New ConcentratIR2 - a Travel into Performance

The ConcentratIR2™ is a miniaturized version of the original multiple-reflection ATR accessory which is compatible even with smaller FTIR sample compartments.
Designed for micro-liquid samples, it features interchangeable diamond and silicon ATR sampling plates. Both ATR configurations consist of a thin disk of silicon or diamond that is optically contacted to a special ZnSe component.
The silicon configuration has eleven internal reflections with a nominal incident angle of 30° and is suitable for use from 4000 cm^{-1} to 650 cm^{-1}.
The diamond configuration has ten internal reflections with a nominal angle of incidence of 45° and has an approximate wavelength range from 4000 cm^{-1} to 550 cm^{-1}. Because of diamond lattice bands, the signal-to-noise ratio is limited for the diamond version in the vicinity of 2000 cm^{-1}.
Turn-tilt mirror adjustments as well as a vertical adjustment are provided to maximize optical throughput. The ConcentratIR2™ is fully enclosed for rapid sample exchange minimal interruption of the purge of the spectrometer

Applications:

- Minute Samples of Liquids, pastes and slurries
- Proteomic, Forensic and Quality control samplesg.

Features:

- Pre-aligned for easy start-up.
- Rapid purging.
- Little or no sample preparation.
- Only 10 µl of sample required.
- Easy clean up between samples.
- Durable and sensitive ATR elements.
  - Si with a nominal incident angle of 30° and eleven reflections.
  - Extended Si a nominal incident angle of 30° and twenty-three reflections.
  - Diamond with a nominal incident angle of 45° and ten reflections.
- Optional liquid cells available

References:

Reference	***Product Description***
UQA-E-XXX	Silicon ConcentratIR2™- Multiple Reflection ATR Accessory
UQA-W-XXX	Diamond ConcentratIR2™ - Multiple Reflection ATR Accessory
UQA-FLC-M	ConcentratIR2 Liquid Cell with Luer Fittings - Ambient adapter
UQA-FLC-S	ConcentratIR2 Liquid Cell with Swagelok Fittings - Ambient adapter
UQA-LSP-0E	Extended Si ATR Sampling Plate for the ConcentratIR2 Twenty-three reflection trough with a 30° incident angle
UQA-LSP-E	Si ATR Sampling Plate for the ConcentratIR2 Eleven reflection trough with a 30° incident angle
UQA-LSP-W	Diamond ATR Sampling Plate for the ConcentratIR2 Ten reflection ATR trough with a 45° incident angle

Analysis of Nail Polish Removers using the Diamond ConcentratIR2

The ConcentratIR2™ is designed for the analysis of liquids, pastes, and slurries. The sample is placed on the top of the Silicon or Diamond ATR wafer. The sample analysis area is a 4 mm diameter circle and approximately 10 µl of sample are required. The ATR top is constructed of 316 stainless steel. An optional liquid cell, also of 316 stainless steel, is offered for static or flow introduction of the sample.

Both ATR configurations consist of a thin wafer disk of Silicon or Diamond that is optically contacted to a special ZnSe component. The approximate wavelength ranges are 4000 cm^{-1} to 650 cm^{-1} for Silicon and 4000 cm^{-1} to 550 cm^{-1} for Diamond.

Because of crystal lattice bands, the signal-to-noise ratio is limited for the Diamond version in the vicinity of 2000 cm^{-1}. Turn-tilt mirror adjustments as well as a vertical adjustment are provided to maximize optical throughput.

Concentrated Multiple Reflection ATR spectroscopy allows the enhanced sensitivity of multiple reflection ATR in a very confined sampling area hitherto reserved for single reflection equipment.

This makes the ConcentratIR2™ especially useful in applications such as proteomics and forensics, where high sensitivity is required and sample amounts are limited, as well as in less demanding situations. Additional applications include the determination of low concentration components in alcoholic beverages and quality control testing of food oils.

A useful application of this method is in the analysis of solutes dissolved in small amounts of volatile liquids. A droplet of the liquid is deposited on the sampling surface. The solvent is allowed to evaporate leaving the solid solute deposited on the ATR element surface. The spectrum of the solute is then taken.

Figure 1 presents a spectrum of a 20 µl sample of a 1.62 x 10^{-3} M solution of carminic acid after the methanol solvent evaporated. The Silicon ATR configuration of the ConcentratIR2™ was used.

The ConcentratIR2™ is equipped with purge ears that are compatible with the most spectrometer. Under many operating conditions, no additional purging of the accessory is required. For those cases where additional purging is required, however, a purge input fitting is provided which can be installed by the user on the front of the accessory

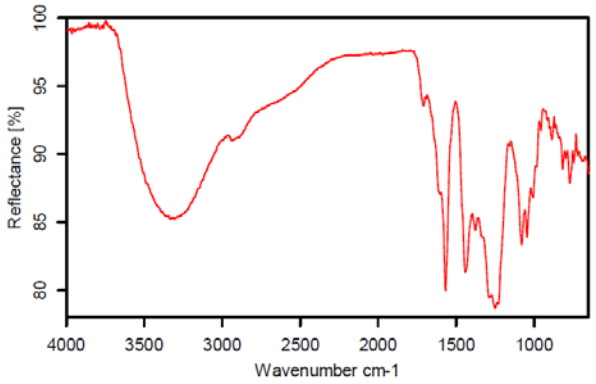

***Figure 1**. ATR spectrum of 20 µl sample of a 1.62 x 10^{-3} M solution of carminic acid after solvent evaporation*.

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