

DIAMOND ATR ACCESSORY FOR THE AGILENT CARY 630 FTIR

The Measure of Confidence



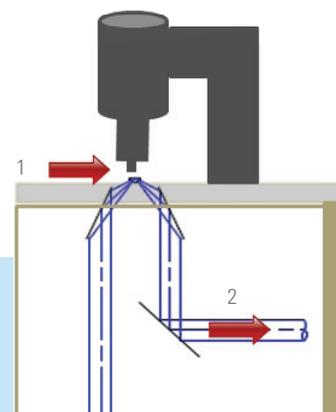
Higher energy throughput, lower noise, superior quality data

Attenuated Total Reflectance (ATR) is the most common sampling technique used in infrared spectroscopy, as it is easy-to-use and provides high quality spectra without requiring sample preparation. ATR can be used to measure solids, liquids or gels, and comes in a variety of configurations based on different crystals types. Diamond ATR is one of the most common, as its robustness makes it suitable for the widest range of applications.

The Agilent diamond ATR accessory for the Agilent Cary 630 FTIR is a single bounce ATR specifically designed to optimize the energy throughput, ensuring you achieve the highest quality spectra. Traditional diamond ATRs significantly reduce throughput, reducing the sensitivity compared to direct transmission measurements. The unique design of the Cary 630 FTIR and the diamond ATR increases energy throughput around 30% compared to other routine FTIR systems, enabling faster data collection, lower noise and superior quality.

How does it work?

The diamond ATR for the Cary 630 FTIR takes advantage of the physical properties of light when encountering two materials with differences in index of refraction. When coming in contact with a sample having a different index of refraction, the infrared light creates an evanescent wave, which provides a very small and specific depth of penetration into the sample with each internal reflection. This small and consistent pathlength



Optical diagram of the Agilent diamond ATR accessory

1. Sample position
2. IR light

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means good quality spectra can be acquired from a wide variety of samples with no sample preparation. The key to obtaining these results with the diamond ATR accessory is to make good contact between the sample and ATR crystal.

Features

Innovative — the Agilent diamond ATR for the Cary 630 FTIR provides more energy throughput than any other ATR it is class. The accessory snaps in and out in seconds with no alignment required, and has a built-in pressure clamp to ensure optimum and reproducible pressure.

Crystal type and pressure clamp

- Single reflection, nominal angle = 45 degrees
- Diamond crystal
- Slip clutch press provides consistent pressure

Effective pathlength*

- 1.1 μm at 4,000 cm^{-1}
- 2.6 μm at 1,700 cm^{-1}
- 7.3 μm at 600 cm^{-1}

Wavelength range

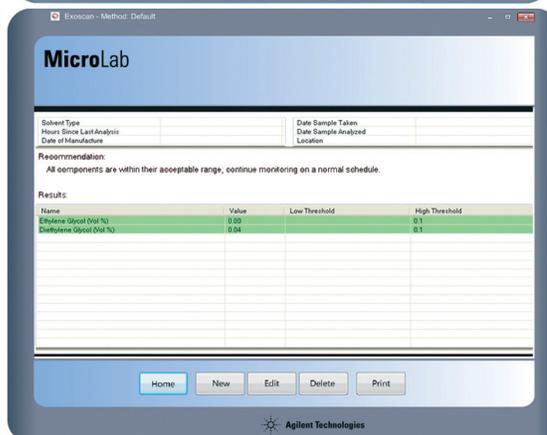
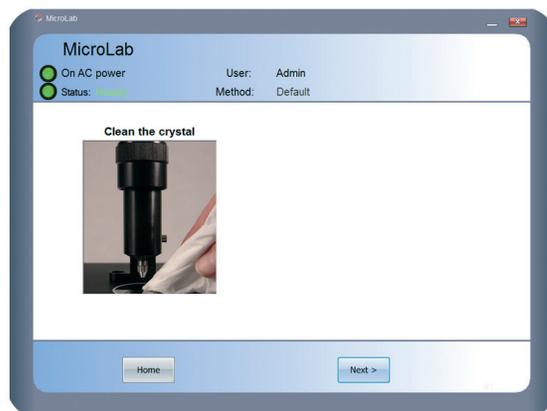
- KBR option: 6,300–350 cm^{-1}
- ZnSe option: 5,100–600 cm^{-1}

Intuitive software — multi-language software guides users through every step of operation, while color coding alerts make it easy to see whether samples meet specification. The software also provides a feedback mechanism to advise when the accessory requires cleaning, ensuring you get the right answers everytime.

Reliable — designed originally for out-of-lab use in Agilent mobile FTIR products, the Cary 630 FTIR is the most rugged FTIR on the market today. Available with ZnSe windows that are optimized for superior energy throughput, the diamond ATR can measure corrosive and hard materials and can be used in the most humid and tropical of environments, providing answers you can trust, day-in/day-out.

* Values based on a typical polymer of refractive index of $n=1.5$

Step-by-step instructions guide users, making operation and interpreting the results easy and reliable



Flexible — Switch between using the diamond ATR, 5 Bounce ZnSe ATR and DialPath/TumbIIR for all your liquid measurements. No alignment required, and accessory changeover is complete within seconds. The Agilent Cary 630 FTIR allows you to measure any liquids, of any concentration with any pathlength in seconds.

Compact — takes up only 9.2 x 8.9 cm of bench space, and weighs just 0.9 kg (2 lb).

Which applications are best suited to the diamond ATR accessory?

Solids, liquids or gels

The ATR technique can be used for analyzing liquids, pastes, powders and even solid samples.

It is widely used in food and beverage analysis, chemicals, pharmaceuticals, fuel and oil analysis.

It is most suitable for higher absorbing samples such as polymers, paints and fibers. Powder and solid samples are also best measured with the single reflection ATR, by using the sample press device, which applies high pressure to powder and solid samples to ensure good contact with the diamond crystal. The single-reflection ATR is also a good choice when the amount of available sample is limited.

When do I choose a DialPath/TumblIR instead of an ATR?

Many liquid measurements are performed with an ATR to avoid the use of the more tedious IR transmission cells. However, Agilent's unique DialPath and TumblIR technology will change the way you analyze liquid samples forever.

The DialPath and TumblIR are as easy-to-use as an ATR — just place a drop of liquid on the accessory, turn the dial (similar to closing the pressure clamp on an ATR), and collect your data. To clean, simply move the dial to the open position and wipe clean.

A single bounce ATR typically provides a pathlength of between 1–6 μm , depending on the crystal used and the frequency of analysis. For example, the diamond ATR has an effective pathlength of $\sim 2.6 \mu\text{m}$ @ 1700 cm^{-1} . The DialPath and TumblIR offer a range of pathlengths from 30 μm up to 200 μm , in their standard configuration, and can be configured for pathlengths up to 1000 μm . Depending on the concentration of your sample and the intensity of the peaks in the spectra, you choose your sampling technique (ATR, Dialpath/TumblIR) that best fits the pathlength required to give the highest quality results.

Three steps to analysis with the diamond ATR

1

Ensure the crystal is clean



2

Place your sample on the window



3

Close the press for sample contact



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© Agilent Technologies, Inc. 2013
Published in USA, April 1, 2013
5991-2197EN

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