

FT-IR Sampling accessories

IQ Accessory IQ Accessory interface is included.
Purge capability Purge capability is standard.

Single reflection ATR measurement

ATR PRO450-S Single reflection ATR accessory
ATR PRO470-H Single reflection ATR accessory, high-pressure

Various types of single reflection ATR accessories and ATR crystals are available to obtain data for different types of samples to reduce the cost and time for infrared sample analysis. A 'torque-limiter' pressure applicator provides significant improvement in sample pressure contact and a standard purge capability can be utilized to obtain quality spectra without atmospheric interferences. Since the active sample contact area is extremely small, trace samples and minute contaminants can be easily measured. The ATR PRO450-S is a multi-purpose ATR accessory, available with the optional ZnSe, Ge or Diamond crystal kit(s), depending upon the desired applications. The ATR PRO470-H provides extremely high-pressure contact and is available with an optional Diamond ATR crystal only.


Specifications:

	ATR PRO450-S	ATR PRO470-H
ATR crystal:	Diamond, ZnSe, Ge (ATR crystal ordered separately)	Diamond
ATR/sample contact area:	1.5 mm in diameter	1.5 mm in diameter
Angle of incidence:	45°	45°
Pressure:	400 kg/cm ²	1,700 kg/cm ²


Crystal kit (options):

	PKS-ZnSe ZnSe crystal kit	PKS-GE Ge crystal kit	PKS-D470 Diamond crystal kit
Prism:	ZnSe	Ge	Diamond
Refractive index:	2.4	4.0	2.4
Useful ATR range: *1	6,000 to 550 cm ⁻¹	5,500 to 700 cm ⁻¹	6,000 to 2,500 cm ⁻¹ 1,700 to 300 cm ⁻¹

*1 Useful ATR range is dependent upon application requirements, instrument and general optical limitations, and different from the transmission range of crystals.




ATR PRO450-S




ATR PRO470-H

Standard accessories:



- Well plate for powdered samples
- Volatiles cover for liquid sample
- Pressure tip (Resin)
- Pressure tip (Metal)
- Pressure tip (Flat)
- Pressure tip (Concave)



PHE-600

PHE-600 Heating attachment (option):
 The PHE-600 is an optional heating attachment for the ATR PRO450-S and ATR PRO470-H. The maximum achievable temperature for sample analysis is 80°C.

ATR PRO670H-S Heating single reflection ATR accessory
ATR PRO690H-H Heating single reflection ATR accessory, high-pressure

The ATR PRO670H-S, available with the optional Diamond, ZnSe or Ge crystal kit, allows ATR measurements for heated samples. The ATR PRO690H-H including a diamond crystal as standard provides extremely high-pressure contact for heated samples, with heating capabilities up to 180°C.

Specifications:

	ATR PRO670H-S	ATR PRO690H-H
ATR crystal:	Diamond, ZnSe, Ge (ATR crystal ordered separately)	Diamond (Standard)
ATR/sample contact area:	1.5 mm in diameter	1.5 mm in diameter
Angle of incidence:	45°	45°
Pressure:	400 kg/cm ²	1,700 kg/cm ²

Crystal kits for ATR PRO670H-S (option)

- PKS-Z670H ZnSe crystal kit
- PKS-G670H Ge crystal kit
- PKS-D670H Diamond crystal kit

Standard accessories:

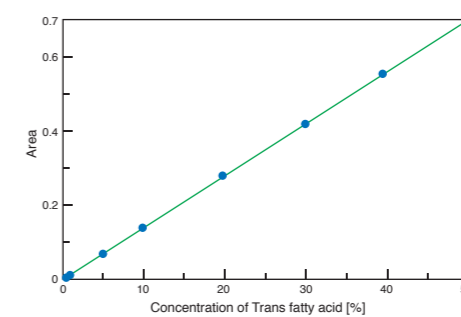
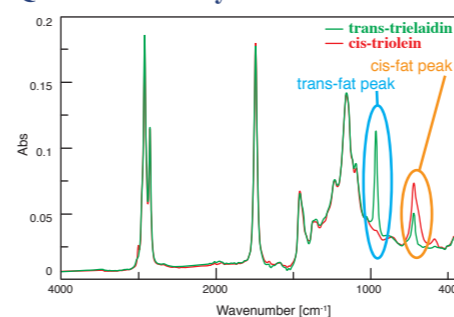
- Pressure tip (Metal)
- Pressure tip (Flat)
- Pressure tip (Concave)
- Temperature controller

* Well plate for powdered samples and volatiles cover for liquid sample are optional.
 * Diamond crystal kit for ATR PRO690H-H is standard.
 * Crystal kits for ATR PRO670H-S are optional.



