

HIGH RESOLUTION FT-IR SPECTROMETER

IFS 125HR

The only commercially available ultrahigh resolution FT-IR spectrometer

Innovation with Integrity

The Bruker IFS 125HR FT-IR spectrometer offers the highest resolution available over a wide wavelength range from 5 cm^{-1} in the Far-IR to 50,000 cm^{-1} in the UV. Each component of the new IFS 125HR is optimized to approach the theoretical limit of sensitivity.

The scanner allows collection of data at very high resolution without beam folding. Studies of physical-chemical primary processes require very high spectral resolution to derive the true molecular quantum motion from the absorption spectra. In addition, high resolution FT-IR spectroscopy is ideal for investigating changes in stratospheric gas concentrations due to its sensitivity and selectivity.

Application examples

- Structure analysis of gaseous molecules at low pressure Low temperature measurements on solids
- Magneto-optical splitting on semiconductor material Emission of high temperature gases
- Environmental atmosphere analysis

- Outstanding resolution across the entire spectrum
- Resolved linewidth of $< 0.0009 \text{ cm}^{-1}$
- Broad spectral range: from 5 cm^{-1} in the far-IR to $>50,000 \text{ cm}^{-1}$ in UV
- Double-sided interferogram acquisition up to 50 cm OPD
- Vacuum optics bench evacuable $< 0.02 \text{ hPa (mbar)}$
- Easy detector and range change

The Interferometer

The permanently aligned interferometer has a 30° angle-of-incidence. The narrow angle-of-incidence makes more effective use of the beamsplitter in addition to reducing beam polarization effects. The beam is split to the fixed and moving cube-corner retroreflectors of the modified Michelson interferometer. The moving mirror is translated on a hybrid bearing whose design ensures beam integrity over the extremely long optical path difference, which can be greater than 11 meters.

The Source Compartment

The source compartment of the IFS 125HR can accommodate three water-cooled sources with computerized selection. In addition, there is a computer-selectable port for external emission experiments. The source beam exits at a focus to the interferometer compartment.

The Sample Compartment

There are two large chambers with focused beams which accommodate a wide variety of sampling accessories including long path gas cells and cryostats. To enhance flexibility, each sample chamber can be equipped with an additional exit port. Flaps isolate the sample compartment to preserve vacuum in the rest of the optics during sample change or accessory installation. At the sample position a 1:1 image of the input aperture is provided.

The Detector Compartment

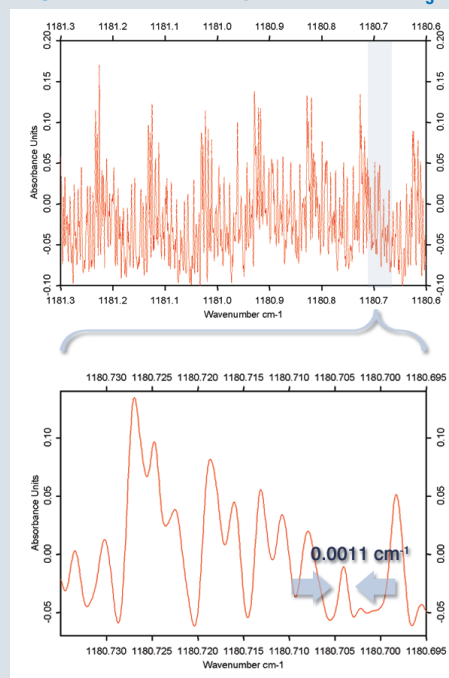
The detector compartment can house up to four internal and two external detectors. All six detector positions are accessible by beams from either sample chamber and detector selection is under computer control. Up to four liquid nitrogen cooled or room temperature detectors with well proven DigiTect™ technology can be mounted internally. The external positions provide room for large liquid helium cooled detectors such as far-IR bolometers. For emission work a separate detector chamber may be mounted at the collimated beam exit port of the interferometer to maximize energy throughput in the NIR/VIS/UV range.

Laser class 1 product.

Stratospheric Gas Analysis

High resolution FT-IR spectroscopy is ideal for investigating changes in stratospheric gas concentrations due to its sensitivity and selectivity. The sun serves as the infrared source and the composite optical density due to all absorbers along the optical path to the spectrometer is measured at a given wavelength. Thus, if an absorption line is interference free, the resulting spectrum can be used to obtain a total column density of all stratospheric and tropospheric absorbers of that species. Careful analysis of the lineshape even allows a concentration profile versus altitude to be obtained.

High Resolution Spectrum of CF₃I



Sample: CF₃I, 20 cm cell, 0.3 mbar; Measurement time: 10 h; Noise: 0.005 Absorbance units

Brüker Optics is continually improving its products and reserves the right to change specifications without notice.
© 2023 Brüker Optics BOPT-01

Brüker Optics GmbH & Co. KG
info.bopt.de@bruker.com

bruker.com

**Brüker Optics is ISO 9001, ISO 13485,
ISO 14001 and ISO 50001 certified.**

Worldwide offices
bruker.com/bopt-offices

Online information
bruker.com/IFS125

