

■ Features

Variety of applications

For the benefits both in flexibility and cost, the system configuration allows the input of an external laser.

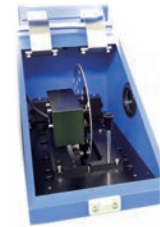
The Tera Prospector has an external input port for use with an external femto-second laser. In our system an external femto-second laser can be shared with not only our TDS system but also the other optical systems. And customers can change specification for 10fs pulse width laser. Measurement zone will become so wide. For customers who have previously purchased a femto-second laser we can supply the TDS optical bench without laser.



Expandability

The large sample chamber can be utilized for a variety of measurements (transmission/reflection/mapping etc.)

The spectrometer is used not only for transmission/reflection measurement; it can also be used with other optional accessories such as mapping measurement. The Tera Prospector can also be used with custom designed accessories. When using optional optics the change in time origin can be easily corrected with a sub-stage. Temperature dependent measurement can be performed using optional heating/cooling accessories



Flexibility

The software can be used for automation of sample exchange and for automated sequential sample measurement

The measurement software can be used for automation of the measurement sequence and can be set-up for a variety of combinations of measurement procedures. The Tera Prospector can be used to perform measurement in combination with other systems. Measurement control can also be made from an external program.



Easy Installation

Easy installation with simple connection to the measurement PC.

Tera Prospector realize simplified connection to setup by two cables(LAN and USB) The spectrometer main unit and PC require only a modest requirement of bench space



■ Product specifications

Tera Prospector	
Measurement system	THz-TDS (Time-Domain Spectroscopy)
Measurement signal	Time waveform of the electric field strength
Output data	Transmission/reflection spectrum (option), Complex Refractive Index and Complex Dielectric Constant (analysis program use)
Sample chamber optical arrangement	Transmission optical system arrangement With an optical system attachment (option), general-purpose measurement such as reflection and ATR measurement can be made. Variable temperature measurement with cryostat (optional) can be made.
Sample chamber capacity	232 (W) × 482(D) × 281 (H) mm, approximately 31L
Measurement zone	200 GHz - 4 THz or greater (cut-off frequency)
Spectral resolution	6 GHz or less
Dynamic range	40 dB or greater (power spectrum: Maximum)
Signal-noise ratio	2500: 1 or greater (Time waveform)
femto-second pulsed laser	Central wavelength near 780 - 810 nm, pulse width less than 120 fs, power greater than 0.5nJ/pulse and frequency greater than 40 MHz (※ an external laser source can be used)
Sample form	Solid samples, liquid samples (requires a liquid cell)
PC requirements	PC compatible with Windows OS (version 10) The PC (above) requires one wired LAN and one USB for connection to the Tera Prospector.
Software	Measurement Software and Analysis Software
Dimensions/Weight	720 (W) × 660(D) × 438 (H) mm, approximately 65 kg. (※ excluding wiring and protrusions etc.)
Power source	AC100 V (50/60 Hz) 10 A (115 V, 200 V, or 230 V specificaions available.)

※ For other requirements, please request us .

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★ Please Note: for purpose of improvement and changes in product design this catalog and any specifications contained herein are subject to change without notification.

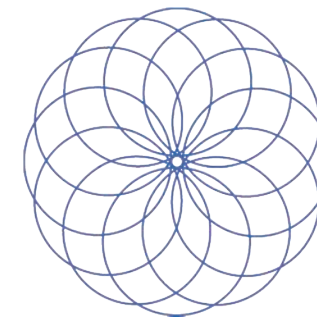
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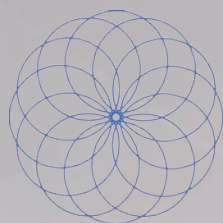
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Tera Prospector[®]
THz Time -Domain Spectrometer



Visible phase change !
New methods for deterioration diagnosis !
Non-destructive inspection of the internal state !



Tera Prospector[®]

THz Time-Domain Spectrometer

The terahertz spectrometer - advancing inspection and analysis

Tera Prospector, terahertz time-domain spectrometer developed by **PNP**, for non-destructive internal analysis of wide range materials.

This spectrometer has large sample room space.

The versatility of this spectrometer is enhanced by a large sample chamber, to which optical systems can be attached to suit a variety of applications.



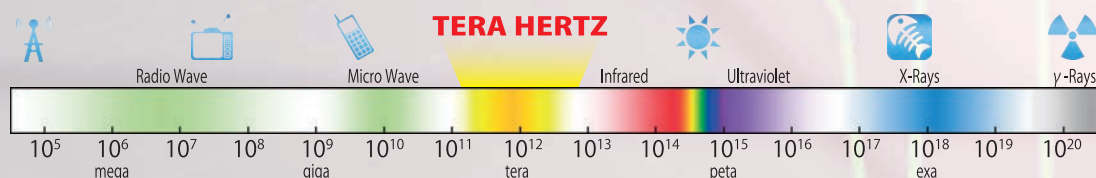
The Tera Prospector is a newly developed spectrometer that measures the boundary regions between light and radio waves; this is not possible using conventional systems.

