sup> ) (2 × 16 element) InSb (10000 - 1900 cm <sup>-1</sup> ) (1 × 16 element) InGaAs (10000 - 5000 cm <sup>-1</sup> ) (1 × 16 element)	MCT (7000 - 750 cm <sup>-1</sup> ) (2 × 16 element) InSb (10000 - 1900 cm <sup>-1</sup> ) (1 × 16 element) InGaAs (10000 - 5000 cm <sup>-1</sup> ) (1 × 16 element)
S/N ratio	Single element detector	5000:1 (Aperture size 100 μm <sup>2</sup> , resolution 4 cm <sup>-1</sup> , 1 min. acquisition, near 2200 cm <sup>-1</sup> , p-p)	5000:1 (Aperture size 100 μm <sup>2</sup> , resolution 4 cm <sup>-1</sup> , 1 min. acquisition, near 2200 cm <sup>-1</sup> , p-p)
	Linear array detector	-	1000:1 (Aperture size 12.5 μm <sup>2</sup> , resolution 16 cm <sup>-1</sup> , 1 min. acquisition, near 2200 cm <sup>-1</sup> , p-p)
Microscope objectives	Cassegrain: 16×, 32× or 10× Automatic objective recognition function (standard) Up to four objectives can be selected by the software.		Cassegrain: 16× and 32× as standard, 10× as option Automatic objective recognition function (standard) Up to four objectives can be selected by the software.
Condenser mirror	Cassegrain: 16×, 32× or 10× (manual exchange) Automatic condenser mirror recognition function (standard)		Cassegrain: 16×, 32× as standard (manual exchange), 10× as option
Condenser mirror compensation	Standard auto-compensation function		
Aperture	PC-controlled vertical/horizontal adjustment and angle of rotation		
Sample stage	Standard	Manual stage with fine adjustment (Movable distance: X: 70, Y: 50, Z: 20 mm)	Auto XYZ stage with auto-focus function (Movable distance X: 100, Y: 75, Z: 25 mm, 1 μm step)
	Option	Auto XYZ stage with auto-focus function (Movable distance X: 100, Y: 75, Z: 25 mm, 1 μm step) Joystick for auto XYZ stage control	Joystick for auto XYZ stage control
Auto focus	Option	Standard	
Sample observation	High resolution CMOS camera 1.3 million pixels with a 3× optical zoom function (standard) IQ Monitor (simultaneous sample measurement and observation) and auto illumination function (standard) 5.7 inch integrated color LCD display (option). Binocular (option)		
Observation options	Visible polarization observation, Differential interference contrast observation, Fluorescence observation, Refractive objectives (10×, 20×)		
ATR measurement (option)	"Clear-View" ATR objective (ATR-5000-SS/SD/SG)* <sup>1</sup> , conventional ATR objective (ATR-5000-D/Z/G)* <sup>1</sup> , Stage-mounted micro ATR using transmittance light path (ATR-5000-TPZ)		
Grazing angle measurement(option)	Cassegrain grazing angle objective (RAS-5000)* <sup>2</sup>		
Purge	Sample area purge case is available as an option.		
Integrated control panel	Transmittance/Reflectance switching with indicator; detector indicator; objective selection/indicator; open/close and rotation of aperture; auto-compensation of condenser mirror; visible illumination adjustment		
Dimension (H × W × D)	587 mm × 302 mm × 695 mm		612 mm × 302 mm × 695 mm
Weight	54 kg		56 kg
Power consumption	AC 100 - 240 V, 50/60 Hz, max. 70 VA		AC 100 - 240 V, 50/60 Hz, max. 105 VA

\*<sup>1</sup> Pressure sensor (PRS-M-5000, PRS-A-5000) is required.

\*<sup>2</sup> Infrared polarizer (PL-IR-5000, PL-IR-7000) is required.

● Specifications are subject to change without notice.

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JASCO's Advanced Research-Grade

# FT-IR Microscopes

Innovation in FT-IR microscopy and imaging systems

**IRT-5000**

Infrared Microscope

**IRT-7000S**

Fully automated Infrared Microscope

**IRT-7000**

Multi-channel Infrared Microscope



# Advanced FT-IR Microscopes for the FT/IR-4000/6000 Series spectrometers

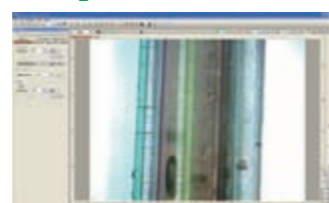
## FT-IR Microscopy and Imaging Systems



JASCO's innovative FT-IR Microscopes, the IRT-5000, 7000S and 7000 series provide new functions that dramatically improve infrared micro-spectroscopy analyses. These microscopes can be easily interfaced with either the FT/IR-4000 or FT/IR-6000 series spectrometers, offering the most advanced microscopy and imaging systems available in the market today. Coupling JASCO's proven technology for infrared spectroscopy (accumulated over 50 years) with the most advanced optical design, the IRT-5000, 7000S and 7000 offer the best solution for even the most challenging sample analyses.

- High optical throughput
- Excellent signal to noise ratio
- High spatial resolution
- Operational flexibility
- Expandable capabilities
- Full range of accessories

### Exceptional visual observation quality



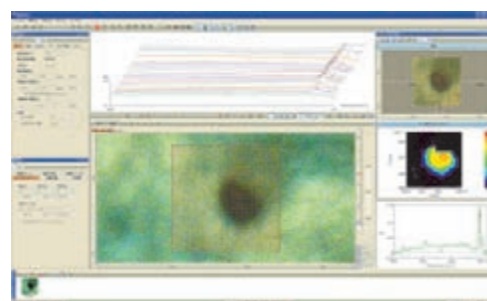
All microscopes are equipped with a high-resolution CMOS video camera with a 3x optical zoom capability, which allows high quality sample observation. Digital zoom function is also available for sample visualization at much higher magnification.

