

# ***FT/IR-6X/8X***

Fourier Transform Infrared Spectrometer



# High-grade FTIR for IR spectroscopy analysis

The FT/IR-6X and FT/IR-8X spectrometers offer a highly configurable optical system applicable to virtually any FTIR application, from simple Mid IR measurement to more complex analysis in the farthest reaches of the electromagnetic spectrum. Research-based measurements are easily performed on the FT/IR-6X or FT/IR-8X spectrometers with options such as full-vacuum, gold-coated optics, rapid & step scan and FT-Raman for more advanced experiments.

Exchangeable elements combined with full automation can be used for spectral measurement from 25,000  $\text{cm}^{-1}$  to less than 20  $\text{cm}^{-1}$  without touching the system. The FT/IR-6X and FT/IR-8X spectrometers are compatible with a range of vacuum and configurable emission ports to perform experiments outside the sample compartment, and are also compatible with our comprehensive range of IR microscopes.

## FT/IR-6X

FT/IR-6X is a powerful FTIR spectrometer for research application, with an excellent signal-to-noise ratio (47,000 : 1) and high resolution (0.25  $\text{cm}^{-1}$ ). It has the capability of extending the measurement wavenumber range (25,000 to 20  $\text{cm}^{-1}$ ), and also has the option of applying the IR measurement under vacuum conditions, FT/IR-6X with superior performance, functionality and flexibility providing the optimal solution.

### Features

- Excellent signal-to-noise ratio (47,000 : 1)
- High resolution (0.25  $\text{cm}^{-1}$ )
- Rapid scan option
- Wavenumber range extension option (25,000 to 20  $\text{cm}^{-1}$ )
- Vacuum option



FT/IR-6X

## FT/IR-8X

FT/IR-8X is our flagship FTIR spectrometer, with an excellent signal-to-noise ratio (55,000 : 1) and high resolution (0.07  $\text{cm}^{-1}$ ). FT/IR-8X can be used with options for rapid scan measurement and step scan measurement with nanosecond time resolution (up to 10 nsec.). In addition, measurement wavenumber region can be extended as an option, and it is possible to upgrade FT/IR-8X to a vacuum model.

### Features

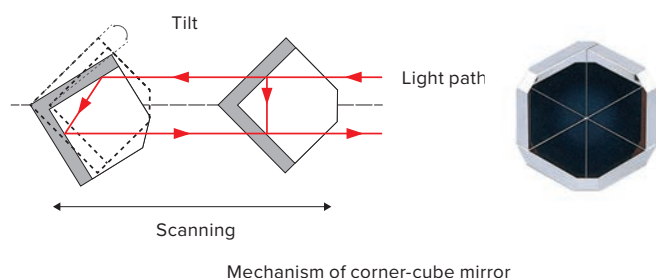
- Excellent signal-to-noise ratio (55,000 : 1)
- High resolution (0.07  $\text{cm}^{-1}$ )
- Rapid scan option / Step scan option
- Wavenumber range extension option (25,000 to 20  $\text{cm}^{-1}$ )
- Vacuum option



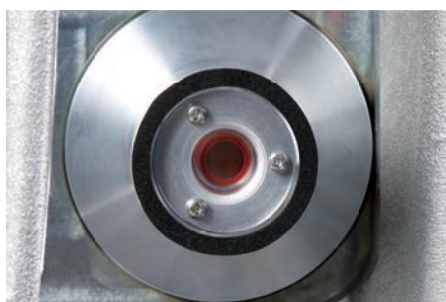
FT/IR-8X

## Stable interferometer

High-quality FTIR measurements start with the precision and stability of the interferometer. That is why the FT/IR-6X and FT/IR-8X spectrometers utilize a Michelson interferometer with corner-cube mirrors for permanent alignment to prevent light-path deviation, eliminating the need for dynamic alignment.



Since the interferometer housing has excellent sealing property, it protects the inner optical components, and improves their lifetime. Reliable measurement for a long period is available by using a high luminance ceramic light source with a long lifetime, a DLATGS detector with temperature control and a moisture-resistant KRS-5 window.