Electric field strength and phase information can be measured simultaneously,

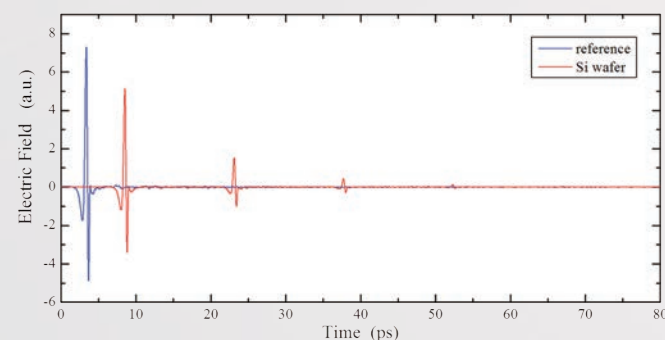
by the measurement of time-domain waveforms of the electromagnetic pulse's electric field strength.

By analyzing the difference in the time-domain waveform of the reference and sample,

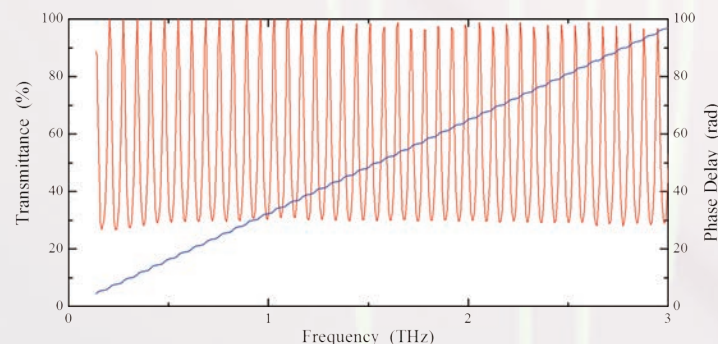
it is possible to obtain the frequency dependence of the complex dielectric constant and complex refractive index, of the sample.



Results for measurement of a high resistance silicon wafer

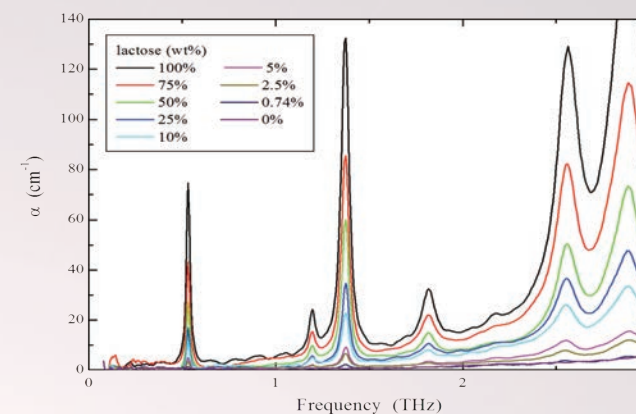


Verify the peak which is reflected repeatedly from the surface of a wafer. From the Fourier-transform of the time-domain waveform (left graph), it is possible to obtain the frequency dependence of transmittance and phase (right graph), and the complex refractive index at each frequency can be obtained.

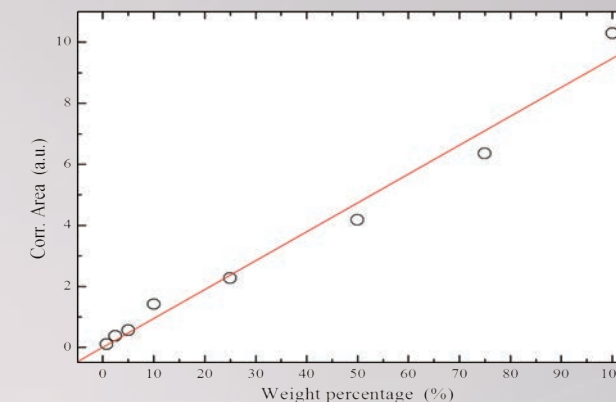
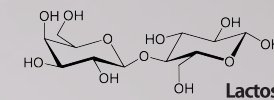


Furthermore, by analyzing the frequency dependence of the complex dielectric constant with the Drude model, the carrier density and mobility are obtained.