## IQ Mapping™

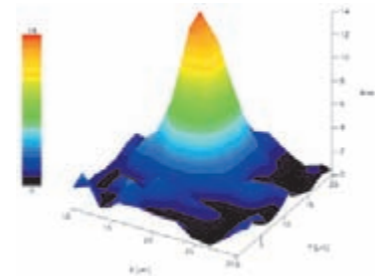
### FT-IR Micro-area Analysis

JASCO's new FT-IR microscope systems feature an innovative capability for sample analysis called "IQ Mapping". This function enables automated multi-point mapping, line mapping, grid mapping and IR Imaging analyses of a microscopic area with a manual sample stage and a single element detector. The microscope system automatically scans the specified points or area, rapidly collecting a full spectrum of each point without moving the sample stage.

The IQ Mapping coupled with ATR objective allows ATR mapping and ATR Imaging of any sample in contact with the ATR objective without moving the sample stage or ATR objective. This function provides high-speed and cross-contaminant free measurements of a small sampling area. Conventional ATR objectives can only provide sample measurements at the immediate center of the crystal, requiring movement of the ATR objective and sample stage for data collection of multiple sampling sites. In addition, JASCO's unique "Clear-View" ATR objective enables a simultaneous sample view even during ATR data collection after the ATR crystal element contacts the sample.



ATR Imaging by using ATR objective



ATR Mapping of 2 μm silica bead using the IQ Mapping function  
Colored 3D display of Si-O peak area near 1100 cm<sup>-1</sup>

## IRT-5000

### Infrared Microscope

Manual sample stage  
Mid-band MCT detector



The IRT-5000 FT-IR microscope employs a mid-band MCT detector as standard, while up to two detectors can be simultaneously installed as an option. The standard "IQ Mapping" function allows multi-point, line, area and ATR mapping experiments without moving the sample stage, in addition to single-point measurements. An optional automatic X-Y-Z sample stage enables auto-focus and mapping analysis of larger sample areas.

- IQ Mapping
- Dual detector capability
- Variety of measurement modes  
(Transmission, reflection, ATR, Grazing Angle Reflectance)
- Multiple objective capabilities
- Field upgrade to IR Imaging using a linear array detector

## IRT-7000S

### Fully Automated IR Microscope

Automatic sample stage  
Mid-band MCT detector



The IRT-7000S FT-IR fully automated microscope employs a mid-band MCT detector as standard, while up to two detectors can be simultaneously installed as an option. It is easily field-upgradable to an IR imaging system by adding an optional linear array detector. The standard automatic sample stage provides wide area mapping and multi-ATR mapping by combining the "IQ Mapping" function with the XYZ auto-stage.

- Fully automated sample stage  
with auto focus function as standard
- IQ Mapping
- Up to four objectives
- Dual detector capability
- Field upgrade to IR imaging using a linear array detector

## IRT-7000

### Multi-channel IR Microscope

Automatic sample stage  
Mid-band MCT detector  
and linear array detector



The IRT-7000 FT-IR multi-channel microscope offers two detectors as standard, a 16-channel linear array detector and a single-point MCT detector. The combination of the standard automatic sample stage and "IQ Mapping" function allows mapping analyses of a larger sample area, multi-area ATR mapping, and IR imaging of a specific area with extremely high spatial resolution and excellent sensitivity in a short time.

- Full IR Imaging function
- IQ Mapping
- Up to four objectives
- Wide area mapping and multi-ATR imaging
- Dynamic Imaging with FT-IR step-scan option
- Multivariate analysis PCA  
(Principal Component Analysis) (standard)

## IRT-5000VC/IRT-7000VC

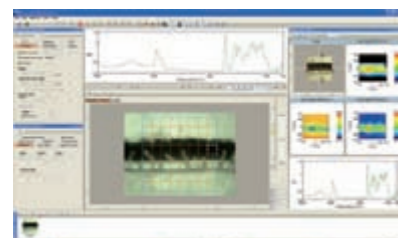
### FT-IR Full Vacuum type Microscopes



For FT-IR measurement, absorption peaks due to atmospheric water vapor and CO<sub>2</sub> can make it difficult to obtain high quality sample spectra. The most effective solution to this problem is the measurement of samples in vacuum. As a factory option, JASCO supplies a vacuum type FT-IR microscope system to be used with the FT/IR-6000V (vacuum interferometer) or FT/IR-6000FV (full vacuum) spectrometers.

# Spectra Manager™ II Cross-platform spectroscopy software package

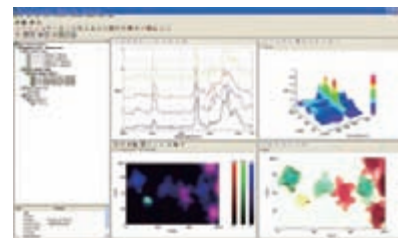
## Superior user-friendly graphical interface



Measurement program window (IRT-5000 with a single element detector)



Measurement program window (IRT-7000 with a linear array detector)



Analysis program window

A full-featured software package, Spectra Manager II provides automatic functions and simplified operational procedures to minimize manual operations. Measurement conditions, microscope sample monitoring/control operations and measurement results can be reviewed in a single screen. The dedicated microscope interface provides various types of measurements such as single and multiple points, mapping, and linear array measurements using a single mouse-click for mode selection.

- Auto-focus/Auto-illumination
- Registration of commonly used aperture settings
- Automatic recognition of microscope objectives
- Thumbnail display memorizing the sample position with focus and aperture information
- Spectrum preview to check conditions before measurement
- IQ Mapping for simultaneous observation of the spectrum and sample image
- Macro-stage control to quickly move to the desired sample position
- Auto-adjustment of condenser cassegrain objective
- Data storage linked with sample image and aperture information
- Report publishing capability (JASCO Canvas)

### Auto-focus function

The auto-focus function is standard for the IRT-7000S/7000. Contrast dynamics of the sample image are shown in a graph after initialization of the auto-focus function. The stage can be automatically moved to a target focal point by clicking a peak maximum in the contrast graph.



