

About Near Infrared

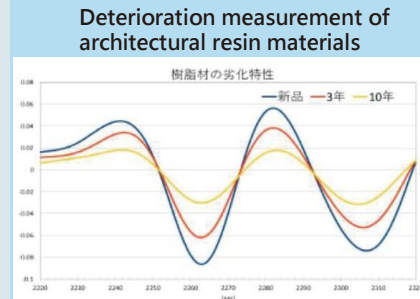
Light in the near-infrared region of 780 to 2500 nm has a smaller molecular extinction coefficient than mid- and far-infrared light, so it can be measured without diluting or destroying the target substance.



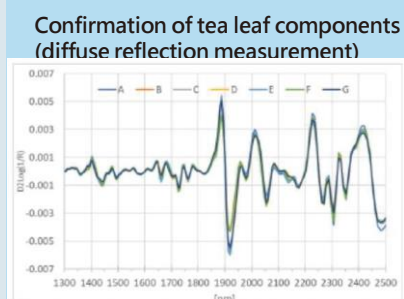
Features of Near Infrared

- **Non-destructive measurement possible**
Since it has lower energy than ultraviolet light and higher transmittance than mid- and far-infrared light, it is possible to perform non-destructive measurements without damaging the target object.
- **Regardless of the measurement target**
It is possible to measure samples in all forms: solid, liquid, pasty, and fibrous. Also, since it is non-destructive, it is suitable for inspecting foods, etc.

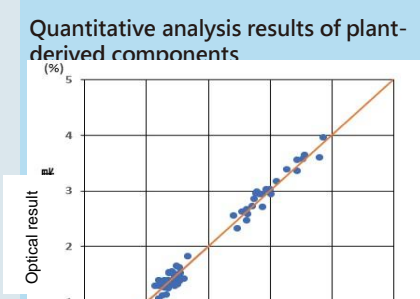
Measurement example



Deterioration measurement of architectural resin materials
樹脂材の劣化特性
Three types of resin materials (new, 3 years old, and 10 years old) were measured. By comparing the second order differential waveforms, it is possible to check the intensity differences in order of newest, which confirms that they can be used to determine deterioration.



Confirmation of tea leaf components (diffuse reflection measurement)
Compare the difference in the absorption amount of each component by the second derivative of the absorbance. Absorption wavelength differs depending on the component. Mathematical methods such as multivariate analysis can be used.

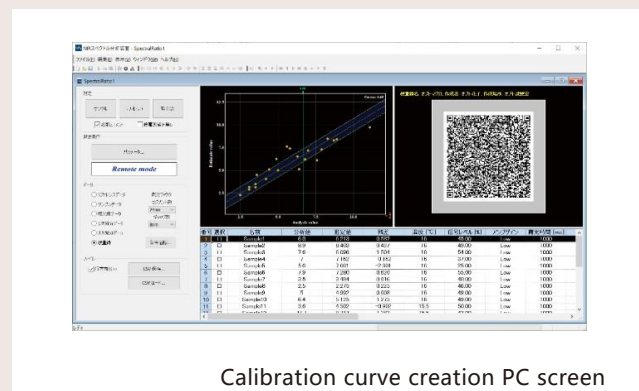


Quantitative analysis results of plant-derived components
Results comparable to HPLC, mass spectrometry, and large analyzers have been obtained.

Application Example

Example of measuring fat in chub mackerel
Terminal display

Creating a calibration model for apple Brix sugar content measurement



It is already being used for grading and branding fish at fishing ports around the country.

Component analysis by light

Optomechatronics
Near Infrared Analyzer

Analyzing the internal components of substances and living organisms using near infrared light

Application

- ◆ Supports component analysis of organic synthetic products, agricultural and marine products, drugs, etc.
- ◆ Versatile measurement of powders, solids, liquids, biological tissues, films, etc.

Features

Despite being compact and lightweight, it is possible to obtain the same analysis results as a bulky analyzer!

