

# Smart Ark

This tutorial introduces the Smart ARK (Attenuated total Reflectance Kit) from Thermo Fisher Scientific. The Smart ARK is an advanced multi-bounce horizontal attenuated total reflectance (HATR) accessory for Thermo Scientific Nicolet™ Series Fourier Transform Infrared (FTIR) spectrometers.

This document describes the basics of HATR sampling with your spectrometer. It explains step by step how to install the Smart Ark in the spectrometer sample compartment and use the accessory to analyze liquids, powders, and solids. You will also learn how to properly maintain and store the accessory when it is not in use.

## Product features

The Thermo Scientific Smart ARK is a premier sampling accessory for ATR analyses. This accessory offers unprecedented ruggedness and stability while providing the highest energy throughput available for ATR applications.

The Smart ARK is designed for fast analysis of liquids, solids, semi-solids, and soft powders using the standard ATR technique.

A variety of crystal materials and angles are available to accommodate a wide range of sample types. The crystal configuration can be changed in one quick step with no optical realignment.

## Crystal features

The Smart ARK is designed to accommodate crystals that allow multiple internal reflections. The higher the number of reflections, the more absorbance information that can be obtained from the sample and the more sensitive is the measurement. This means you can analyze components

that are present in the sample in small amounts (0.1% detergent in water, for example) and materials that are weak IR absorbers.

The term "horizontal" refers to the position of the crystal surface. A horizontal crystal allows you to analyze a wide range of sample types, such as liquids, gels, pastes, powders, and solids, with no special preparation.

## Smart accessory features

The Smart ARK is part of our extensive family of Smart Accessories for Nicolet Series spectrometers.

All Smart Accessories offer the following features:

- Pinned-in-place, permanently aligned optics.
- Fully integrated design.
- Snap-in installation.
- Automatic purging.
- Automatic recognition.
- Automatic measurement settings.

## Smart Ark specifications

The Smart ARK with standard Zinc Selenide (ZnSe) crystal features:

- Crystal angle: 45°
- Refractive index: 2.4 at 1000 cm<sup>-1</sup>
- Spectral range: 4000 - 650 cm<sup>-1</sup>
- Number of reflections: 12
- Depth of penetration: 2.0 micrometers (assumes RI of sample is 1.5 at 1000 cm<sup>-1</sup>)
- Effective pathlength: 12.12 micrometers
- Useful pH range: 5 to 9
- Liquid sample volume: 1.0 milliliters

## Specifications for optional crystal materials

We offer a variety of crystal materials and angles for the Smart ARK to accommodate a wide range of sample types. The crystal material determines the spectral range for the analysis and the depth of penetration that can be achieved with a particular sample. The lower the crystal's refractive index, the deeper the IR energy penetrates the sample and the more absorption that occurs. The refractive index of the crystal should be close to but not the same as the refractive index of the sample.

The angle of incidence refers to the angle of the IR beam's first reflection after it enters the crystal. Increasing the angle of incidence reduces penetration.

The table below shows the optional crystal materials and angles available for the Smart ARK.

Crystal material	RI*	Angle of incidence
ZnSe	2.4	40, 45, 50, 55, 60, 70
Ge	4.0	30, 40, 45, 60
ZnS	2.2	45, 60
AMTIR	2.5	45
Si	3.4	45

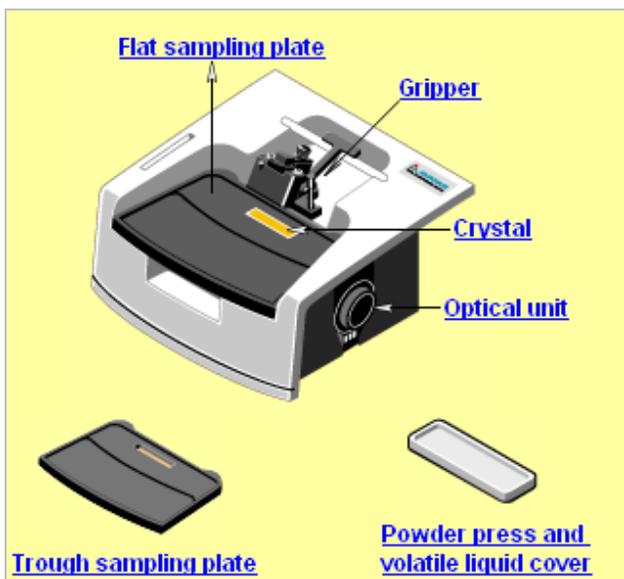
\*Refractive index at 1000 cm

## Product components

The Smart ARK's efficient optical design and interchangeable crystals offer premium, consistent performance for both research and analytical testing applications. The accessory provides two sampling configurations for each crystal material:

- A flat plate for sampling solids and semi-solids.
- A trough plate for sampling liquids, gels, and powders.