Contrast graph

### Macro-stage control

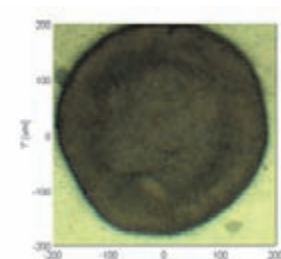
On the macro-stage map, designed as the image of the sample holder, the current stage position is indicated with a red point. By double-clicking a target point on the macro-stage map, the auto-stage quickly moves itself to the desired position for sample observation or measurement.



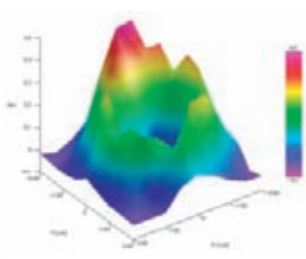
Macro-stage map

## Chemical imaging features

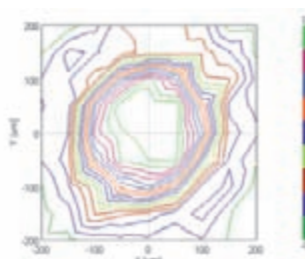
By simply clicking on a spectral feature in the 'Monitor' display, a chemical image can be displayed as a color 3-D image, a 3-D figure, a contour plot, or a color-coded plot. The microscope image and the chemical image can be overlaid in a single screen by selecting the chemical image and configuring the image transparency.



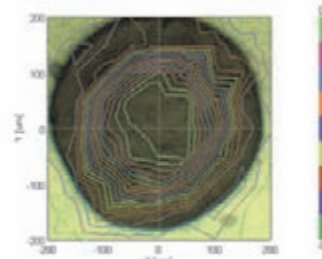
Microscope image



3-D image



Contour plot



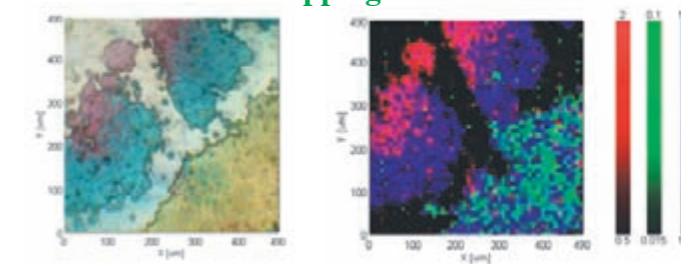
Overlay of microscope image and contour plot

## Sampling flexibility

A wide range of data acquisition modes provides the best solution for almost any type of sample and application.

- IQ Mapping
  - Single point
  - Multi-point
  - Line Mapping
  - Grid Mapping
  - Micro-ATR Mapping
- IQ Mapping with automatic X-Y-Z stage
  - Wide-area Mapping
  - Wide-area ATR Mapping
- Linear array detector and rapid scan
  - IR Imaging
- Linear array detector and step scan
  - Dynamic Imaging

### Wide-area ATR Mapping

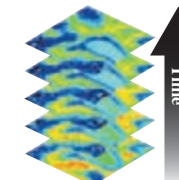


Wide area (490 x 490 μm) ATR imaging by the combination of IQ Mapping with the automated XYZ stage

The combination of the automatic sample stage and the "IQ Mapping" function allows mapping analyses of a large sample area, multi-area ATR mapping, and IR imaging of a specific area with extremely high spatial resolution and excellent sensitivity in a short time.

### Dynamic Imaging

Combining an FT/IR-6000 with the step-scan option offers advanced capabilities for dynamic imaging as well as time-resolved measurements of a specific area at the maximum time resolution of 5 μsec.



## Dedicated analysis software

### PCA mapping data analysis program

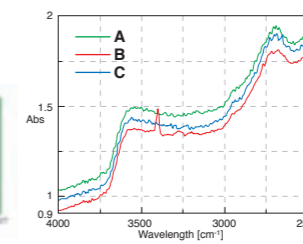
The PCA (Principal Components Analysis) mapping data analysis program creates chemical images based on the differences in spectral characteristics of the infrared spectra, analyzing those differences and grouping them as principal components.

In the example below, the PCA mapping software analyzes the differences in the pigments for an LCD color display, groups them based on the chemical differences of the three RGB components and provides the color image maps of the components.

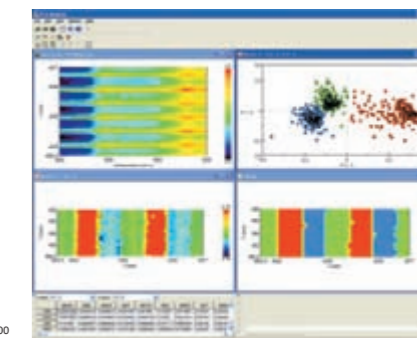
\* Optional for IRT-5000, standard for IRT-7000S/7000



Microscope image



Spectra of LCD display panel



PCA mapping analysis of LCD display panel

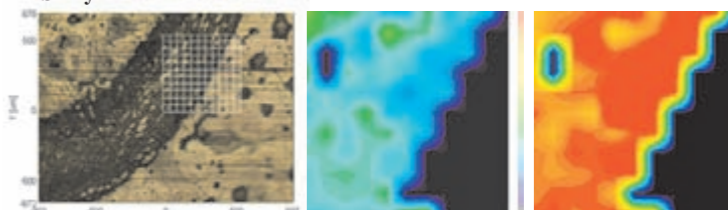
### IR mapping secondary structure analysis program

Based on the IR mapping data of a protein or other tissue sample, the secondary structure estimation (SSE) software analyzes the secondary structure of the sample based on the Amide I and II absorptions, providing chemical image maps based on the contributions of the secondary structures of the proteins in the sample.