Example of measurement of absorbance to obtain sugar content

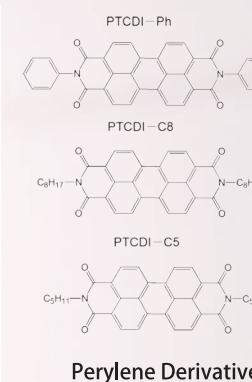
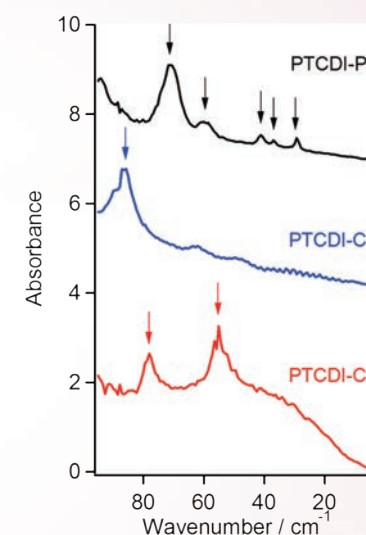


Graph of the extinction coefficient of Lactose tablets with different weight rate.



Plots of the area under the absorption peak at 1.3THz as a function of lactose percentage by weight

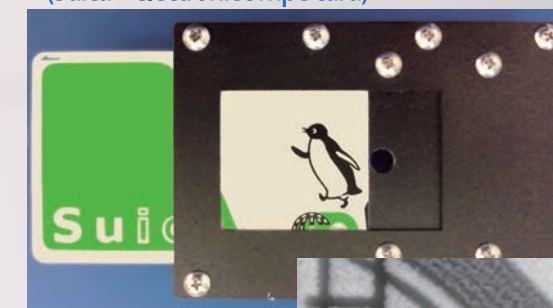
Example of using the terahertz absorbance spectrum for analyzing molecule branched side chains (distinction of functional group side chains)



Perylene Derivatives

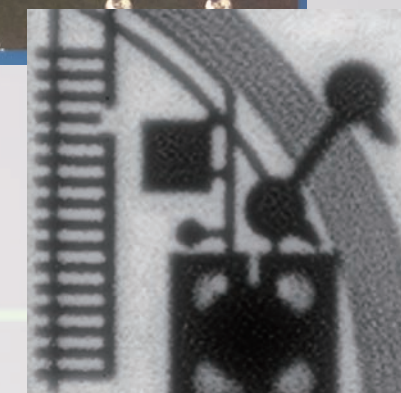
The differences in the side chains of perylene derivatives (PTCDI-C5, C8 and PH) can be observed using the absorbance spectrum in the terahertz region.

Example of transmission measurement of a resin material (Suica – electronic swipe card)

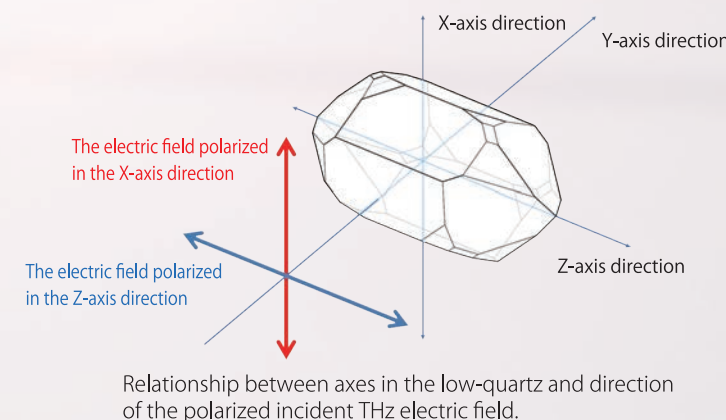


Measured using the Mapping Unit (option).

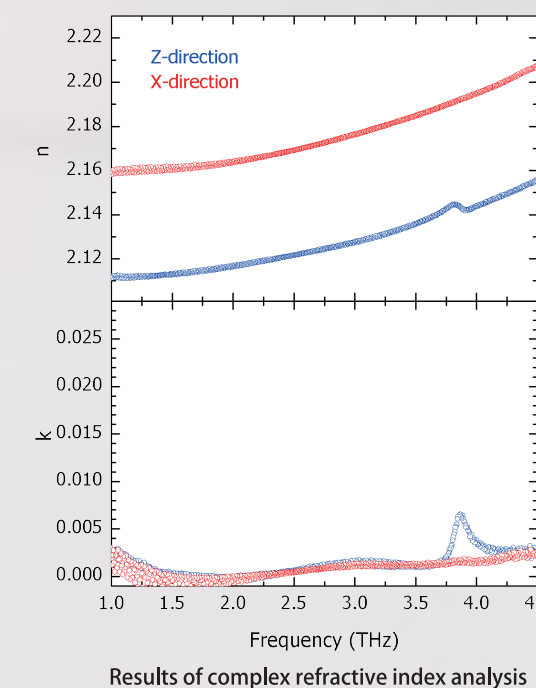
A Suica card consists of a loop coil and FeliCa chip encapsulated in PET-G resin. Components inside the resin are visible using terahertz measurement.



Complex refractive index measurement of a quartz sample



Dependence on the relationships between the quartz crystal axis and the incident electric field, the large differences in the complex refractive index can be observed. The figure shows analysis results of the complex refractive index obtained from the transmission measurement for an incident polarized THz electric field parallel to the X and Z axes in Y-cut quartz crystal.



Results of complex refractive index analysis