



THE SEAGULL™ RESEARCH PACKAGE

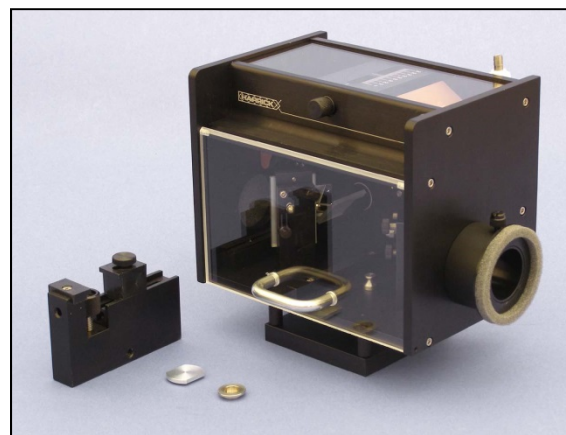
The Seagull™ Research Package is a special offer, packaging our Seagull variable angle reflection accessory with its ATR Kit and Wire Grid Polarizer. The Seagull™ is a powerful accessory for examining numerous types of samples using external reflectance, ATR or in-line diffuse reflectance. The included Wire Grid Polarizer is excellent for increased sensitivity to thin films on reflective substrates and for orientation studies. The Seagull can be operated over a broad range of incident angles without misaligning the system, without defocusing the incident radiation, and without changing the incident polarization. The Seagull™ incorporates Harrick's PermaPurge™ feature for changing the incident angle of without interrupting the spectrometer purge.

APPLICATIONS

- ▶ Variable angle external and internal reflectance.
- ▶ Ideal for examining a wide variety of samples, including powders, optical coatings, opaque substrates, films on opaque substrates and slightly curved solids.
- ▶ Excellent tool for studying liquids and films on liquids by external reflectance, for depth profiling and for determining optical constants.

FEATURES

- ▶ Seagull Multi-purpose, variable angle reflection attachment.
 - ▶ ATR, external and diffuse reflectance capabilities.
 - ▶ Continuously variable angle of incidence, from 5° to 85°.
 - ▶ Focuses and centers the beam on the sample for all incident angles.
 - ▶ Direct angular read-out for all measurements; no ATR angle correction needed.
 - ▶ Maintains polarization and alignment for angles; no repositioning of the sample necessary.
 - ▶ High optical throughput.
 - ▶ PermaPurge™ for changes in angle without interruption of the purge.
- ▶ ATR Kit
 - ▶ ZnSe or Ge hemispherical ATR crystal
 - ▶ Crystal holder with pressure plate and clamp.
- ▶ Wire Grid Polarizer
 - ▶ KRS-5 substrate, for use from 5000 cm⁻¹ to 285 cm⁻¹.
 - ▶ High extinction ratio.
 - ▶ Two-position holder with a 22-mm clear aperture provides p- or s- polarization.



HEMISPHERES	
Material	Catalog No.
Ge	EJ6XBB
ZnSe	EM6XBB
Si	EE6XBB

- ▶ Options available:
 - ▶ Ming-Sung™ ATR Rotator for oriented polymer studies.
 - ▶ High Force Ge ATR Kit with torque screwdriver.
 - ▶ Liquid, powder and heated sampling accessories available.

INCLUDES

- ▶ Seagull variable reflection accessory with sample holder for external reflectance, a sample cup for diffuse reflectance, pressure plate, alignment mirror and mating hardware for the specified spectrometer.
- ▶ Two-position infrared Wire Grid Polarizer (KRS-5 substrate).
- ▶ ATR Kit with ZnSe or Ge hemisphere, holder pressure plate and clamp.

ORDERING INFORMATION

Seagull™ Research Package (includes Seagull™, ATR Kit with ZnSe crystal and wire grid polarizer)	CATALOG No. SRP-XXX
Seagull™ Research Package (includes Seagull™, ATR Kit with Ge crystal and wire grid polarizer)	SRP-J-XXX

OPTIONS

	CATALOG No.		CATALOG No.
High Force Ge ATR Kit	SEA-IRK-JH	Heatable Flow-Through Liquid ATR Cell, 24V	SEA-HLC-3
Flow-Through Liquid Cell	SEA-FLC	Heated Sample Stage, 24V	SEA-HOT-3
Ming Sung™ ATR Rotator	SEA-MNP	Temperature Controller, 110V, with USB adapter.	ATK-024-1
Powder Sample Holder	SEA-PSH	Temperature Controller, 220/240V (CE marked), with USB adapter.	ATK-024-2
Torque Screwdriver	PTW-SXX		
Trough Liquid Cell	SEA-TLC		