KRS-5 window

## AccuTrac™ DSP control

FT/IR-6X and FT/IR-8X spectrometers control the interferometer drive using the latest Digital Signal Processing (DSP) technology. Compared to analog control of the moving mirror, the DSP system shortens the time interval for speed control. This mechanism provides precise moving mirror control, and enhances the constant-speed performance of the mirror drive.

## Stable optical bench

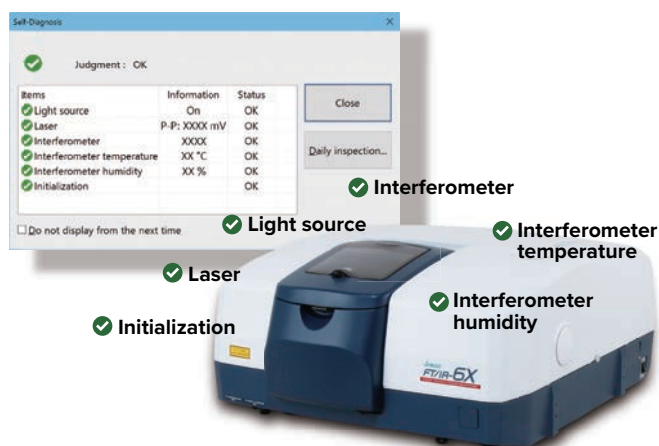
The optical bench's vibration-proof mounting prevents interference from sources of vibration.



Vibration-proof mounting

## Self-diagnosis function

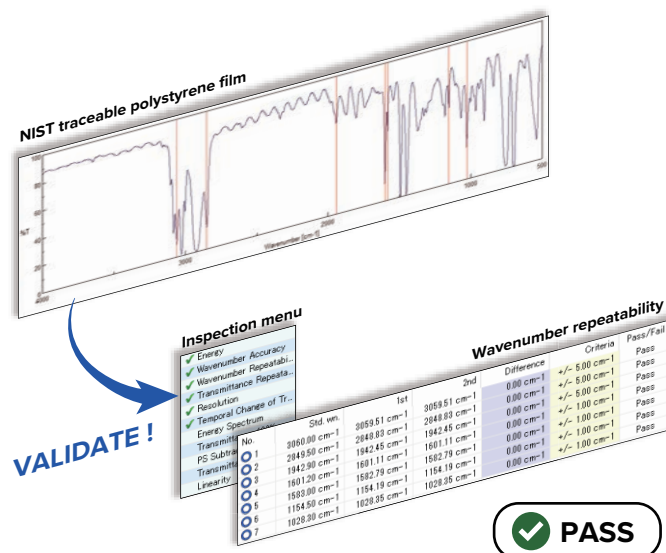
The self-diagnosis function checks the status of the FT/IR-6X or FT/IR-8X at startup. If there is any problem, it will be detected immediately. The diagnosis results are automatically recorded, and it is possible to track the temporal change. Therefore, if there is a problem with the data, you can retrace and check.



Self-diagnosis function

## Auto validation

Built-in NIST traceable polystyrene film for easy validation. The status of the instrument can be checked daily and can be confirmed the reliability of analysis results.



Validation function

## iQX accessory

When an accessory with an iQX Accessory identification chip is fitted in the sample compartment, the measurement program automatically loads the information (model name, serial number, etc.) and automatically selects optimal measurement parameters. This accessory data is also recorded in the measured spectrum.

## Excellent signal-to-noise ratio

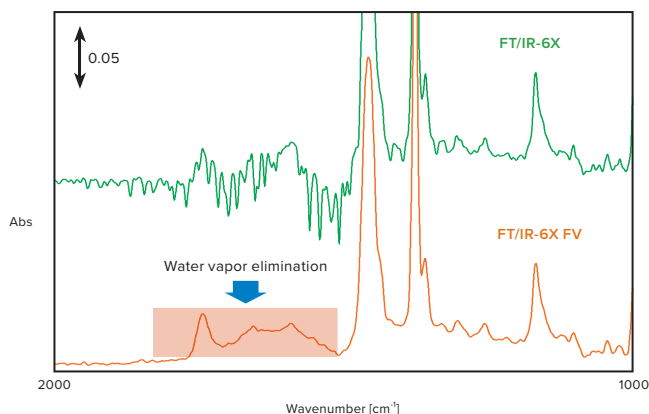
Both the FT/IR-6X and FT/IR-8X achieve exceptional signal-to-noise ratios using DSP control and a 24-bit A/D converter. The FT/IR-6X starts with a signal-to-noise ratio greater than 47,000 : 1 (FT/IR-8X -55,000 : 1).