In the example, the IR mapping data of the cross-section of a rabbit blood vessel is used to construct the chemical image maps of the distributions of α-Helix and β-Sheet proteins in the sample.

\* Optional for IRT-5000/7000S/7000

#### Study of arteriosclerosis in a rabbit



Microscope image

Chemical image of α-Helix

Chemical image of β-Sheet

# Optional FT-IR Microscope accessories

## Cassegrain objectives for transmission and reflection measurements

### Multiple objective capabilities



An electronically-controlled, 4-position objective carousel can be fitted with any combination of 10x, 16x, 32x, or grazing-angle cassegrain objectives, 10x or 20x refractive objectives or micro-ATR objectives. These objectives are automatically recognized when attached.

#### Objective/condenser cassegrain pair for transmission and reflection measurements

- RFO-30-16-57AL 16x Cassegrain pair, Al-coated (Standard for IRT-5000-16, IRT-7000S-16, IRT-7000)
- RFO-30-16-57 16x Cassegrain pair, Au-coated
- RFO-30-32-70AL 32x Cassegrain pair, Al-coated (Standard for IRT-5000-32, IRT-7000S-32, IRT-7000)
- RFO-30-32-57 32x Cassegrain pair, Au-coated
- RFO-30-10-45AL 10x Cassegrain pair, Al-coated (Standard for IRT-5000-10, IRT-7000S-10)
- RFO-30-10-45 10x Cassegrain pair, Au-coated

#### Cassegrain objectives for reflection measurements only

- RFO-30-16R-AL 16x cassegrain objective, Al-coated
- RFO-30-16R 16x cassegrain objective, Au-coated
- RFO-30-32R-70AL 32x cassegrain objective, Al-coated
- RFO-30-32R 32x cassegrain objective, Au-coated
- RFO-30-10R-AL 10x cassegrain objective, Al-coated
- RFO-30-10R-AU 10x cassegrain objective, Au-coated



\* Please use Au-coated cassegrains for measurements in the near-infrared region.

#### Specifications

	Normal sample viewing area	Aperture setting area	Measurement area using IQ mapping
16x Cassegrain	600 μm × 480 μm	X: 0 ~ 500 μm, Y: 0 ~ 500 μm (Max. 500 × 500 μm)	X: -200 ~ 200 μm, Y: -200 ~ 200 μm (Max. 400 × 400 μm)
32x Cassegrain	300 μm × 240 μm	X: 0 ~ 250 μm, Y: 0 ~ 250 μm (Max. 250 × 250 μm)	X: -100 ~ 100 μm, Y: -100 ~ 100 μm (Max. 200 × 200 μm)
10x Cassegrain	960 μm × 768 μm	X: 0 ~ 800 μm, Y: 0 ~ 800 μm (Max. 800 × 800 μm)	X: -320 ~ 320 μm, Y: -320 ~ 320 μm (Max. 640 × 640 μm)

#### Objective lenses for sample observation

- OBJ-5000-10 10x Objective (for sample observation)
- OBJ-5000-20 20x Objective (for sample observation)

## Grazing angle reflection objective

The grazing-angle reflection method is utilized for measurement of a thin film on a metal surface (Å to several μm in thickness) using polarized light. This objective greatly improves the sensitivity over the standard reflection method.



\* Infrared polarizer is required.

- RAS-5000 Grazing Angle Reflection Objective

**Specifications**  
Incident angle: 70°±10°  
Reflection: single

## Infrared polarizer

The polarizer is integrated into the FT-IR microscope and all polarizer control such as angle setting and insertion in the light path is accomplished by the software. The polarizer is used to perform infrared polarization measurements of samples and highly sensitive polarized reflectance measurements.

- PL-IR-5000 Infrared polarizer for IRT-5000
- PL-IR-7000 Infrared polarizer for IRT-7000S/7000

**Specifications**  
Polarizer: Wire-grid polarizer  
Polarizer angle control: 0 ~ 175° (1° step)

## Transmittance ATR accessory

The ATR-5000-TPZ enables micro-ATR measurements of a sample using the transmittance light path of the microscope. The sample is fixed on the surface of the ATR crystal and the entire assembly is put on the sample stage. The combination of the automatic sample stage allows ATR mapping of a wide sample area with a maximum area of 2.5 × 1 mm. The ATR-5000-TPZ, which requires a single sample-ATR crystal contact for ATR mapping, eliminates cross-contamination concerns.

\* The ATR-5000-TPZ requires the PKT-ZNSE or PKT-ZNS crystal kit.

- ATR-5000-TPZ Transmittance type ATR (without crystal)
- PKT-ZNSE Crystal kit, ZnSe for ATR-5000-TPZ
- PKT-ZNS Crystal kit, ZnS for ATR-5000-TPZ



ATR-5000-TPZ



Light path of ATR-5000-TPZ

## Standard ATR objectives

The ATR-5000-Z (ZnSe crystal) is useful when the sample has a low refractive index and for cases when deep penetration into a sample is required. The ATR-5000-G (Ge crystal) is useful when the sample has a high refractive index and for cases where a shallow penetration depth is required. The ATR-5000-D (diamond crystal) features are used for extremely hard samples or for chemically reactive samples. The ATR-5000-G45 is designed for better contact with samples that have a rough topography.



ATR-5000-G45



ATR-5000-Z



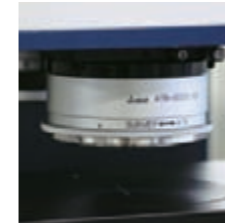
ATR-5000-D

- ATR-5000-Z ATR Objective with ZnSe crystal
- ATR-5000-G ATR Objective with Ge crystal
- ATR-5000-D ATR Objective with diamond crystal
- ATR-5000-G45 ATR Objective with Ge crystal, projection type

\* The optional pressure sensor is required.