ATR PRO670H-S

Quantitative analysis of trans-fats in food

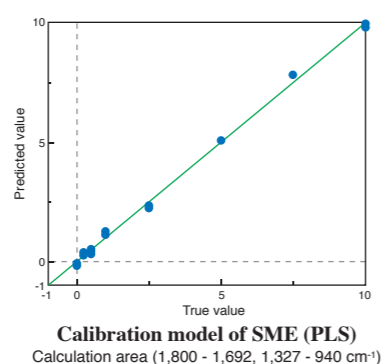
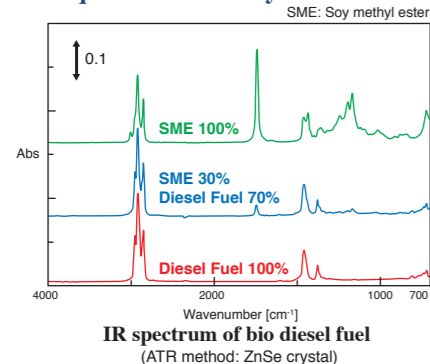


Sample	Trans-fat content [%]
Margarine	3.1
Cooking oil	1.9
Sesame oil	0.7
Olive oil	0.8
Chili oil	1.2

Trans-fat content of commercial food oils

The figures above illustrate the quantitative analysis of trans-fats in several kinds of oil with a calibration made according to the official AOAC (The American Organization of Analytical Chemists) ATR method, by using the ATR PRO670H-S with the diamond ATR crystal at 65°C. By using the ATR methods, the quantity of trans-fats in various kinds of food oils can be determined simply and quickly without complicated procedures.

PLS quantitative analysis of biodiesel



Biodiesel fuel was measured by using the ATR PRO450-S with a ZnSe ATR crystal. Without any complicated sample preparation, the determination of the content of fatty acid methyl esters (FAME) in diesel fuel oils is possible according to the test method of ASTM D7371-07.

ATR PRO650-G Single reflection ATR accessory, 65° incident angle

The ATR PRO650-G is a single reflection ATR accessory whose angle of incidence is 65°. The Ge ATR crystal is included as standard. It enables highly sensitive measurements of high-refractive index samples such as Si wafers and/or thin films on a sample surface.

Specifications:

ATR crystal:	Ge
Wavelength range:	5,200 to 700 cm ⁻¹ (instrument dependent)
ATR/sample contact area:	3 mm in diameter
Angle of incidence:	65°
Pressure:	400 kg/cm ²

Standard accessories:

- Ge crystal kit
- Pressure tip (Metal)
- Pressure tip (Flat, large type)
- * Well plate for powdered samples and volatiles cover for liquid sample are optional.



ATR PRO650-G

ATR PRO610P-S Polarized single reflection ATR accessory
ATR PRO630P-H Polarized single reflection ATR accessory, high-pressure

The ATR PRO610P-S, available with an optional ZnSe, Ge or Diamond crystal kit, allows ATR polarization measurements. The ATR PRO630PH-H with an optional Diamond crystal provides extremely high-pressure contact for high quality, reproducible polarized IR spectra.

Specifications:

	ATR PRO610P-S	ATR PRO630P-H
ATR crystal:	Diamond, ZnSe, Ge (ATR crystal ordered separately)	Diamond
ATR/sample contact area:	1.5 mm in diameter	1.5 mm in diameter
Angle of incidence:	45°	45°
Pressure:	400 kg/cm ²	1,700 kg/cm ²
Polarizer:	Wire-grid polarizer, KRS-5	
Polarization angle:	0 to 180°	

Standard accessories:

- Pressure tip (Metal)
- Pressure tip (Flat)
- Pressure tip (Concave)
- * Polarizer and analyzer
- * Crystal kit, well plate for powdered samples and volatiles cover for liquid samples are optional.

Crystal kit (option):

- PKS-Z610P ZnSe crystal kit
- PKS-G610P Ge crystal kit
- PKS-D610P Diamond crystal kit



ATR PRO610P-S

Multiple reflection ATR measurement

ATR PRO410-M Multiple reflection ATR accessory

Specifications:

Crystal material:	ZnSe or Ge (An optional crystal kit is required.)
Refractive index:	2.4 (ZnSe), 4.0 (Ge)
Contact area with sample:	5 × 20 mm for solid samples 10 × 25 mm for liquid samples
Number of reflections:	5
Angle of incidence:	45°

Crystal kits for ATR PRO410-M (option):

- PKM-ZESE-S ZnSe crystal kit for solid samples
- PKM-GE-S Ge crystal kit for solid samples
- PKM-ZESE-L ZnSe crystal kit for liquid samples
- PKM-GE-L Ge crystal kit for liquid samples



ATR PRO410-M

ATR-500/Mi Multiple reflection ATR accessory

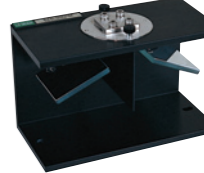
Specifications:

Crystal material:	KRS-5 for solid samples (standard) ZnSe and Ge (option)
Refractive index:	2.37 (KRS-5), 2.4 (ZnSe), 4.0 (Ge)
Contact area with sample:	10 × 30 mm for solid and liquid samples
Number of reflections:	5
Angle of incidence:	45°

* The liquid sample holder is available as an option.