## High resolution measurement

The highly accurate 28 degrees Michelson interferometer and near frictionless-moving mirror offers class-leading resolution down to 0.07  $\text{cm}^{-1}$ .

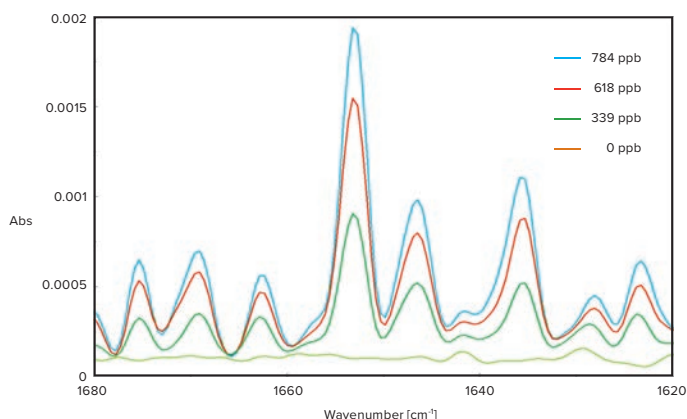
## Vacuum option

When measuring in the IR range, eliminating the effects of water vapor in the instrument is extremely important for obtaining high-precision data. Although purging with dry air or nitrogen gas is the conventional solution to this problem, the FT/IR-6X and FT/IR-8X have options for a full or partially evacuable optical system. This system can be used for performing low ppb-level water vapor monitoring, thin-film measurement and dilute solution measurement. Where measurement across wide spectral regions is required, automatic window and/or beam-splitter exchange can be included for uninterrupted spectral acquisition.



Water vapor elimination by vacuum option

Since the vacuum option enables the influence of the atmosphere to be removed effectively compared with the purge option, it enables weak peaks to be detected and the performance of Far IR measurement with high accuracy. The figure below shows the spectra of ultra-low concentration water vapor. Vacuum option is a powerful tool to monitor low concentration gas (less than ppm) and to measure thin film.



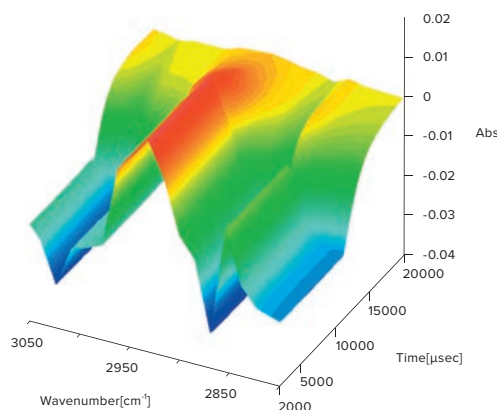
Spectra of ultra-low concentration water vapor

## Rapid scan and step scan options

For time-resolved measurements, rapid scan option is available for FT/IR-6X and FT/IR-8X. Rapid scan provides measurement up to a maximum of 40 Hz.

Step scan measurement options are also available for FT/IR-8X. Step scan offers microsecond and/or nanosecond measurement options. Step scan measurements require an infinitely repeatable and reproducible experiment. Some key application examples include:

- Depth profiling with PAS
- Thin film measurements with PM-IRRAS
- Chemical transitions in the electric field orientation of liquid crystals
- Materials rheology with polymer stretching
- Protein folding



Dynamic response measurement of liquid crystal (5CB)  
(Time resolution: 250  $\mu\text{sec}$ .)