## “Clear-View” ATR objectives

### Sample viewing function during a sample in contact with ATR crystal



The innovative “Clear-View” ATR objectives permit both ATR data collection and viewing of the sample by using the same cassegrain elements, simply changing the crystal position up and down. In addition, the ATR-5000-SD and ATR-5000-SS enables a simultaneous sample view even during ATR data collection after the ATR crystal element contacts the sample, a capability not available in conventional ATR objectives. This innovative function allows the selection of a specific area of the sample while observing the entire area of the sample that is in contact with the crystal element.

- ATR-5000-SD “Clear-View” ATR Objective with diamond crystal
- ATR-5000-SS “Clear-View” ATR Objective with ZnS crystal
- ATR-5000-SG “Clear-View” ATR Objective with Ge crystal

\* The optional pressure sensor is required.



ATR-5000-SD



ATR-5000-SS

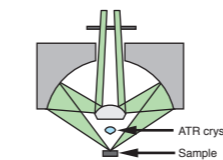


ATR-5000-SG

#### Specifications

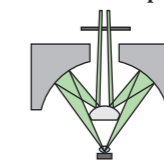
	ATR-5000-SD	ATR-5000-SS	ATR-5000-SG
Applicable sample refractive index	1.0 ~ 1.5	1.0 ~ 1.5	1.0 ~ 2.5
Wavelength range (cm <sup>-1</sup> )	7,000 ~ 2,500 1,600 ~ 700	7,000 ~ 700	5,200 ~ 650
Magnification	Crystal in raised (view) position	16	
	Crystal and sample contact (sample position)	35.2	64
ATR crystal element	Material	Diamond	ZnS
	Refractive index (@ 1000 cm <sup>-1</sup> )	2.4	2.2
	Area in contact with sample	ø500 μm	
	Number of internal reflections	1	
Simultaneous sample view when crystal is in contact with the sample surface	Possible	Impossible	
IQ mapping area (μm)	180 × 180	100 × 100	

#### Normal sample view with the crystal element in the raised position



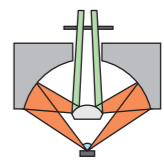
The ATR-5000-SD/SS/Sg enables sample viewing by setting the ATR crystal in the raised position.

#### Sample viewing after crystal contact with the sample area



The ATR-5000-SD and SS enable sample viewing through the ATR crystal after contact with the sample surface.

#### ATR measurement and simultaneous sample viewing



The ATR-5000-SD and SS provide simultaneous sample view during ATR data collection.

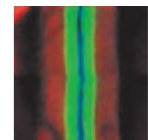
The figures below illustrate the analysis of a multi-layer medical packaging film by using the IRT-7000 and the ATR-5000-SS (ZnS crystal) “Clear-View” ATR objective. The film was embedded in an epoxy resin and sliced to obtain a cross-section of the film which was analyzed by ATR Imaging using the IQ Mapping function. From the results of the ATR Imaging, it was determined that the medical packaging film consists of five layers and three components.



Sample image before contact of the ATR crystal with the sample surface



Sample image after contact of the ATR crystal with the sample surface



ATR Imaging of a section of the medical packaging film

## Pressure sensor

The pressure sensor is required for the ATR Cassegrain objectives and is used to maintain constant pressure during an ATR measurement. The alarm functions when the sensor recognizes excessive pressure between the sample and the crystal. The pressure sensor display panel is standard and can be mounted on the control panel of the microscope.

- PRS-A-5000 Pressure sensor for auto-stage
- PRS-M-5000 Pressure sensor for manual stage



Pressure sensor display panel



PRS-A-5000

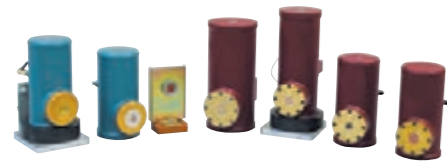


PRS-M-5000

# Optional FT-IR Microscope accessories

## Variety of detectors for wavenumber extension

### Integrated detectors



The IRT-5000 and IRT-7000S employs a single element mid-band MCT detector as standard, while up to two detectors can be installed simultaneously to expand the spectral range of the microscope systems. Upon request, the standard mid-band MCT detector can be exchanged for a narrow or wide-band MCT detector as a factory option. The IRT-7000 offers two detectors as standard; a 16-channel linear array narrow-band MCT detector for infrared imaging and a single element mid-band MCT detector for single point measurements. A range of optional detectors are available to expand the spectral range of the microscope systems.

#### Optional single element detectors (integrated) for IRT-5000/7000S/7000

- TGS-5000 DLATGS detector, range: 7800 ~ 400  $\text{cm}^{-1}$
- NMCT-5000 Narrow-band MCT detector, range: 7800 ~ 750  $\text{cm}^{-1}$
- WMCT-5000 Wide-band MCT detector, range: 7800 ~ 450  $\text{cm}^{-1}$
- INSB-5000 InSb detector, range: 15000 ~ 1850  $\text{cm}^{-1}$
- IGA-5000 InGaAs detector, range: 12000 ~ 4000  $\text{cm}^{-1}$

#### Optional linear array detectors (integrated) for IRT-7000

- MNMCT-7000 Linear array Narrow-band detector (2 × 16 element), range: 7000 ~ 750  $\text{cm}^{-1}$
- MINSB-7000 Linear array InSb detector (1 × 16 element), range: 10000 ~ 1900  $\text{cm}^{-1}$
- MIGA-7000 Linear array InGaAs detector (1 × 16 element), range: 10000 ~ 5000  $\text{cm}^{-1}$

### User-exchangeable second detectors



User-exchangeable second detectors are available for the IRT-5000, 7000S and 7000 microscope systems. These detectors can be easily exchanged in a short time, at any time, as required by the user application. A modification kit for the main body of the microscope is required to use the user-exchangeable second detectors.