Optional crystal and liquid sample holder:

- ZnSe crystal for solid samples
- Ge crystal for solid samples
- Liquid sample holder without crystal
- ZnSe crystal for liquid samples
- Ge crystal for liquid samples



ATR-500/Mi

FT-IR Sampling accessories

Grazing-angle reflection measurement

RAS PRO410-H Grazing-angle reflectance accessory

85° incident angle with no mirror

The most common angle of incidence for grazing angle accessories is eighty degrees because the accessory throughput is limited and it is difficult for a standard FT-IR instrument to utilize an incidence angle of more than eighty degrees. The enhanced throughput of the FT/IR-4000/6000 series allows the use of the RAS-PRO410-H with an incident angle of 85 degrees due to the high S/N ratio of these instruments.



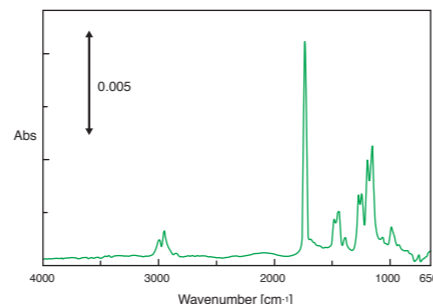
Specifications:

Optical system:	Refractive optics
Incident angle:	85°
Polarizer:	Wire-grid, KRS-5
Polarizing direction:	Fixed at 0° to the plane of incidence (P polarization)
Sample placement:	Horizontal
Sample masks:*	20 × 10 mm, 10 × 10 mm (standard), 10 × 5 mm (option)

* An optional MCT detector is required when the sample masks of 10 × 10 mm and 10 × 5 mm are used.

IQ Accessory **Purge capability**

RAS spectrum of PMMA (polymethyl methacrylate) thin layer on a metal substrate



PMMA thin layer on a metal surface was measured by using the RAS PRO410-H under vacuum condition. The very small peaks can be detected without any effects of water vapor interference.

RAS PRO410-B Grazing-angle reflectance accessory

80° incident angle



Specifications:

Incident angle:	80°
Polarizer:	PL-82 is required
Sample masks:	10 × 10 mm, 10 × 20 mm
Sample placement:	Horizontal

IQ Accessory **Purge capability**

RAS-300/Hi Grazing-angle reflectance accessory

75° incident angle



Specifications:

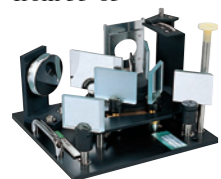
Incident angle:	75°
Polarizer:	Polarizing mirror (parallel polarization only)
Sample masks:	10 × 10 mm, 10 × 20 mm
Sample placement:	Horizontal

IQ Accessory

PR-510i Variable-angle reflectance accessory

Variable incidence angle, 55~85°

The PR-510i is designed for the measurement of ultra thin layers on reflective surfaces using variable incidence angles selectable from 55-85°



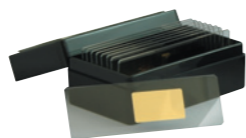
Specifications:

Incident angle:	55~85°
Polarizer:	Wire-grid polarizer, KRS-5
Sample masks:	30 × 40 mm
Sample placement:	Vertical

IQ Accessory

Gold-coated reference mirror

The gold-coated reference mirrors are used as the reference reflection plate for infrared reflection measurements and can be used for the all the reflection accessories outlined above.



Specifications:

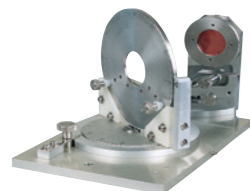
Composition:	10 pcs./set
Size:	25 × 65 mm (entire body), 25 × 15 mm (mirror)

P/N: 2000-0049 Gold-coated reference mirrors

Film sample measurement

VAT-500i Variable angle transmission accessory

The VAT-500i enables transmittance measurements of film-type samples at different angles of incidence. The polarizer is standard to enhance IR measurements. The VAT-500i can be used for the analysis of polymer films and coating layers, and dichroism measurements of oriented films.