- ◆ One-touch analysis reduces analysis time
- ◆ Compact and lightweight design that can be installed anywhere
- ◆ Comprehensive support from development and design to data analysis
- ◆ High-precision analysis and individualized response using AI
- ◆ Non-destructive component analysis without pre-treatment

Versatile type that can flexibly handle various samples

Portable Infrared Analyzer

- M020
- M021
- M022
- M023



Small and lightweight mobile type

Mobile Infrared Analyzer

- M011-02

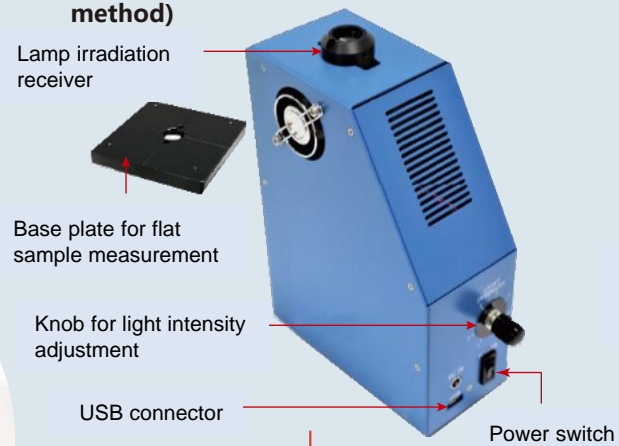


Portable Infrared Analyzer

Measuring the components of various materials with high precision using near-infrared light from 1100 to 2500 nm

Reflection Type[M020/M022]

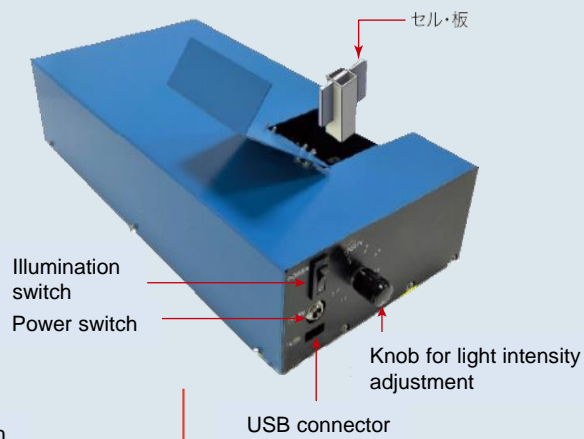
Universal type compatible with powder / solid / biological tissue / liquid * / film * (*when using transmission-reflection method)



Can be used as a standalone, hanging, or depending on the object to be measured.

Transmission Type[M021/M023]

Portable transmission type specialized for liquids/transparent solids



The device is small and handy and can be used at any site.

Transfer data to PC and create calibration model

(Note) A separate PC is required. If you prepare one, please contact us regarding the specifications of your PC.

検量線作成の PC 画面

1 Wide range of targets

A variety of measurements are possible, including the determination of organic synthetic products, quantitative analysis, food analysis, and plant analysis.

2 Compact body

It is a compact all-in-one device that integrates a light source and a spectrometer. Transmission and reflection type allow you to use the optical system and verification model or judgment model.

Application

- ✓ Determination of plastic type and deterioration
- ✓ Analysis of alcohol and water components
- ✓ Quantification of main components of wheat, soybeans, and rice
- ✓ Non-destructive evaluation of fruit sugar content, internal defects, and ripeness
- ✓ Evaluation of ingredients on chocolate and butter production lines
- ✓ Quality evaluation of coffee and green tea
- ✓ Quantification of the effective ingredients of Chinese herbal medicines

Specification

FPI: Fabry Perot Interferometer(MEMS)
FTIR: Fourier Transform Infrared Spectroscopy