## IR microscope options

FTIR microscopy has generally been reserved for measuring specified samples such as small contaminants on polymer films or micro samples transferred to infrared transparent windows. The FT/IR-6X or FT/IR-8X spectrometers can be coupled to any of the IRT Series of IR microscopes to create systems for materials identification and sample imaging.



IRT-7100 IR microscope



# Wavelength range

The FT/IR-6X and FT/IR-8X spectrometers can be configured for any spectral region within the measurement range 25,000 cm<sup>-1</sup> to less than 20 cm<sup>-1</sup>. Automatic beam splitter and window exchange allow uninterrupted measurement across the entire spectral range.



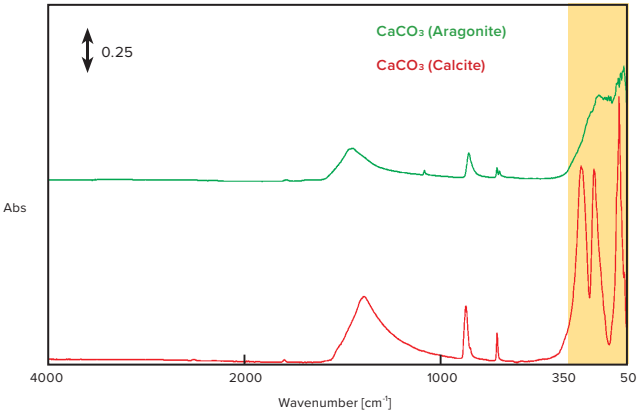
Automatic beam splitter changer

JASCO can also provide the FTIR system which enables to perform the broad band measurement (6,000 to 30 cm<sup>-1</sup>) without switching optical elements. In addition, its system can be applied to a vacuum system, which can immediately get the entire spectral data from Mid IR to Far IR without any influence from water vapor or CO<sub>2</sub> in the atmosphere.