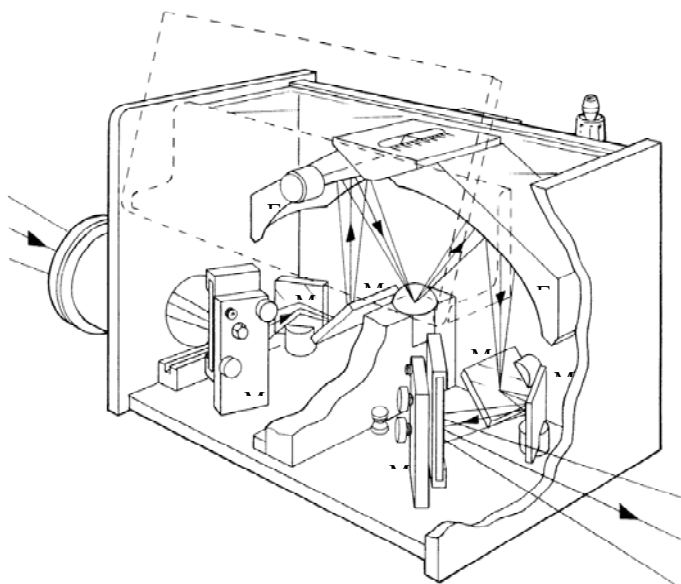


Figure 1. The Seagull™ variable angle reflection accessory.

Variable angle reflection spectroscopy is becoming increasingly important. Certain samples such as powders, opaque substances, films on opaque substrates, and films on liquids are tedious or practically impossible to analyze with conventional transmission spectroscopic equipment. The analysis of such samples with reflection spectroscopy, however, is straightforward.

The Seagull™ is shown in Figure 1. Three mirrors (M1, M2, and M3) direct the beam to an ellipsoid (E1) that focuses the beam onto the sample. The sample reflects the light onto a second ellipsoid (E2). Ellipsoid E2 reflects the beam from mirrors M4, M5, and M6 onto the detector of the spectrometer. Mirrors M3 and M4 are coupled to rotate together, in mirror image fashion. This directs the beam to and from different portions of the ellipsoids, changing the incident angle of the beam on the sample. This configuration automatically preserves the optical alignment for any selected angle of incidence.

The Seagull™ is ideal for examining surface and optical coatings, for measuring optical constants, and for liquid or electrochemical analysis with the appropriate cells. Sampling accessories are available for convenient sampling of a variety of types of samples.

For ATR studies, the Seagull can be equipped with an ATR Kit that includes a ZnSe or Ge ATR hemisphere mounted in a holder. The holder simply slides into the Seagull in place of the standard one. The holder has a built-in pressure applicator. The kit also includes a compatible pressure plate and is compatible with our standard torque screwdriver. The High Force Ge ATR Kit includes a torque screwdriver and is specially designed for examining thin films on silicon and reflective substrates.

A flow-through liquid cell is offered for ATR studies of liquids. This cell is equipped with two luer ports and seals against the ATR crystal with an o-ring. The cell can be used for both flow-through measurements and for applications requiring a sealed liquid cell. A temperature-controlled version of the cell is also available for examining liquids from room temperature to 150°C.

For ATR measurements of powders, a convenient powder holder is available. This holder provides a spring-loaded removable cup that minimizes spillage of the sample while optimizing contact with the ATR crystal.

For studying oriented polymers and determining ordering in systems with molecules on inorganic surfaces, our Ming-Sung™ ATR Rotator is available. This rotator is a specially designed crystal holder that permits a 0° to 90° rotation of the sample without dismounting the sample. It is compatible with the hemispheres that can be purchased separately or with the ATR Kit.

