

Smart ARK™

For Research Grade, Multiple-Reflection ATR Analysis

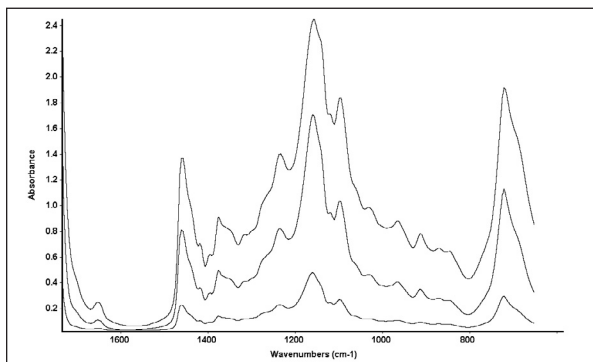
The Thermo Scientific Smart ARK is a stable, rugged, high energy throughput HATR. The Smart ARK is the ideal choice for both research and analytical test laboratories. It is well suited for high level accurate quantitative and qualitative analyses because sample preparation is not necessary. The Smart ARK's high performance is a result of high optical collection efficiency and unique patented crystal design. This crystal design allows the user to change crystal angles and materials without optical realignment. The multi-reflection crystal design is extremely well-suited for analyzing lower concentration samples and where high sensitivity is necessary. It is good for samples that require consistent, precise analysis or when different pathlengths are required to analyze a sampling system.

Example Applications

- Liquids
- Solids
- Semi-solids
- Powders
- Quantitative and qualitative measurements

Unique Features

To facilitate changing crystal angles or material (and subsequently the depth of penetration into a sample or effective pathlength) our patented crystal design ensures high energy throughput without the need for mechanical or manual optical alignment of the accessory. It is extremely easy to change crystal plates and angles; there is no need to worry about moving mirrors and mechanical parts failing. The crystal design ensures reproducibility and reliability with every measurement, which is especially critical when transferring analytical methods between laboratories with multiple spectrometers. The Smart ARK is available with the widest variety of crystal plates in different materials and angles including 30, 40, 50, 55, 60, and 70 degrees (dependent on material). There is a crystal material for almost any pH sample and a suitable crystal angle that results in a pathlength from 0.6 to 45 micrometers.



Spectra of vegetable oil using 40° (top), 45° (middle) and 60° (bottom) ZnSe crystals on the Smart ARK

The following table shows the angle of incidence (θ), number of reflections, the refractive index of the crystal (R.I.), the calculated depth of penetration (dp), the calculated effective pathlength (EPL) in micrometers for three common materials (other materials available upon request). The experimental sampling depth is 2 to 3 times the calculated depth of penetration.

θ	# OF REFL.	ZnSe (R.I. = 2.4)		Ge (R.I. = 4)		AMTIR (R.I. = 2.5)	
		dp	EPL(μ m)	dp	EPL(μ m)	dp	EPL(μ m)
30	21	NA	NA	1.2	17.68	NA	NA
40	14	4.4	45.64	0.763	4.24	2.76	38.75
45	12	2.0	12.12	0.664	2.59	1.70	9.68
50	10	1.5	5.82	0.596	1.62	1.34	4.93
55	8	1.25	3.11	0.547	.992	1.14	2.71
60	7	1.11	1.94	0.510	.672	1.02	1.72
Critical Angle		38.68	22.02			36.87	

Both trough and flat plate style crystal plates are available to suit the specific sample analysis. The trough plate version is optimized for use with liquids, pastes, and gels. The flat plate version is optimized for use with solid films. All crystal plates are Teflon® coated to improve chemical resistivity and prevent discoloration of the plate surface. The pressure device has been optimized to reduce breakage of the crystals that can be caused by too much or uneven pressure.

Specifications

Crystal Material: Zinc Selenide (standard), Germanium (optional), Silicon (optional), Zinc Sulfide (optional), AMTIR (optional)

Angle of Incidence: 45 degree (standard), optional 30, 40, 50, 55, 60, 70-degree depending on material

Number of Reflections: 12 (standard) see chart above for additional information

Pathlength: Approximately 12 micrometers

Sample Volume (trough): 1.0 milliliters

Heated Option: Allows thermal studies from ambient to 100 °C

Ordering Information

Accessory	Part Number
Smart ARK Trough Plate Kit	0031-3XXT
Smart ARK Flat Plate Kit	0031-3XX

XX = denotes instrument code