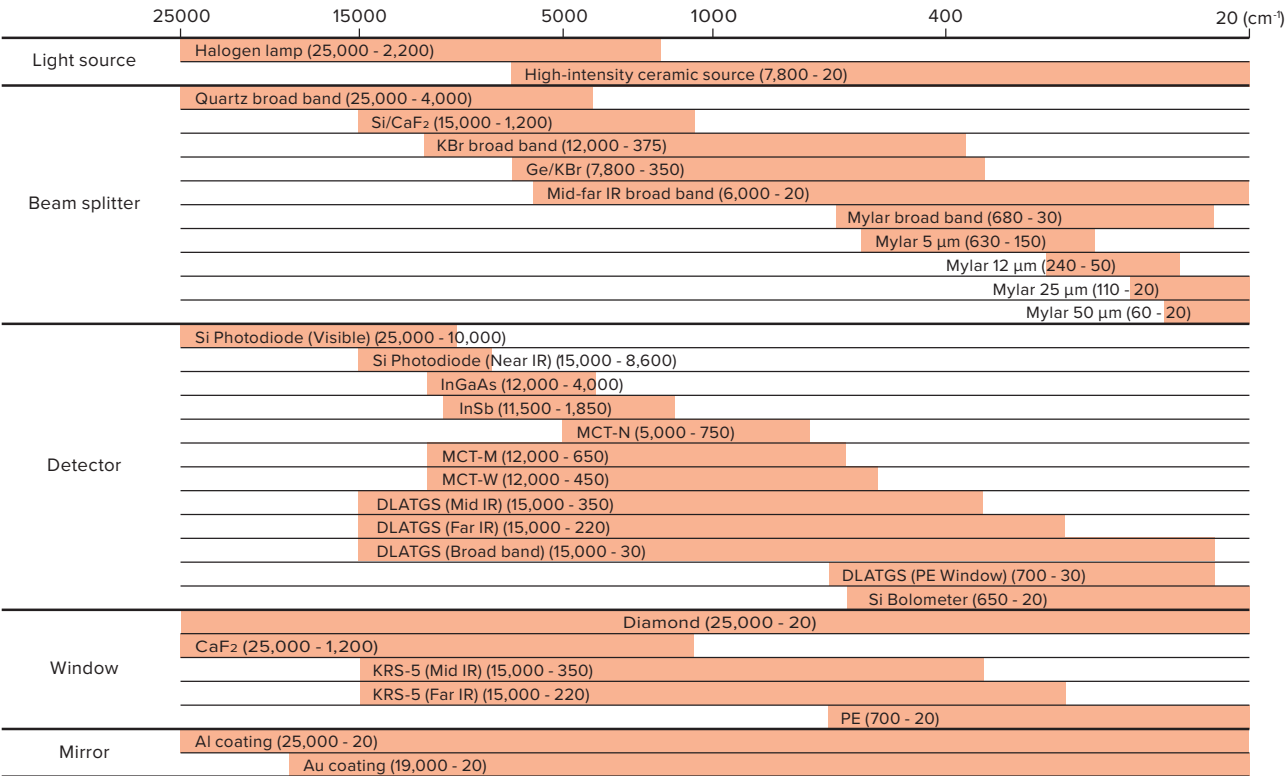


FT/IR-6X FV

The figure below shows the spectra of CaCO<sub>3</sub>. Since the FTIR system with a broad band beam splitter and broad band detector can immediately get the entire spectral data from Mid IR to Far IR, its system can distinguish the crystal structure difference of CaCO<sub>3</sub>.



Spectra of CaCO<sub>3</sub>



\*1 When extending the wavenumber region of FT/IR-6X to the visible region, He-Ne laser option is also required.  
\*2 Mylars (5/12/25/50 μm), MCT detector for step scan option and Au coating option are not available with the FT/IR-6X.

Available range of optical elements

# Single platform for every instrument

## - Spectra Manager™ software suite -

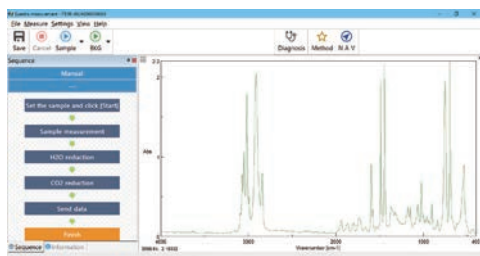
JASCO has developed a unique and powerful, cross-platform Windows® software package to control the widest range of optical spectroscopy instrumentation. Spectra Manager™ is a comprehensive lab companion for measuring and processing data, eliminating the need to learn multiple software programs and allowing data from many instruments to be analyzed and displayed together on the same platform.

### Instrument control

Drivers are included to control each spectroscopy instrument and parameter dialogs allow easy editing of pre-saved parameter files. Data acquired from each instrument is automatically loaded into the analysis program to free up the PC and control software to acquire more data during post-acquisition processing. Each instrument driver also has its own dedicated application for instrument hardware diagnostics and validation.

### Flexible display features

User-friendly features include overlay printing in colors and patterns, autoscale mode, and style and font, as well as customized toolbars.

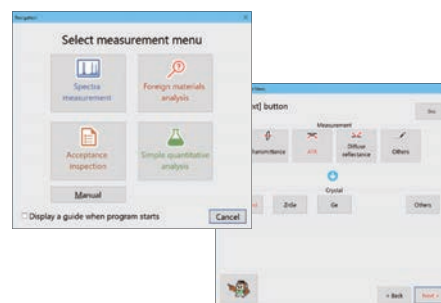


### Data processing and spectral analysis

View and process multiple types of measurement data files (UV/Vis/NIR, FTIR, Raman, Fluorescence, CD) in a single window, using a full range of data processing functions. Features include arithmetical operations, derivatives, peak detection and processing, smoothing, and baseline correction.

