GASERA

FTIR accessory: PA301

Ultra-high performance photoacoustic detector
for solid, semi-solid and liquid samples

PA301
PHOTOACOUSTIC
DETECTOR

Versatile analysis

The PA301 improves laboratory productivity and safety by enabling extremely versatile and rapid analysis of solid, semi-solid, and liquid samples in any form without sample preparation.

The insensitivity to sample surface morphology and the depth profiling capabilities provide wide applicability in many areas of chemical and biological research which no other single accessory can match.

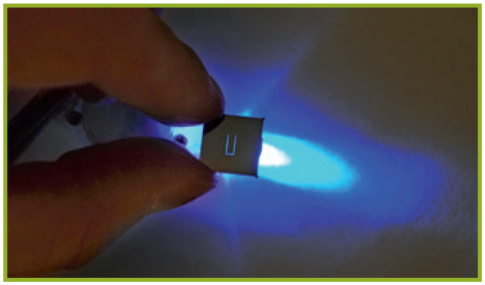
Due to the ultra-high sensitivity of the Gasera's novel cantilever sensor, ambient air can be used as the carrier gas to obtain a signal-to-noise ratio (SNR) that is still significantly better compared to other commercial photoacoustic detectors used with helium carrier gas. The quickness and the ease of use make the PA301 a must-have accessory for every lab.

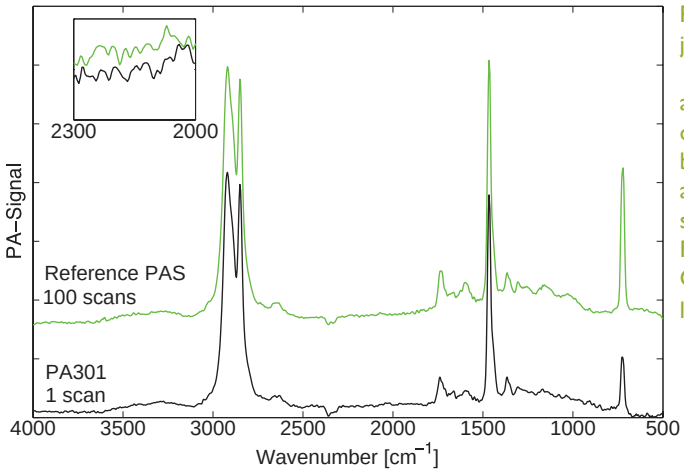
Photoacoustic detection

Photoacoustic spectroscopy directly measures a sample's infrared absorption. The absorption of infrared radiation in the sample creates heat which is transferred into the surrounding gas and a photoacoustic signal is generated via thermal expansion. Thus the measurement is non-destructive and the signal is independent of the surface roughness. The measurement depth can be controlled by varying the mirror velocity or phase angle of detection, and thus depth-varying information can be obtained.

Ultra-sensitive optical microphone

The heart of the system is the patented optical microphone comprising of a MEMS cantilever coupled with a laser readout interferometer that can digitally measure microscopic movements of the cantilever sensor, having a dynamic range greater that any analog circuitry can ever obtain.





PA301 gives an equal SNR with just one scan, as opposed to 100 scans by its commercial alternative. This means that overnight measurements can be now performed in only a few minutes. A polyethene sample was analyzed with FTIR using resolution of 8 cm^{-1}, OPD 0.16 cm/s, and using helium purge in both systems.

Applications include

- Dark samples
- Pharma quality control
- Soil samples
- Paper and wood analysis
- Oil analysis
- Tissue and hair samples
- Food analysis
- Forensics
- Cosmetics
- Art conservation
- Polymers
- Paint and pigment analysis
- Gemstones

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Features

- Measures solid, semi-solid and liquid samples.
- Insensitive to sample morphology – hard crystalline materials or powders can be easily measured.
- Highly absorbing "black" samples are well suited for the instrument due to the photoacoustic measurement principle.
- Spectral range from UV to far-infrared.
- Capability for depth profiling.
- Sample space with the maximum sample size of 10 mm and 9 mm in diameter and height.
- Automated purge gas control for nitrogen or helium.
- Photoacoustic detector with cantilever enhanced optical microphone.
- Patented ultra-sensitive optical microphone based on a MEMS cantilever sensor coupled with a laser interferometer to measure microscopic movement of the cantilever sensor.
- Complies with the following standards or other standardization documents under the Low Voltage Directive 2006/95/EC and EMC Directive 2004/108/EC: EN 61326-1:2005, EN 61010-1: 2001
- 12 months warranty

Technical specifications

- Dimensions (baseplate and fitting parts to FTIR not included): 17 cm W x 9,5 cm H x 18 cm D (6,7 in W x 3,8 in H x 7,1 in D)
- Weight (baseplate and fitting parts to FTIR not included): 3.0 kg
- Operational conditions:
  - Temperature range: 15 °C – +35 °C
  - Humidity range: Below 90% RH, non-condensing
  - Pressure range: Ambient level
  - Dust/water resistance: IP20 (IEC 529)
  - Shock/vibration endurance: Strong vibrations can affect the measurement results
  - Acoustic sensitivity: Loud sounds can affect the measurement results
- Storage conditions:
  - Temperature range: 0 °C – +60 °C
- Sample requirements:
  - Max size: 10 mm and 9 mm in diameter and height
  - Sample cups available in two different sizes
  - Sample cup material is aluminum
- Purge gas connection:
  - Connector type: Tube connector for 2,4 mm (i.d.) tube
- Electrical connections:
  - Power supply unit:
  - Input voltage: 100 - 240 Vac, 50 - 60 Hz
  - Input power max: 30W
  - Analog outputs:
  - Output connectors: BNC
  - Output signal voltage span: ± 3.3 V
  - Output signal frequency band: Low pass filtered, 0-10kHz
  - Output load: >2k resistive
- Measurement specifications:
  - Repeatability: 5% of measured value in operational conditions
  - FTIR scan speed range: ~5 Hz – 30 kHz (HeNe frequency)
  - Spectral range defined by window material, all common window materials are available
  - Noise level of the detector: 2 µPa/sqrt(Hz)
  - Microphone sensitivity: Approx. 10 V/Pa
- Fits to following FTIRs:
  - Bruker Tensor and Vertex series
  - Thermo Nicolet 6700/8700, Nexus series, iS10 and iS50
  - Perkin-Elmer Frontier, Spectrum One, Spectrum 100
  - Varian/Bio-Rad 3000/4000/6000/7000
  - Agilent/Varian 640/660/670/680
  - Jasco FT/IR-4000/6000
  - Shimadzu IRAffinity-1 /IRPrestige-21

  The list is continuously growing, ask for other models

Sales package content

- Gasera PA301 photoacoustic FTIR accessory
- Optical microphone DSP unit
- Required cables and parts for connecting to a specified FTIR instrument
- Power supply unit
- Accessory box (sample cups, sample holders, reference carbon black, tweezers, etc.)
- User Manual
- Storage case

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