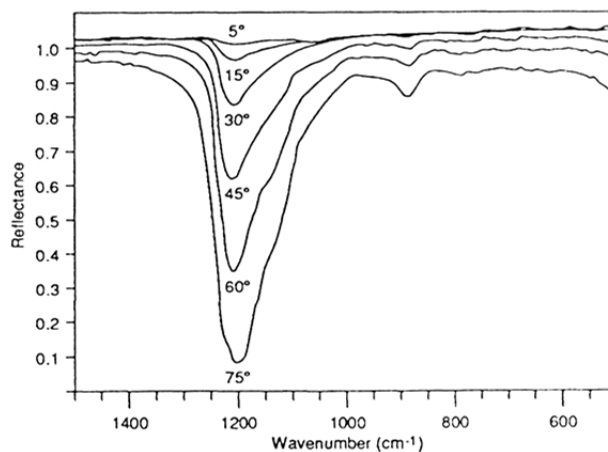


Figure 2. External reflectance of 0.05 μm SiO_2 on aluminum (p-polarization).

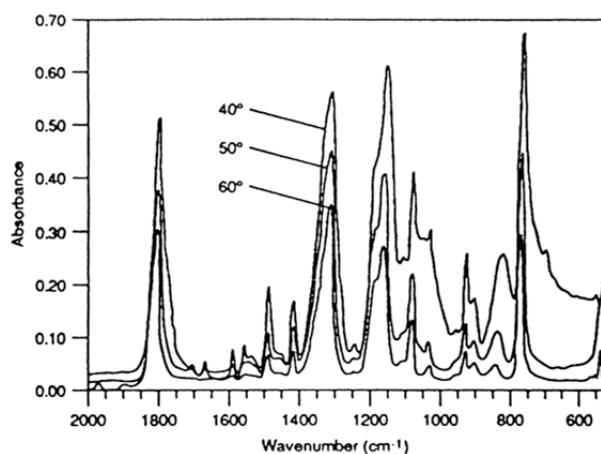


Figure 3. Internal reflectance of a 2.5 μm mylar film on a silicon substrate.

A heated sample stage is available for operation up to 150°C. This stage can be used to support samples for either ATR or specular reflectance measurements.

For specular reflectance of liquids, the trough liquid cell provides an open reservoir to contain the sample. The trough readily mounts onto the standard specular reflectance holder.

In addition, a model of the Seagull™ with independently variable angles of incidence and collection is available on special order.

The versatility of the Seagull™ makes it a powerful tool for the analysis of a number of different sample types using a variety of reflection techniques. Representative spectra are shown in Figures 2 through 5.

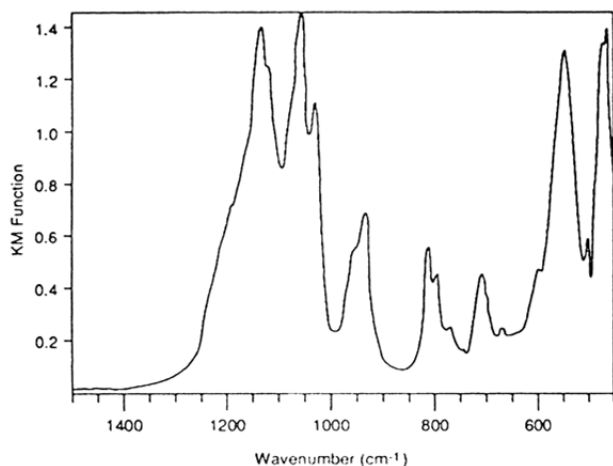


Figure 4. Diffuse reflectance of kaolinite diluted in KBr at a 15° angle of incidence.

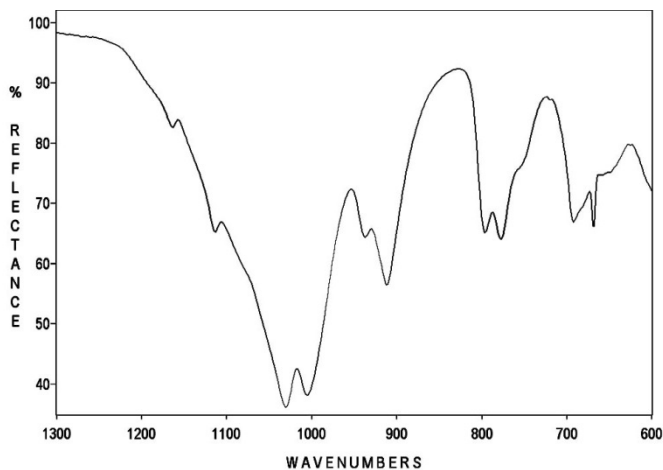


Figure 5. ATR spectrum of 10 μm silica powder, recorded at a 45° angle of incidence using the powder sample holder.