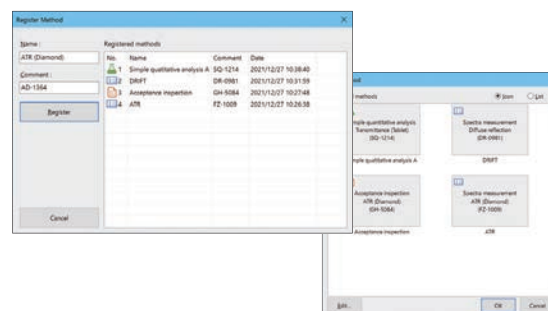
### Navigation function

The navigation function allows even those who are unfamiliar with IR analysis to perform measurements in the same way as experts. Measurement parameters suitable for your measurement purpose can be set by selecting menu according to the navigation.



### Method function

Registering frequently used measurement parameters in the method, you can perform the measurement by just selecting the target method from the next time.



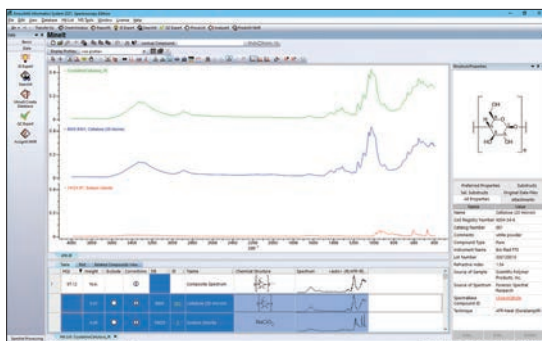
### Report publishing

JASCO Canvas allows users to create layout templates of spectral data and results to meet individual reporting requirements.

# KnowItAll Spectra Search Program

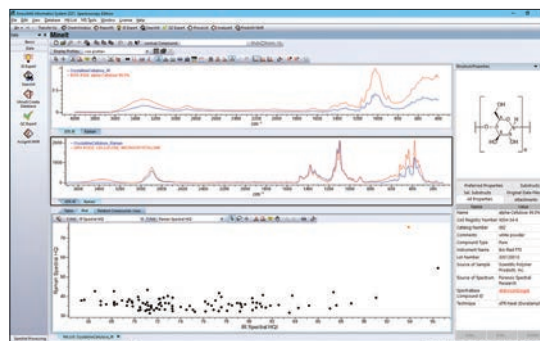
JASCO adopts Wiley KnowItAll as JASCO Spectroscopy edition.

- Wiley's original 12,600 data and JASCO's original 400 data is included as the standard package
- Multi-component search function that can search for a mixture sample of up to 5 components
- Supports for functional group analysis of infrared, Raman, and polymer infrared
- Multi-techniques that can be searched simultaneously with the Raman spectra
- User database ability
- ID expert function that executes a spectral search, mixture search, and functional group search at the same time
- Database provided by Wiley (approx. 264,000 IR spectra) can be added



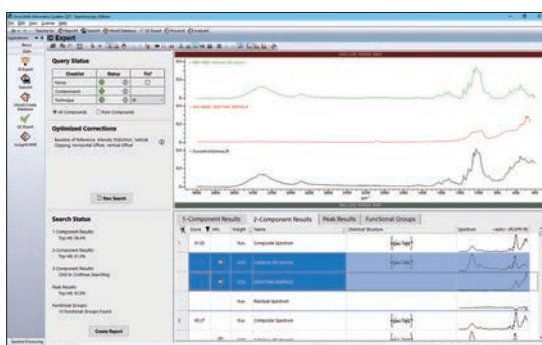
## Multi-component

Identification of the spectrum about each component from unknown sample containing up to 5 components. The good search algorithm makes it possible to search in a short time.



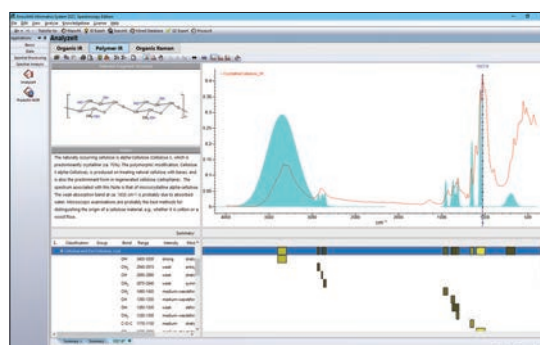
## Multi-technique

Simultaneous search function for IR and Raman spectra about the same sample and plot function of the hit rates of each search result against each other.