#### User-exchangeable second detectors

- TGS-5000C DLATGS detector with cassette for IRT-5000, range: 7800 ~ 400  $\text{cm}^{-1}$
- TGS-7000C DLATGS detector with cassette for IRT-7000S/7000, range: 7800 ~ 400  $\text{cm}^{-1}$
- NMCT-5000C Narrow-band MCT detector with cassette for IRT-5000, range: 7800 ~ 750  $\text{cm}^{-1}$
- NMCT-7000C Narrow-band MCT detector with cassette for IRT-7000S/7000, range: 7800 ~ 750  $\text{cm}^{-1}$
- WMCT-5000C Wide-band MCT detector with cassette for IRT-5000, range: 7800 ~ 450  $\text{cm}^{-1}$
- WMCT-7000C Wide-band MCT detector with cassette for IRT-7000S/7000, range: 7800 ~ 450  $\text{cm}^{-1}$
- INSB-5000C InSb detector with cassette for IRT-5000, range: 15000 ~ 1850  $\text{cm}^{-1}$
- INSB-7000C InSb detector with cassette for IRT-7000S/7000, range: 15000 ~ 1850  $\text{cm}^{-1}$
- IGA-5000C InGaAs detector with cassette for IRT-5000, range: 12000 ~ 4000  $\text{cm}^{-1}$
- IGA-7000C InGaAs detector with cassette for IRT-7000S/7000, range: 12000 ~ 4000  $\text{cm}^{-1}$

#### Modification kit

- SDC-5000 Modification kit for the user-exchangeable second detector for IRT-5000
- SDC-7000 Modification kit for the user-exchangeable second detector for IRT-7000S/7000



User-exchangeable second detector with cassette

## XYZ Auto-stage and joystick

An optional automatic X-Y-Z sample stage for the IRT-5000 enables auto-focus and mapping analysis of large sample areas. The joystick option for the IRT-5000/7000S/7000 systems provides an alternative control method for stage movement and sample positioning when using the auto-stage.

- IPS-5000 XYZ Auto-stage option for IRT-5000
- JOY-IPS-5000 Joystick option for IRT-5000/7000S/7000



IPS-5000 XYZ Auto-stage



JOY-IPS-5000 Joystick

## Purge case

The IRT-5000/7000S/7000 systems have a nitrogen purge capability as standard. An optional purge casing for the sample stage area is available for further elimination of the influence of CO<sub>2</sub> and water vapor bands.

- PGC-5000 Purge case for IRT-5000
- PGC-7000 Purge case for IRT-7000



\* When a linear array detector is added to the IRT-5000 after installing the PGC-5000 purge case, the PGC-5000UPG purge case upgrade kit is also required.

## Sample temperature control system

The MHC-5000 and 7000 offer the ability to measure infrared spectral changes due to phase transitions of the sample during controlled heating/cooling of the sample. The temperature control program is available as an option.

- MHC-5000 Heating System
- MHC-7000 Heating System

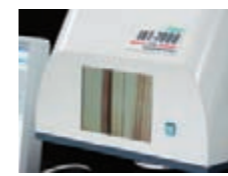
Temperature range  
MHC-5000: Room temp. ~ 600°C (standard), -190 ~ 600°C (option)  
MHC-7000: Room temp. ~ 375°C (standard), -60 ~ 375°C (option)



\* When using the manual stage, only the 10× cassegrain objective can be used with the temperature control system due to limitations in the working distance. For the auto-stage, the 10× or 16× cassegrain objectives can be used.

## Sample observation options

### Color LCD monitor



LCD-5000

A 5.7 inch TFT color LCD monitor can be installed in the microscope system, providing a sample view for sample positioning/area selection and simultaneous observation during data collection.

- LCD-5000 Color LCD Monitor for IRT-5000/7000S/7000

### Binocular



VIS-5000

A binocular option, with 10× oculars, enables direct visual observation of the sample with the ATOS system.

- VIS-5000 Binocular for IRT-5000/7000S/7000
- \* The color LCD monitor and visual binocular cannot be installed simultaneously. Neither option can be used with a vacuum type microscope.

### Polarization observation

Polarized illumination light heightens the observation of materials such as single crystals, minerals or other foreign objects inside a polymer film which are otherwise difficult to observe using the standard visible illumination.

- PL-E-5000 Visible Polarizer
- PL-E-5000VIS Visible Polarizer
- PL-E-5000FV Visible Polarizer

- \* Both PL-E-5000 and PL-E-5000VIS are required when using the VIS-5000 binocular.
- \* PL-E-5000FV (factory option) needs to be used for a vacuum type FT-IR microscope.



Normal observation



Polarization observation

### Differential interference contrast observation

For colorless or transparent samples, light and dark interference patterns from the sample can be used to highlight and observe the sample image as a stereoscopically bright image with shading.

- DIC-5000 Differential interference contrast observation

- \* 10× objective (observation) and Visible Polarizer are required.
- \* 20× objective (observation) cannot be used with the DIC-5000 option



Normal observation



Differential interference contrast observation



DIC-5000

### Fluorescence observation



Selecting specific excitation and emission wavelengths, fluorescent portions of a sample can be vividly observed as a visible image, thus highlighting specific sample features of interest.