Specifications:

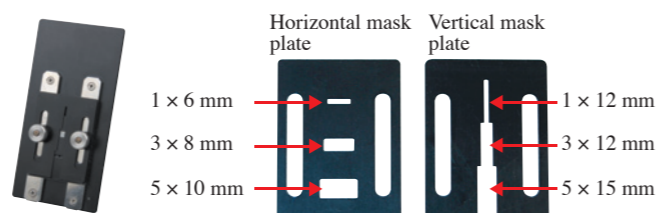
Measurement mode:	Transmission
Sample size:	Maximum ø5 inch Minimum ø34 mm (or 22 × 22 mm) Maximum thickness 4 mm
Angle of incidence:	0 ~ 90°
Polarizer:	Wire-grid polarizer, KRS-5

IQ Accessory

Universal sample holder

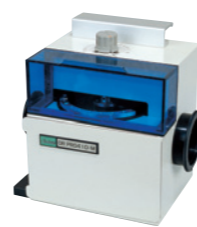
The universal sample holder (P/N: 2000-0045) is used to measure small film-type samples using the transmission method. Changing the combination of slits on two mask plates, the aperture size can be optimized for maximum light intensity corresponding to the size and shape of a sample.

P/N: 2000-0045 Universal sample holder



Diffuse reflection measurement

DR PRO410-M Diffuse reflectance accessory



The DR PRO410-M can hold up to 14 samples including a background, or reference, sample on the sample holder at the same time. Multiple samples can be analyzed while maintaining the sample purge conditions.

Composition:

- Main unit
- 7-position sample holder × 2

IQ Accessory **Purge capability**

SMART-400i Smart Tech Diffuse reflectance accessory



The Smart Tech provides simple sample preparation and easy measurement procedures. To measure a solid sample, the included sampling holder is used to scrape the sample surface. Powder samples can be placed directly onto the sampling holder without further preparation.

Composition:

- Main unit
- 5-position sample holder
- Sample window, 10 pcs.
- Sampling holder
- Standard spectra: 30 each of polymer and drug spectra

IQ Accessory

NRF PRO410-N DR measurement in the NIR region

Samples such as powders or pellets can be measured while keeping the samples in a sample bottle or test tube. The non-destructive analysis of tablets can be done simply by placing the sample onto the accessory.

IQ Accessory



Optional holders



Specifications:

Wavenumber range:	15,000 ~ 4,000 cm ⁻¹
Incident angle:	11.2°
Spot diameter:	10 mm dia.
Reference material:	Diffusion plate for reference
Option:	test tube holder, pellet holder, powder sample holder

* InSb or InGaAs high-sensitivity detector is required for the diffuse reflectance measurement.

* This accessory is used with a near-infrared model of the FT/IR-4000 and FT/IR-6000 series.

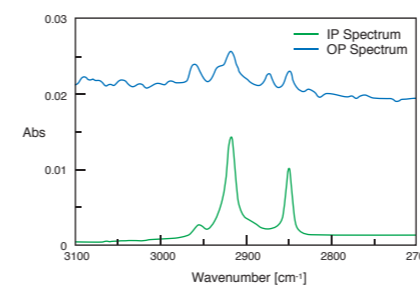
IR MAIRS measurement

AM-4000 Automated MAIRS measurement unit



The AM-4000 automates transmission measurements of a thin film on an IR transparent substrate at variable angles of incidence to obtain the in-plane (IP) and out-of-plane (OP) spectra. The enclosed software calculates the molecular orientation angle of the sample.

* MAIRS: Multiple-angle incidence resolution spectrometry



IP and OP spectra of cadmium stearate

DR-81 Diffuse reflectance accessory



The DR-81 employs a 5-position sample holder.

Composition:

- Main unit
- 5-position sample holder (2 pcs.)

DR-600Ai, Bi, Ci Vacuum heated DR measurement

The DR-600 is used for the characterization of the adsorption state of powder samples such as catalysts, featuring heating and evacuation functions.

IQ Accessory



Specifications:

Cell temperature:	1000°C (Ai), 800°C (Bi), 600°C (Ci)
Vacuum level:	0.13 Pa
Sample size:	8 mm dia.
Window material:	KBr
Gas flow:	capable
Heater:	Kanthal heater
Cell cooling method:	water-cooled

* Temperature controller and temperature control software are optional.

Specular reflection measurement

RF-81S Specular reflectance accessory

The RF-81S can measure the relative reflectance of samples with respect to the reference sample.

Specifications:

Incident angle:	10°
Number of reflections:	Single
Sample mask size:	1, 3 and 5 mm dia.



IR photo-acoustic measurement

PAS-500 Infrared photo-acoustic measurement accessory

The PAS-500 allows photoacoustic detection of infrared absorbance by samples via an acoustic signal that is evolved from the thermal expansion of a purge gas as a result of infrared absorption by the sample. The depth profile information can be obtained by changing the interferometer scan speed or phase modulation using a step-scanning interferometer.

