Fraunhofer
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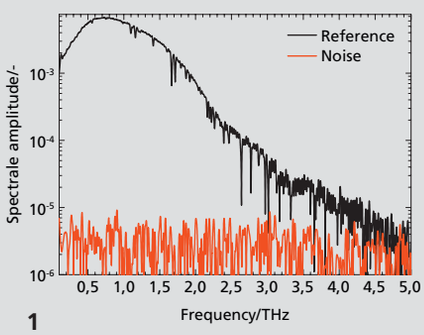
FRAUNHOFER INSTITUTE FOR INDUSTRIAL MATHEMATICS ITWM



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TeraTec
Application Center for Terahertz Technology

1 *Reference spectra*

2 *The terahertz spectrometer T-SPECTRALYZER – developed in cooperation with HÜBNER GmbH & Co. KG.*

TERAHERTZ-SPECTROMETER

For the identification of chemical substances and materials analysis

The use of terahertz waves for spectroscopy opens up new possibilities in many areas of metrology. Promising applications are to be found, among others, in materials analysis and testing as well as in substance identification. A spectrometer developed at Fraunhofer ITWM is based on terahertz time-domain spectroscopy, which can reveal the chemical fingerprint of substances providing a high degree of selectivity. The broadband spectra are analyzed and displayed using chemometric methods. Reliable automated evaluation is thereby achieved.

The applications

Terahertz time-domain spectroscopy is suitable for the specific detection of

- pure substances
- mixtures
- concealed and covered substances

for the differentiation of

- amorphous and crystalline structures
- polymorphic modifications

as well as for the determination of

- the doping of semiconductors

The benefits

- Contact-free, non-destructive testing without complex sample preparation
- Simultaneous measurement in transmission and reflection
- Robust design with long-term stability
- Raster scanning or single-point selection possible
- User-friendly operator and analysis interface
- Radiation harmless to health

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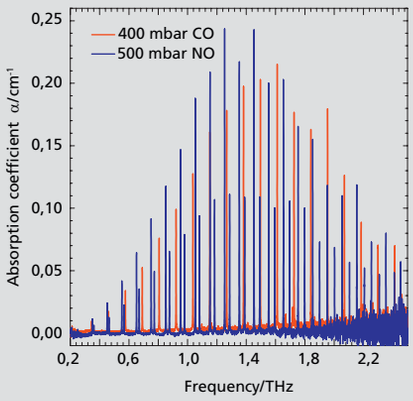

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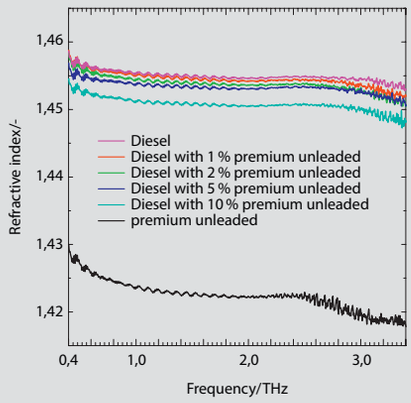

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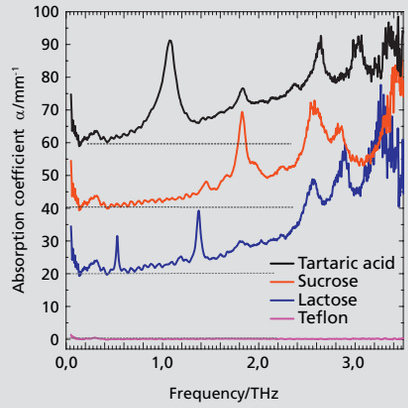

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Examples

3 *Gases*

4 *Liquids*

3 *Solids*

Our offer

- **Consultation** – on technology and application aspects
- **Initial tests** – in our application lab
- **Feasibility studies** – technically and economically
- **Equipment rent** – for limited-period tasks
- **Measuring studies** – for industry and research
- **Development** – from single components to individual complete systems
- **Measurements on customer's site** – with mobile systems on any large objects

Areas of application

- Specific detection of substances
- Analysis of chemicals in powder or tablet form
- Analysis of liquids or gases
- Investigation of moisture distribution
- Measurement of the doping of semiconductor materials
- Determination of the filling level of polymers
- Substance identification inside plastic pipes and tubes as well as packaging

Typical system specifications (example of a customized system)

Spectrometer dimensions	
Height	60 cm
Width	72 cm
Depth	82 cm
Weight	87 kg
Characteristics	
Bandwidth	more than 4 THz
Dynamic range	more than 70 dB at 0,5 THz
Measurement time	8 sec. per spectrum (optional: up to 40 spectra per second)
Power connection	
Mains voltage	110 – 230 V Wechselstrom
Frequency	50 – 60 Hz
Power consumption	< 300 VA
Environmental conditions	
Operating temperature	20 – 30 °C
Relative humidity	0 – 60 %

All specifications and features are subject to modification without notice.