Product	Detection mode	Wavelength range(nm)	Wavelength resolution	Wavelength repeatability	Spectroscopic method	Dimension (exclude protrusion)
M020-01	Reflection mode	1350~1650	less than 18nm	±2 nm	FPI	64x140x130 mm
M020-02		1550~1850	less than 20nm			
M020-03		1750~2150	less than 22nm			
M020-04		2100~2450	less than 28nm			
M022		1100~2500	less than 8nm	±0.5 nm	FTIR	64x190x130 mm
M021-01	Transmission mode	1350~1650	less than 18nm	±2 nm	FPI	130x78x257 mm
M021-02		1550~1850	less than 20nm			
M021-03		1750~2150	less than 22nm			
M021-04		2100~2450	less than 28nm			
M023		1100~2500	less than 8nm	±0.5 nm	FTIR	

accessories

M020/M022

- Reference white board
- USB cable
- AC adapter (AC100V-240V/DC5V2A)
- CD-ROM (instruction manual, dedicated software)

M021/M023

- USB cable
- AC adapter (AC100V-240V / DC5V2A)
- CD-ROM (instruction manual, dedicated software)

Item	Specification	
	Reflection mode(M020/M022)	Transmission mode(M021/M023)
Detector	Near infrared spectroscopy	
Light source	5W Lens lamp (x2)	0.9W Lens lamp (x1)
Intensity adjustment	Continuously variable	
A/D resolution	16 bit	
Interface	USB2.0x1	
Software	Included analysis software under Windows10 and 64 bits	
Power supply	Input:100-240V, 50-60Hz /Output:5V	
Operating temperature	+5 ~ +35°C	
Operating humidity	30 ~ 80% (no condensation)	
Remarks	Cooling fan for light source	—

Options

Plate sample measurement base (for reflective type)



Powder cell (for reflection)



Mobile Infrared Analyzer

Non-destructive measurement of fish fat and fruit sugar content using visible to near infrared light from 640-1050nm

M011-02

1 Handy Type

The body uses an ultra-compact sensor, has a maximum length of 129mm, and weighs 300g. Compact, lightweight, and handy type that is easy to operate and can be used freely.

2 Easy data handling

It emits near-infrared rays (two-lamp type) and sends intensity information for each wavelength to PCs and mobile devices, whether by wire (USB) or wireless (Bluetooth). Easy to check on the spot. It is also possible to calculate the target component from the first and second derivatives of absorbance changes at each wavelength.

3 No damage on object

To measure, simply touch the object to be measured. Analyze the components without destroying the shape of the measured object.

- Calibration models for horse mackerel, mackerel, redfish, conger eel, and other fillets are available. Calibration models for other fish species are also in preparation.
- Fruits and fresh vegetables are also possible.
- The acquired data is output in csv format and can be analyzed on a PC.
- Equipped with calibration model creation function (optional)



Software

- Setting measurement conditions such as exposure interval and gain
- Real-time display of measurement results
- Saving measurement data in csv
- Lipid content can be measured on-site using a mobile terminal
- Calibration model can be created from component analysis values and measured spectra (optional)



PC screen for creating a calibration model



Display Terminal

Specification

Item	Content
Wavelength range	640-1050nm
Sensor type	Near Infrared Spectroscopy
Slit size	75x750 um
Wavelength resolution	15nm(max)
Wavelength reproducibility	-0.5~+0.5nm
Wavelength temperature dependence	-0.05~+0.05nm/°C
Sampling time	20~10,000ms
Input power	10E-1.2~10E-7W
Light source	IR lamp (x2)
A/D resolution	16 bit
Output wavelength resolution	2nm
Driving voltage	5V (Battery)
Output display data	Wavelength, light intensity, 1st/2nd differential
Control method	Switch on main unit, Remote control via USB/Bluetooth
Data transfer	USB, Bluetooth
Dimension	45 (dia.) x 129mm
Weight	300g(include battery)
Operating temperature, humidity	5-35degree, 30-80%(no condensation)
Notes	Only the tip light receiving cap part is waterproof. A white plate is included as standard for calibrating the spectral sensitivity of the device.

Options

- Li-ion battery 18650 standard product
- P001-01 Calibration model creation software
- P002-02 Mobile terminal software
- C005-02 Single charge cradle set
- C005-03 Arm mount
- C005-04 Holster