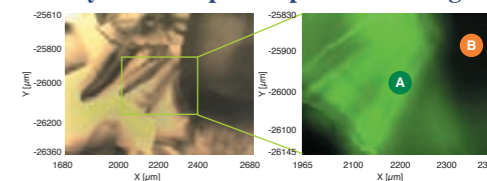
Excitation and emission filters and dichroic mirror for MF-5000VIS

- MF-5000VIS Fluorescence observation
- MF-5000UV Fluorescence observation

#### Specifications

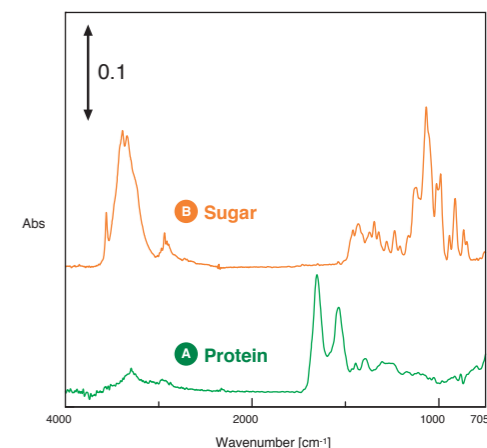
	MF-5000VIS	MF-5000UV
Light source:	Xe lamp, 75W	Hg-Xe lamp, 150W
Fluorescence excitation/emission range:	400 ~ 700 nm	250 ~ 700 nm
Excitation wavelength:	400, 480 nm (Band-pass filter) (Max. 5 filters can be mounted.)	330, 400, 480 nm (Band-pass filter) (Max. 5 filters can be mounted.)
Emission wavelength:	540, 600, 700 nm (Band-pass filter) (Max. 5 filters can be mounted.)	450, 540, 600, 700 nm (Band-pass filter) (Max. 5 filters can be mounted.)
Dichroic mirror:	506 nm	409 and 506 nm
Observation camera:	Cooled CCD camera	Cooled CCD camera for UV-Vis

### Analysis of complex of protein and sugar



Normal observation

Fluorescence observation



# FT-IR Microscope sampling tools

## SliceMaster

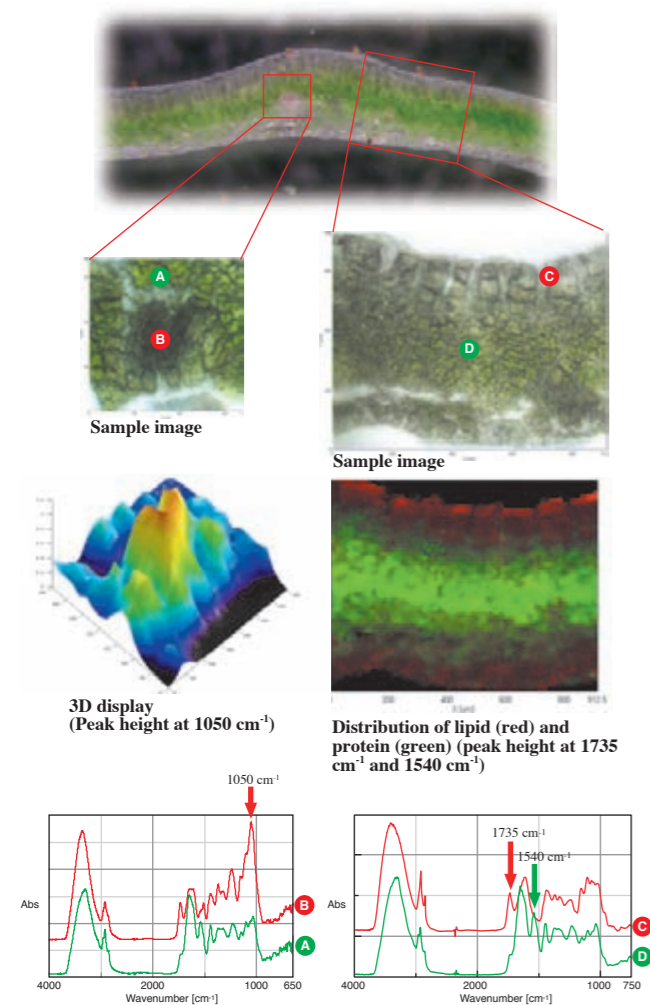
### Precision cutting from 10-200 microns

The SliceMaster is a handy compact slicer that can create thin sections quickly and easily. It is a powerful tool for multi-layer film analysis and/or cross sectional analysis. Three models are available, and can be selected for different sample preparation capabilities.

- HS-1 Vertical slicer  
Cutting angle: 90° (against the surface of the sample)  
Sample thickness: Max. 3 mm
- HK-1 Angled slicer  
Cutting angle: 15° (against the surface of the sample)  
Sample thickness: Max. 0.2 mm
- HW-1 Multi-angle slicer  
Cutting angle: 45°~90° (against the surface of the sample)  
Sample thickness: Max. 2 mm

### Cross sectional analysis of the leaf of a Cyclamen houseplant

The leaf sample was sliced using the HW-1 Multi-angle slicer, and placed between two KBr plates to create a pellet (KBr plate method). The sample pellet was measured using the IRT-5000 with the IQ Mapping function (left side) and the IRT-7000 with the high-speed imaging function (right side).



## Mini KBr/KCl plates

### Window for transmission measurements

The mini KBr/KCl plates are disposable windows used for the KBr pellet method, in which a sample is placed on KBr or KCl crystals and formed into a pellet for transmittance measurements. For measurement of chlorine containing compounds that may be influenced by halogen exchange, the mini KCl plate is recommended.



- Mini KBr plates, 3W × 3D × 0.5H mm, 200 pcs/set (P/N: 2000-0060)
- Mini KCl plates, 3W × 3D × 0.5H mm, 100 pcs/set (P/N: 2000-0066)

\* A ø5 micro pellet die and a hand press are required.

## Reference mirrors

### For reflection measurements

These gold reference mirrors are used as the reference for IR reflection measurements. They can also be used as reference materials for grazing-angle measurements.