The accessory includes the Gripper sample press for pressing solids against the crystal and a powder press to ensure even contact for powder samples (also serves as a volatile liquids cover).



Component	Description
<b>Flat sampling plate</b>	The flat sampling plate supports an ATR crystal so the surface of the crystal is level with the surface of the plate. The flat plate is used to measure solid and semi-solid samples that have a flat, smooth surface. The sampling plates are fully sealed and coated with plastic to protect them from sample materials that may be corrosive.
<b>Gripper</b>	The Gripper is a mechanical press used to achieve uniform contact between the sample and the ATR crystal. The Gripper mounts on the accessory housing so that it sits above the sampling plate. The Gripper can be used with both the flat and the trough sampling plates.

Component	Description
<b>Crystal</b>	<p>The crystal causes the IR beam to bend and be reflected from its internal surfaces, producing a series of evanescent waves. ATR crystals are made from IR-transmitting materials that have a high index of refraction. The standard zinc selenide (ZnSe) crystal has a refractive index of 2.4 and an angle of incidence of 45 degrees. The depth of penetration ranges from 1 to 4 micrometers, depending on the angle of incidence. The crystal is about 8 cm long and produces 12 internal reflections. For measurements in the mid-IR spectral range, the ZnSe crystal produces usable data between 4000 and 650 cm<sup>-1</sup>. ZnSe crystals are suitable for solutions that have a pH between 5 and 9.</p>
<b>Optical unit</b>	<p>The optical unit is a sealed tube which contains an aluminum base supporting two mirrors. The input mirror directs the beam from the IR spectrometer into the ATR crystal. The output mirror collects the IR energy as it exits the crystal and directs the energy to the detector in the IR spectrometer. The optics tube is connected to the purge system in the IR spectrometer. This design maintains a controlled environment around the IR beam as it travels through the ATR accessory and eliminates water and carbon dioxide peaks in the ATR spectra.</p>
<b>Trough sampling plate</b>	<p>The trough sampling plate has a trough or well in the middle. The plate supports an ATR crystal so the surface of the crystal is level with the bottom of the trough. The trough plate is used to measure materials that need to be contained, such as free-flowing liquids, gels, pastes and powders. The trough plate holds a sample volume of 1.0 milliliters.</p>
<b>Powder press and volatile liquid cover</b>	<p>This is a Teflon™ insert that serves as a powder press and a volatile liquid cover. When analyzing powder samples, the insert can be placed right side up, as shown above, on the surface of a powder sample before lowering the Gripper compression plate. The Gripper/powder press combination provides uniform pressure to powder samples. We recommend using the Gripper and powder press whenever you analyze powders. Flip the insert over and it serves as a convenient cover that can be placed over the trough when measuring volatile liquids. The cover prevents the sample from evaporating during the analysis.</p>

## Operating precautions

The crystal is an important component of the Smart ARK optics and should be handled with care. Cracks, chips, or clouding of the crystal surface will degrade the accessory's performance.

To maximize the life of your crystal:

- Make sure the samples you analyze will not react with the crystal material.
- Use only recommended solvents to clean the crystal.

See the list at the left for crystal characteristics and compatibility information. To learn about the characteristics of your crystal, click the crystal type in the list below.

Crystal	Characteristics
<b>Zinc Selenide (ZnSe)</b>	<ul style="list-style-type: none"><li>• Refractive index @ 1000 cm<sup>-1</sup>: 2.4</li><li>• Density (g/cm<sup>3</sup>): 5.27</li><li>• Hardness (Knoop #): 150</li><li>• Useful pH range: 5 to 9</li><li>• Physical characteristics: hard, brittle</li><li>• Recommended cleaning agents: alcohol, acetone, water</li><li>• Solvents which attack ZnSe: strong acids and alkalis, oxidizing agents, amines, chlorinated solvents, such as methylene chloride and chloroform</li></ul>

