THE SPLITPEA™

Harrick's SplitPea™, [1] is a horizontal internal reflection (ATR) accessory with the smallest sampling area of any ATR accessory - less than 250 µm in diameter for its Si ATR crystal. The SplitPea™ is configured to apply localized, measured pressure to produce superior contact between the sample and the ATR crystal. This makes the SplitPea™ ideal for quick and easy examination of a wide range of samples. These include: hard samples, like paint chips and combinatorial chemistry substrates; small samples, such as individual fibers and nanoliters of liquids; large samples, such as transparency film and defects thereon. In addition to making ATR nanosampling simple and straightforward, the SplitPea™ features PermaPurge™, [3] for rapid sample and crystal exchange without interrupting the purge of the spectrometer. The Harrick SplitPea™ is an innovative alternative to infrared microscopes, beam condensers, and diamond cells.

APPLICATIONS

- Uniquely suitable for studying optically thick, hard samples; slightly curved samples; fibers; paint chips; nanoliters of liquids and pastes; defects on large panels; and droplets of corrosive liquids.
- Invaluable for forensic samples and combinatorial chemistry samples.

FEATURES

- Internal and external reflection capabilities provide application versatility.
- High sample throughput due to little or no sample preparation.
- Usually retains sample integrity.
- Small sampling area - less than 250 µm in diameter for ATR with a silicon crystal.
- Minimizes stray light due to the small sampling area.
- Inert internal reflection elements available for use from the Near IR to the Far IR.
- Calibrated pressure applicator for reproducible ATR measurements.
- Designed for optimal contact between the ATR crystal and hard surface solids.
- Flip-up, streamlined pressure applicator for easy access to sampling area
- High energy throughput with DTGS detectors.
- Harrick's exclusive PermaPurge™ allows rapid sample and crystal exchange without interrupting the purge of the system.
- Spill-resistant cover.
- Options include Flow-Through Liquid Cell and Heatable Sampling Plates for operation to 200°C.

INCLUDES

- Two ATR holders with mounted Si hemispheres or one ATR holder with a mounted diamond hemisphere.
- Sample holder adapter for studying powders by internal reflectance.
- External reflection sample holder and alignment mirror.
- Mating hardware for the specified spectrometer.

[1] U. S. Patent 5,210,418
[2] U. S. Patent 5,308,983
[3] U. S. Patent 5,177,561

ORDERING INFORMATION

	CATALOG NO.
SplitPea™	UNS-XXX
Meridian™ Diamond SplitPea™	MER-XXX
Flow-Through Liquid Cell with Luer Fittings	UNS-LCF
Liquid Cell O-Ring	ORV-0015
Powder Adapter O-Ring	ORV-012

OPTIONS AND REPLACEMENT PARTS.

	CATALOG NO.
Mounted Crystals: Si	UNS-ATR-0E
Diamond	UNS-ATR-0W
Ge	UNS-ATR-0J
ZnS	UNS-ATR-0I
ZnSe	UNS-ATR-0M
Heatable Sampling Plates:	
Diamond	UNS-HOT-0W
Si	UNS-HOT-0E
Ge	UNS-HOT-0J

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This horizontal reflection accessory is ideal for analyzing optically thick, hard materials. Samples, which are difficult to analyze by conventional spectroscopic methods, such as fibers, paints, and microliters of liquids or pastes, are easily examined with the SplitPea™.

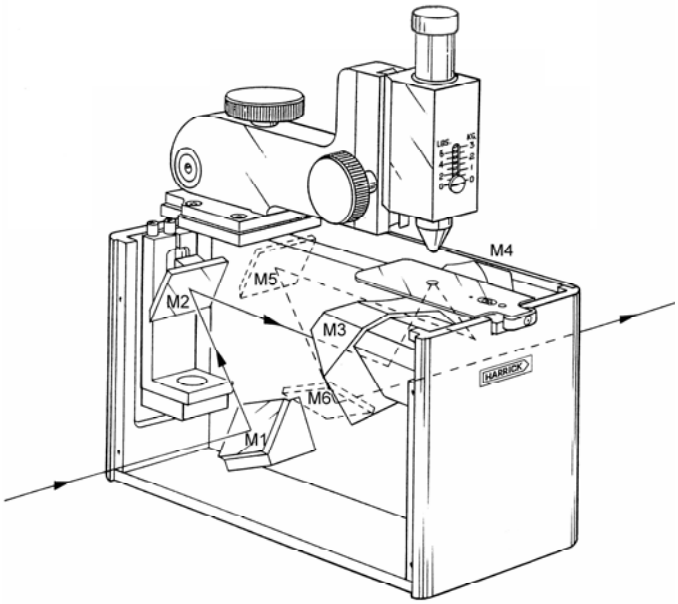

Figure 1. The SplitPea™.