- Gold-coated reference mirrors
- Specifications**  
Composition: 10 pcs/set  
Size (entire body): 25 × 65 mm  
Size (mirror): 5, 15 and 10 mm diameter  
Coating layer: Surface layer Au (50 μm)

\* A gold-coated mirror is included in the standard kit for the IRT-5000/7000S/7000.

## Diamond sample window

### To compress and flatten solid samples

When measuring a sample with transmittance mode, a sample thickness less than 1 μm and a smooth surface are preferable for a high quality spectrum. The Diamond Window is very effective to compress thick samples.

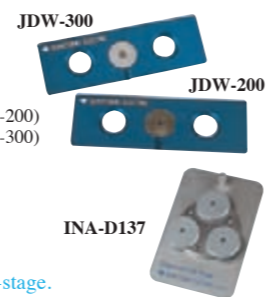
- JDW-200 Diamond Window
- JDW-300 Diamond Window

**Specifications**  
Diamond size: 2.5 dia. × 0.5 thickness mm (JDW-200)  
3.5 dia. × 0.5 thickness mm (JDW-300)

- INA-D137 Diamond EX<sup>®</sup> Press

**Specifications**  
Diamond holder size: 43 dia. × 2.5 thickness mm  
Required working distance: more than 5.5 mm

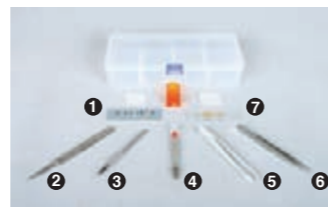
\* The INA-D137 can not be used with the combination of 32× Cassegrain and an auto-stage.



## Micro sampling tool kit

This kit includes tools for micro sample preparations such as removal of tiny foreign substances or placement of thin slices on a sample plate.

- Configuration**
- 3-position sample holder ①
  - Micro sampling knife, H-type ②
  - Micro sampling knife, S-type ③
  - Sample manipulation micro-needle ④
  - Tweezers for KBr plates ⑤
  - KBr plate for micro sampling, 5 × 5 × 1 mm, 5 pcs/set
  - Tweezers for micro sampling ⑥
  - Reference mirror for micro-reflection measurements ⑦
  - KBr plate, ø10 × 0.1 mm, 5 pcs/set



\* This kit is a standard accessory for the IRT-5000/7000S/7000.

# Ordering information

## IRT-5000 Infrared Microscope

### Standard configuration

- IRT-5000-16 IRT-5000 Infrared Microscope, 16× Cassegrain
- IRT-5000-32 IRT-5000 Infrared Microscope, 32× Cassegrain
- IRT-5000-10 IRT-5000 Infrared Microscope, 10× Cassegrain

### Right-side position type for instrument systems with FT-Raman

- IRT-5000-16R IRT-5000 Infrared Microscope, 16× Cassegrain
- IRT-5000-32R IRT-5000 Infrared Microscope, 32× Cassegrain
- IRT-5000-10R IRT-5000 Infrared Microscope, 10× Cassegrain

### Full vacuum type

- IRT-5000-16VC IRT-5000 Infrared Microscope, full vacuum type, 16× Cassegrain
- IRT-5000-32VC IRT-5000 Infrared Microscope, full vacuum type, 32× Cassegrain
- IRT-5000-10VC IRT-5000 Infrared Microscope, full vacuum type, 10× Cassegrain

### Upgrade kit

- UPG-5000 Upgrade kit to IRT-7000 for IRT-5000

## IRT-7000S Fully Automated IR Microscope

### Standard configuration

- IRT-7000S-16 IRT-7000S Fully automated Infrared Microscope, 16× Cassegrain
- IRT-7000S-32 IRT-7000S Fully automated Infrared Microscope, 32× Cassegrain
- IRT-7000S-10 IRT-7000S Fully automated Infrared Microscope, 10× Cassegrain

### Upgrade kit

- UPG-7000S Upgrade kit to IRT-7000 for IRT-7000S

## IRT-7000 Multi-channel IR Microscope

### Standard configuration

- IRT-7000 Multichannel Infrared Microscope, 16× and 32× Cassegrain objectives, with array detector

### Full vacuum type

- IRT-7000VC IRT-7000, full vacuum type



IRT-5000 with the FT/IR-4100 FT-IR Spectrometer



IRT-5000 with the FT/IR-6100 FT-IR Spectrometer



IRT-7000 with the FT/IR-4100 FT-IR Spectrometer



IRT-7000 with the FT/IR-6100 FT-IR Spectrometer

## IRT-1000 (Irtronμ) Sample compartment microscope for FT-IR



The IRT-1000 sample compartment microscopy system is designed to provide affordable analysis of microscopic samples with the high performance features of an external FT-IR microscope accessory. The IRT-1000 offers unprecedented convenience and ease of use in conjunction with the JASCO FT/IR-4000 and 6000 Series FT-IR instruments. The microscope accessory installs into the spectrometer sample compartment in seconds without optical alignment.

- Transmittance, reflectance and ATR (option) measurement modes
- DLATGS, MCT or NIR optimized detector
- Unique SmartMonitor™ function allows sample observation during spectrum preview
- Five inch TFT LCD monitor for sample observation
- Optional sampling accessories for liquid and powder samples
- Affordable, easy-to-use microscopy system

### Options for IRT-1000



#### SmartPurge™

An optional purge casing can be used to eliminate interference from atmospheric CO<sub>2</sub> and water vapor bands.



#### Liquid sample holder

The liquid sample holder includes three standard spacers, 0.1, 0.05 and 0.025 mm pathlengths for liquid sample analyses.



#### ATR objective

Three types of optional ATR objectives are available, selecting from ZnSe, Ge, and Diamond crystal elements. An optional pressure sensor (recommended) to protect the ATR objective is also available.



#### Powder sample holder

The powder sample holder can be used for diffuse reflectance measurements of powdered samples mixed with KBr. Up to five samples can be loaded onto the holder.