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Crystal	Characteristics
<b>Germanium (Ge)</b>	<ul style="list-style-type: none"> <li>• Refractive index @ 1000 cm<sup>-1</sup>: 4.0</li> <li>• Density (g/cm<sup>3</sup>): 5.32</li> <li>• Hardness (Knoop #): 1150</li> <li>• Useful pH range: 1 to 14</li> <li>• Physical characteristics: hard and brittle, sensitive to temperature, reflection losses</li> <li>• Recommended cleaning agents: alcohol, acetone, water, toluene</li> <li>• Solvents which attack Ge: hot sulfuric acid (H<sub>2</sub>SO<sub>4</sub>), aqua regia</li> </ul>
<b>Zinc Sulfide (ZnS)</b>	<ul style="list-style-type: none"> <li>• Refractive index @ 1000 cm<sup>-1</sup>: 2.2</li> <li>• Density (g/cm<sup>3</sup>): 4.08</li> <li>• Hardness (Knoop #): 355</li> <li>• Useful pH range: 7 to 14</li> <li>• Physical characteristics: withstands thermal and mechanical shock</li> <li>• Recommended cleaning agents: alcohol, acetone</li> <li>• Solvents which attack ZnS: acids</li> </ul>
<b>AMTIR</b>	<ul style="list-style-type: none"> <li>• Refractive index @ 1000 cm<sup>-1</sup>: 2.5</li> <li>• Density (g/cm<sup>3</sup>): 4.40</li> <li>• Hardness (Knoop #): 170</li> <li>• Useful pH range: 1 to 7</li> <li>• Physical characteristics: relatively hard, brittle</li> <li>• Recommended cleaning agents: alcohol, acetone, water, toluene</li> <li>• Solvents which attack AMTIR: alkalies</li> </ul>

Crystal	Characteristics
Silicon (Si)	<ul style="list-style-type: none"><li>• Refractive index @ 1000 cm<sup>-1</sup>: 3.4</li><li>• Density (g/cm<sup>3</sup>): 2.33</li><li>• Hardness (Knoop #): 1150</li><li>• Useful pH range: 4 to 12</li><li>• Physical characteristics: hard and brittle, withstands thermal shock, inert</li><li>• Recommended cleaning agents: alcohol, acetone, water, toluene</li><li>• Solvents which attack silicon: hydrofluoric acid (HF) and nitric acid (HNO<sub>3</sub>)</li></ul>

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## Precautions for the gripper

To see features in an infrared spectrum that is collected through an ATR accessory, the sample must be in close contact with the ATR crystal. The Gripper is used to apply pressure to solids, semi-solids, and powders so that the required contact can be achieved.

Heed the precautions described to avoid damaging the crystal when using the Gripper.

### NOTICE

When using the Gripper, observe the following precautions:

- Do not lower the compression pad on the bare crystal.
- Do not apply pressure to the crystal for extended periods of time.
- Do not use the Gripper to press a sample that has an uneven surface.
- Make sure the thickness control is properly set and the pressure control is at its lowest setting before you lower the compression pad.

## Precautions for analyzing liquids

Liquid samples are simply poured or injected directly onto the crystal.

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The trough sampling plate is required for analyzing liquids. A cover is provided to seal volatile liquids in the trough to prevent evaporation during the analysis.

Follow the precautions described at the left to avoid damaging the crystal when analyzing liquids.

### NOTICE

Make sure your sample will not react with the crystal material. Click here for compatibility information. Applying extremely hot or cold liquids may crack the crystal. Do not submerge the crystal or place it in an ultrasonic bath.

## Starting the software

To measure and analyze samples, start OMNIC Paradigm software.

For instructions on using OMNIC Paradigm software, see the guides and tutorials at [www.knowledge1.thermofisher.com](http://www.knowledge1.thermofisher.com)

## System performance

Run the Accessory Performance Test workflow to verify the performance of your accessory.

1. From the dashboard of OMNIC Paradigm software, right-click the Accessory Performance Test workflow and select Run.
2. Follow the prompts to complete the workflow.

When the workflow is complete, you can find the test report in the Reports section of the dashboard.

## Installing the Smart Ark accessory

The accessory fits into guides on the side walls of the sample compartment.

These accessories are aligned at the factory and they require no further adjustment.

The optical components are mounted in a sealed tube, which automatically connects to the purge system in your IR spectrometer.

◆ **To install the accessory**

1. Make sure the spectrometer is turned on.
2. If the sample compartment cover is attached, remove it.
3. If the side wall adapters are in place inside the sample compartment, remove them.
4. If you were using any of the connectors at the back of the sample compartment, remove the cables.
5. Remove the Snap-in baseplate or any other accessories installed inside the sample compartment.
6. Insert the accessory. Lower the accessory into the spectrometer sample compartment and press gently downward until the accessory locks in place.