## ID expert

Spectral search, mixture search, peak search, and functional group search are all performed automatically, providing important clues for analysis of unknown samples.

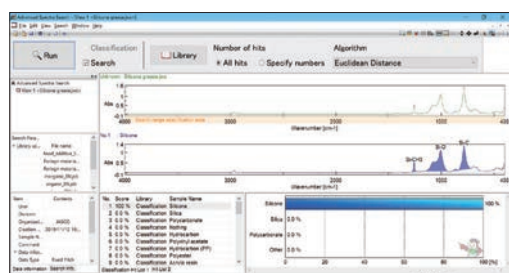


## Functional group analysis support

Search for the peak of the spectrum by comparing it with the information of the functional group registered in the database. Supports functional group analysis for IR/Raman, IR polymer materials.

# ADSS-4000 Advanced Spectra Search program

Spectra search support program makes it possible for anyone to perform spectral analysis like an expertise operator. An epoch-making search program that uses machine learning techniques to perform classification without using a database. It has the function of classifying the spectrum of an unknown sample into 35 categories and the function of searching using a data library (approx. 600 data), and both two functions can be executed at the same time.



Spectra classification results

Carboxylic acids	Silicone	Urethanes
Carboxylic acid salts	Epoxy resins	Silica
Carboxylic acid esters	Polyethers	Silica (talc)
Carboxylic acid esters (oil)	Polyethers (polyacetal)	Silica (kaolin)
Proteins	Fluorides	Carbonates
Polymides	Styrene	Sulfates
Cellulose and sugar	Polycarbonates	Polyimides
Hydrocarbons	Nitriles	Phosphates
Hydrocarbons (polyethylenes)	Phenolic resins	Water
Hydrocarbons (polypropylenes)	Polyvinyl acetates	Acetone
Acrylic resins	Polyvinyl chlorides	Alcohol
Polyesters	Polyvinyl alcohol	

Classification categories



#### **JASCO CORPORATION**

2967-5, Ishikawa-machi, Hachioji-shi, Tokyo 192-8537 Japan  
Tel: +81-42-649-5177 Fax: +81-42-646-4515 Web: [www.jasco.co.jp](http://www.jasco.co.jp)  
Japan

#### **JASCO INTERNATIONAL CO., LTD.**

11-10, Myojin-cho 1-chome, Hachioji-shi, Tokyo 192-0046, Japan  
Tel: +81-42-649-3247 Fax: +81-42-649-3518 Web: [www.jascoint.co.jp/english/](http://www.jascoint.co.jp/english/)  
Australia, Hong Kong, India, Indonesia, Korea, Malaysia, New Zealand, Pakistan,  
Philippines, Russia and CIS countries, Singapore, Taiwan, Thailand, Vietnam

#### **JASCO INCORPORATED**

28600 Mary's Court, Easton, Maryland 21601, U.S.A.  
Tel: +1-410-822-1220 Fax: +1-410-822-7526 Web: [www.jascoinc.com](http://www.jascoinc.com)  
Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Guatemala, Mexico,  
Paraguay, Peru, Puerto Rico, United States of America, Uruguay, Venezuela

#### **JASCO EUROPE S.R.L.**

Via Luigi Cadorna 1, 23894 Cremella (LC), Italy  
Tel: +39-039-9215811 Fax: +39-039-9215835 Web: [www.jascoweb.com](http://www.jascoweb.com)  
**JASCO Deutschland** [www.jasco.de](http://www.jasco.de) | **JASCO UK** [www.jasco.co.uk](http://www.jasco.co.uk) | **JASCO France** [www.jascofrance.fr](http://www.jascofrance.fr)  
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#### **JASCO CHINA (SHANGHAI) CO., LTD.**

Room No.D, 10F, World Plaza, 855 Pudong South Road, Pudong New Area, Shanghai, China  
Tel: +86-21-6888-7871 Fax: +86-21-6888-7879 Web: [www.jasco-global.com](http://www.jasco-global.com)  
China



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