## Installing a sample plate

The Smart ARK includes a set of sampling plates for measuring different kinds of samples. Two sampling plates are available for each crystal type: a flat plate for measuring solids and a trough plate for measuring liquids and powders.

Follow the instructions at the left to install a sampling plate.

◆ **To install a sample plate**

Position the sampling plate with the crystal facing up and slide the plate onto the Smart ARK as shown below.

The two small alignment holes on the bottom of the sampling plate fit over the pins on the accessory surface.



## Installing the Gripper

In order to see features in an infrared spectrum that is collected through an ATR accessory, the sample must be in close contact with the ATR crystal. The Gripper is used to apply pressure to solids and powders so that the required contact can be achieved.

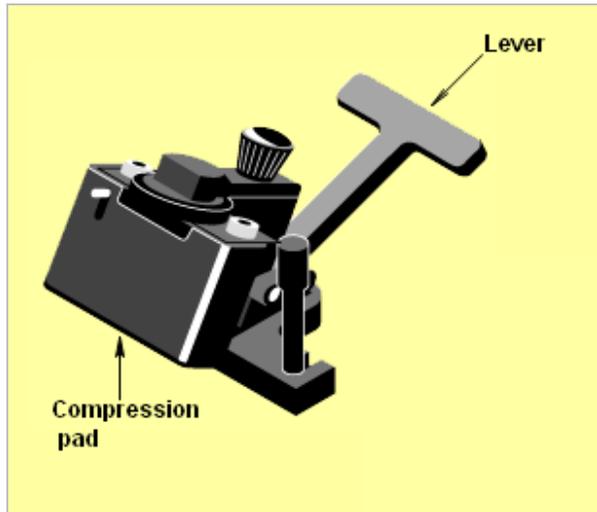
The Gripper is required for all solids and powders

### NOTICE

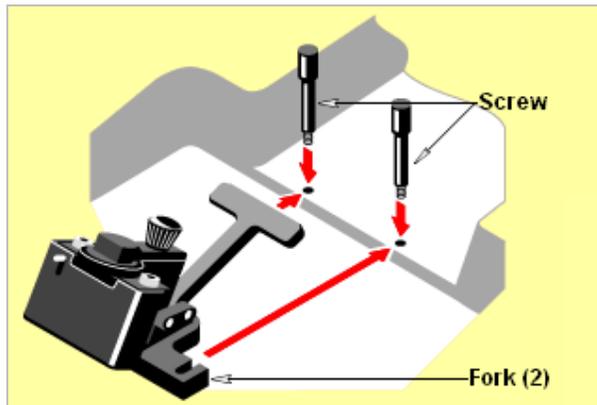
Read the instructions on installing samples and operating the Gripper before attempting to use it or you may damage the crystal.

❖ **To install the Gripper**

1. Make sure the Gripper compression pad is in the raised position by lowering the lever.



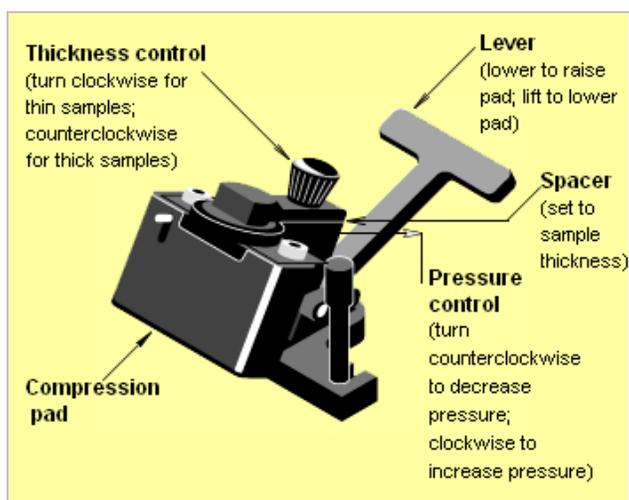
2. Partially insert the two long screws into the holes on the top of the accessory housing.
3. Slide the forks on the base of the Gripper onto the screws and tighten the screws finger tight.



To remove the Gripper, loosen the screws and slide the Gripper forward.

## Operating the Gripper

The Gripper has a couple of moving parts. Use the lever to raise and lower the compression pad. The thickness control allows you to open and close the spacer. Use the pressure control to specify the pressure that will be applied when the compression pad is down.



- Thickness control: Turn clockwise for thin samples and counterclockwise for thick samples.
- Lever: Lower to raise pad; lift to lower pad
- Spacer: Set to sample thickness
- Pressure control: turn counterclockwise to decrease pressure; clockwise to increase pressure

## Changing your measurement settings

When you install a Smart Accessory, the system automatically updates the measurement settings to those associated with the accessory. The default settings for the accessory have already been optimized for collecting data with the accessory.

After you install the accessory, the accessory name is shown in the Settings list on the dashboard of OMNIC Paradigm software.

## Running the performance test

Run the Accessory Performance Test workflow to verify the performance of your accessory.

1. From the dashboard of OMNIC Paradigm software, right-click the Accessory Performance Test workflow and select Run.
2. Follow the prompts to complete the workflow.

When the workflow is complete, you can find the test report in the Reports section of the dashboard.

# Measuring the background

A background spectrum is needed to process the sample data to an infrared spectrum. The background is a reference spectrum which accounts for the unique optics of the ATR accessory and spectrometer. Each sample spectrum is ratioed against a background so that the final spectrum is free of these features.

The correct sampling plate and crystal must be installed on the ATR accessory when the background is measured. If you will be analyzing a solid sample, install the flat sampling plate. Use the trough sampling plate for liquid and powder samples. DO NOT place a sample on the crystal when measuring the background.

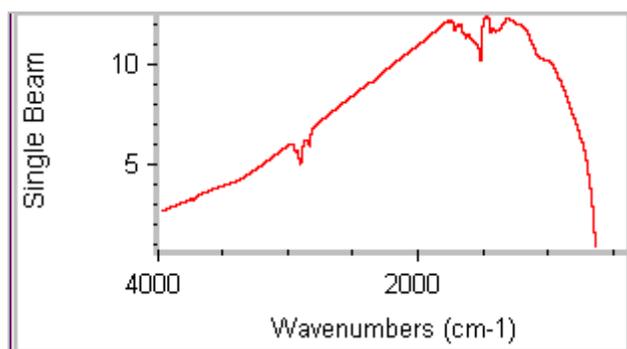
## ◆ To measure the background

1. Make sure the correct sampling plate and crystal are mounted on the Smart ARK. Do not place anything on the crystal when measuring the background. If you will be using the Gripper, make sure the compression pad is not touching the crystal."
2. Collect a background spectrum. Click Preview and Measure Background on the dashboard.

## The background spectrum

The new background spectrum will be used to process all of the sample spectra you collect until you replace it by collecting another background.

Here's what a background spectrum collected with an ATR accessory looks like.



## When to collect a new background

The background data used to process each sample measurement to an IR spectrum must be measured under exactly the same conditions as the sample. For best results, we recommend collecting a background spectrum before each sample. If you use the same sampling technique and instrument settings to analyze all of your samples, you can use the same background to process multiple samples. However, we recommend collecting a new background at least once every two hours. If any of the conditions described at the left are true, remeasure the background immediately.

If any of the following is true, you should immediately remeasure the background and use the new background to process your sample data.

- You changed a component in your spectrometer or sampling accessory
- You changed one of the measurement settings other than Gain, Final Format, or Sample Scans.
- You see a change in the amount of water or carbon dioxide bands in the IR spectra of your samples.
- You see an unexpected change in the spectral baseline.
- The quality of your spectral data is reduced (more noise or spurious peaks in the spectrum).

## Installing a sample

When background collection is completed, you are ready to insert the sample.

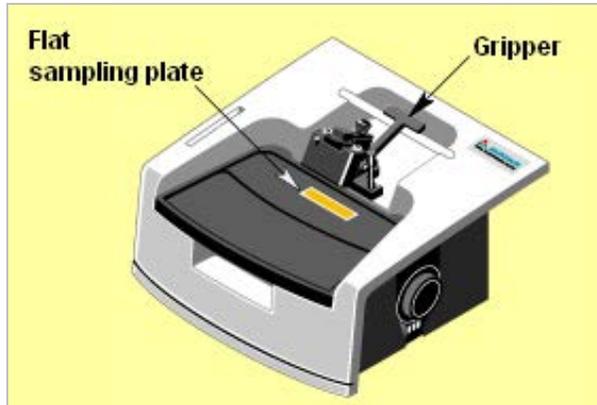
### Installing a solid sample

ATR is an excellent technique for measuring the composition of bulk solids or the surface properties of a layered solid. The IR beam from an ATR accessory migrates only a short distance from the surface of the crystal. Because of this, the sample must be placed firmly against the crystal before any sample information will show up in the infrared spectrum.

This does not mean that you simply place the sample on the crystal so that it touches in one or two places. It means you must add pressure so that the surface of the sample conforms to the surface of the crystal.

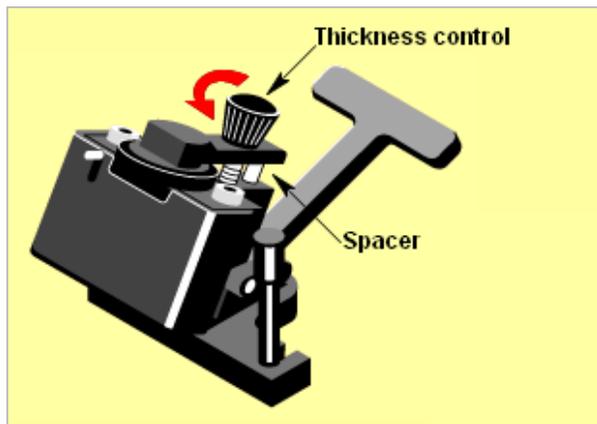
❖ **To install a solid sample**

1. Make sure a flat sampling plate with an appropriate crystal and the Gripper are installed on the Smart ARK. If you need to change the sampling plate, stop and collect another background spectrum before continuing with this procedure.



2. Raise the Gripper compression pad by lowering the lever.
3. Minimize the pressure by turning the pressure control counterclockwise as far as it will go.
4. Set the thickness spacer to the approximate thickness of your sample. Turn the thickness control clockwise for thin samples; turn it counterclockwise for thick samples.

**Note** The Gripper cannot be used to analyze samples that are thicker than 8 millimeters.



5. Place the sample on the ATR crystal. The surface of the sample must be completely flat on both sides. For best results, the sample should cover the crystal completely (required for quantitative analysis). If the sample is too small to cover the crystal, cover the Gripper

compression pad with aluminum foil so the pad does not touch the crystal when you press it against the sample (the material used to make the pad has a distinctive infrared spectrum of its own).

#### NOTICE

Pressing solids that have an uneven surface may damage your crystal.

6. If the sample thickness is 8 millimeters or less, use the Gripper to press the sample against the crystal. Lift the Gripper lever to lower the compression pad.
7. Turn the pressure control clockwise until the compression pad contacts the sample.

#### NOTICE

Apply only enough pressure to gently press the sample against the crystal.

## Analyzing thick solids

If the sample is too thick for the Gripper (8 millimeters or more), try using your hand to press the sample against the crystal. However, the quality of the resulting spectrum may be poor, since it is difficult to achieve even pressure across the surface of the sample without the Gripper.

In addition, you cannot measure component concentrations in the sample if you use your hand to press the sample against the crystal because you cannot apply consistent pressure from one sample to the next.

## Installing a liquid sample

ATR is an ideal technique for analyzing liquids. Sample preparation is minimal and cleanup is easy and fast. Even highly absorbing liquids, such as aqueous solutions, can be measured accurately without dilution because the IR beam penetrates the sample only a tiny amount.

The effects of uneven pressure on depth of penetration (and, thus, sample absorption) are not a factor when measuring liquids because they conform to the surface of the crystal without added pressure. Since pathlength (depth of penetration) is constant, liquids can be measured reproducibly and the ATR spectra can be used for quantitative analysis.

❖ **To install a liquid sample:**

1. Make sure a trough sampling plate with an appropriate crystal is installed on the Smart ARK. If you changed the sampling plate, stop and collect another background spectrum before continuing with this procedure.

**NOTICE**

Make sure your sample will not react with the crystal material.

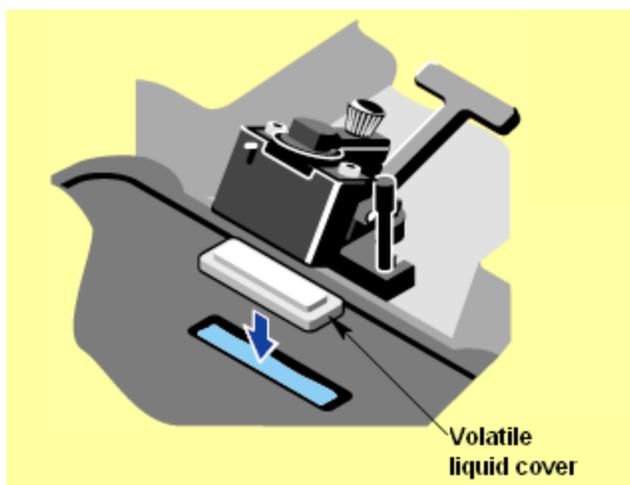
2. Pour or inject the sample directly onto the crystal. If the sample is viscous, use a rubber spatula to spread the sample over the surface of the crystal. For best results, the sample should cover the crystal completely (required for quantitative analysis).

**NOTICE**

The liquid should be at or close to room temperature. Applying extremely hot or cold liquids may crack the crystal.

3. If the sample is volatile, install the Gripper and volatile liquid cover. Place the cover over the trough as shown below.

**Note** The volatile liquid cover is the powder press turned upside down.



4. Set the Gripper thickness spacer to the approximate thickness of the volatile liquid cover.
5. Lift the Gripper lever to press the cover over the sample.

## Installing a powder sample

Powders are easier to run by ATR than by infrared transmission because little or no preparation is required. When analyzed by IR transmission, powders must be mixed with the proper amount of KBr (potassium bromide) and pressed into a pellet. The pellet is then placed in the IR beam. When an ATR accessory is used, the powdered sample is placed directly on the ATR crystal. A powder press is used to achieve even distribution and contact with the crystal.

The ATR technique also has some benefits over diffuse reflection because distortions due to scattering that occur in diffuse reflection spectra are not present in ATR spectra. To install a powder sample:

1. Make sure the trough sampling plate and Gripper are installed on the Smart ARK. If you changed the sampling plate, stop and collect another background spectrum before continuing with this procedure.

### NOTICE

Apply only enough pressure to gently press the sample against the crystal.

NOTICE: Make sure your powder sample will not scratch the crystal. Do not use the Gripper to crush a sample.

2. Raise the Gripper compression pad by lowering the lever.
3. Minimize the pressure by turning the pressure control counterclockwise as far as it will go.
4. Set the Gripper thickness spacer to the approximate thickness of the volatile liquid cover.
5. Grind the sample, if necessary. For analysis by ATR, the particles of a powder sample should be about the same size as the wavelength of light used for the analysis. For infrared spectroscopy, this means the particle size should be less than 10 micrometers.

If the particles are too big, use a mortar and pestle or an electric grinder to grind the sample. One to 2 minutes of grinding is usually sufficient.

Note: The WIG-L-BUG electric grinder, available from Thermo Fisher Scientific, is designed to grind samples to the correct particle size for ATR measurements.

1. Place the sample on the crystal. To install a powdered sample, sprinkle a thick (1 to 3 millimeter) layer of the sample on the crystal. For best results, the sample should cover the crystal completely.

Note: If the particles are extremely hard, consider purchasing a diffuse reflectance accessory for the analysis. Diffuse reflectance accessories often provide superior results from hard powders, which scatter much of the energy from the infrared beam when measured by ATR.

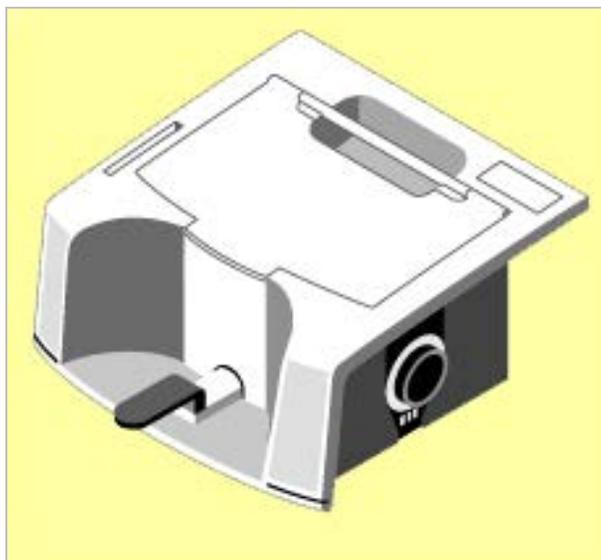
1. Place the powder press over the powder.
2. Lower the Gripper compression pad by lifting the lever.

## Measuring the sample

Once the sample is positioned on the crystal, you are ready to start collecting the sample data. The sample measurement will show how the energy you started with was reduced by the sample.

### ❖ To measure the sample

1. Move the sample into the infrared beam. Slide the sample holder out about 3 cm (1 inch). You should feel it click into position.



2. Measure the sample.

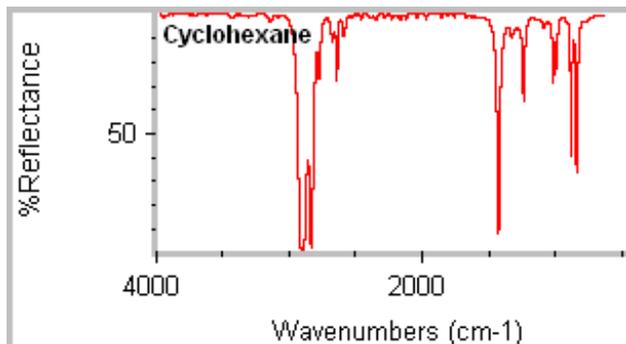
## Sample spectrum

When % Reflectance is selected as the final format of your sample spectra, the software displays a reflection spectrum. A reflection spectrum looks similar to a transmission spectrum. The spectrum is updated as new data are collected.

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When the system has collected the number of scans specified, the final spectrum is displayed in a window.

The final spectrum shows only the change in IR energy (the background energy has been removed). This is a spectrum of cyclohexane measured using the standard zinc selenide (ZnSe) crystal.



## Adjusting the pressure

If no spectral bands appear or the bands are very small and you are measuring a solid or powder, restart data collection. Then gradually increase the pressure applied by the Gripper until sample bands appear in the spectrum.

Stop increasing the pressure as soon as the bands stop getting bigger or fall in an acceptable Y-axis range.

### NOTICE

Powder samples produce weak spectra even with maximum pressure. Be careful not to break the crystal by applying too much pressure.

To adjust the pressure If you need to increase the pressure applied to a solid sample, turn the pressure control clockwise. You can leave the compression pad down while you adjust the pressure.

Increase the pressure in small increments (about 1/2 turn) and then wait 3 to 4 seconds to see the effect on the spectral data.

# Cleaning Up

Remove the sample immediately after you finish the analysis.

If any sample material remains on the crystal, remove the sampling plate and clean the plate and crystal thoroughly before measuring another sample.

You can clean the crystal with soap and water or with a suitable solvent. The crystal must be cleaned gently using soft material.

When the crystal is clean and dry, you are ready to continue measuring samples.

## ◆ To clean the crystal

1. Remove the sample.
2. If sample material remains on the crystal, remove the sampling plate by lifting it off the alignment pins.

### NOTICE

DO NOT leave a sample on the crystal overnight.

3. Wash the crystal with soap and water and dry it with unscented tissue or cotton.

### NOTICE

DO NOT leave a sample on the crystal overnight.

## Using solvents to clean the crystal

If you need to use a solvent to remove the sample, make sure you select a solvent that is compatible with the crystal.

Crystal	Recommended Solvent
ZnSe	alcohol, acetone, water
Ge	alcohol, acetone, water, toluene

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Crystal	Recommended Solvent
ZnS	alcohol, acetone
AMTIR	alcohol, acetone, water, toluene
Si	alcohol, acetone, water, toluene

❖ **To clean the crystal with a solvent**

The cotton or tissue may be moistened with a suitable solvent, if necessary, to remove the sample. If you clean the crystal with a solvent, allow enough time for the solvent to evaporate completely. To ensure complete evaporation, dry the crystal with clean, dry air or nitrogen.

#### NOTICE

Use only recommended solvents to clean the crystal. Do not leave a cleaning fluid on the crystal for more than 5 minutes or you risk loosening the adhesive that bonds the crystal to the sampling plate. Do not submerge the sampling plate or place it in an ultrasonic bath.

## Removing the Smart Ark

You can remove the Smart ARK accessory as easily as you installed it.

When not in use, your accessory and all sampling plates should be stored in a dust-free environment such as a cabinet or box.

❖ **To remove the Smart Ark**

1. If a sample is positioned on the Smart ARK sampling plate, remove the sample.
2. Gently pull up on the accessory to release it. Continue lifting the accessory straight up until it is completely free of the sample compartment.

## Next Steps

For more information on using OMNIC Paradigm software to measure and analyze samples, see the guides and tutorials at [www.knowledge1.thermofisher.com](http://www.knowledge1.thermofisher.com).