The SplitPea™ can be configured for internal or external reflectance, simply by changing the sample holder. In its internal reflection mode, the SplitPea™ features a removable crystal/sample holder for easy sample insertion and crystal cleaning. For the external reflection and pre-alignment, the SplitPea™ features a removable sample holder and reference mirror. The SplitPea™ is enclosed in a purgable box for rapid sample exchange without interrupting the purge of the system.

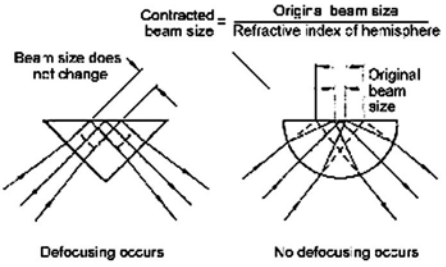

Figure 2. Focusing Effects of a Hemisphere.

An illustration of the SplitPea™ is shown in Figure 1. Two mirrors, M1 and M2, direct the beam to an ellipsoidal mirror, M3, which focuses the light onto the sample. The radiation reflected from the sample is collected by a second ellipsoid, M4. Mirrors M5 and M6 direct radiation reflected from M4 to the detector of the spectrometer. This configuration provides a six times linear reduction of the source image on the sampling surface.

For internal reflection, the SplitPea™ comes with two silicon internal reflection elements (IRE). Silicon is an excellent material for the IRE of the SplitPea™ since it is extremely inert, allowing the analysis of even highly corrosive materials. In addition, it is a very hard material. This permits the application of high clamping pressures to ensure good contact between the IRE and the sample. Generally, lower pressures are required to achieve the good contact needed in internal reflectance than are needed to flatten the sample for transmission studies. Thus fewer chemical and physical changes will be induced in the sample with the SplitPea™ than with a high pressure diamond anvil cell.

The Si IRE is a 3-mm diameter hemisphere. This further focuses the incident radiation onto the sample (see Figure 2), providing an additional 3.4 times linear reduction of the source image. For such a short pathlength, Si is virtually transparent in the far and mid-infrared. The Si IRE is beveled on the edge of its flat surface to provide a sampling area slightly larger than the 150-200 μm diameter hot spot on the crystal. This makes it easier to position small samples and maximize the clamping pressure. Because of the small size of this island, the pressure plate applies localized pressure to the sample improving contact between the sample and the IRE and allowing high contact pressures to be achieved.

For applications versatility, ZnSe, Ge, and diamond IREs are also available. This IRE selection offers a variety of sampling depths of volumes. .

For liquid sampling, a flow-through liquid cell is available for use with the SplitPea™. This cell is o-ring sealed and features two luer fittings.

In addition, heatable sampling plates are available for sampling at temperatures up to 200°C with the diamond or Si ATR crystals and to 100°C with a Ge ATR crystal. These sampling plates feature a gasket-sealed ATR crystal, K-type thermocouple, and 24V heater. These are designed for use with the Harrick Temperature Controller.

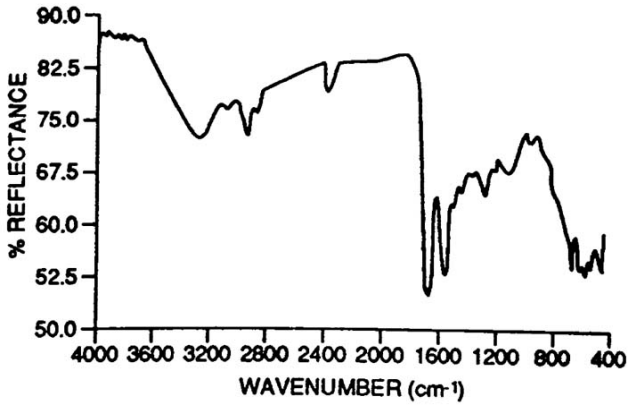

Figure 3. Internal Reflectance of a Human Hair.

Representative spectra recorded with the SplitPea™ are shown in Figures 3 through 6.

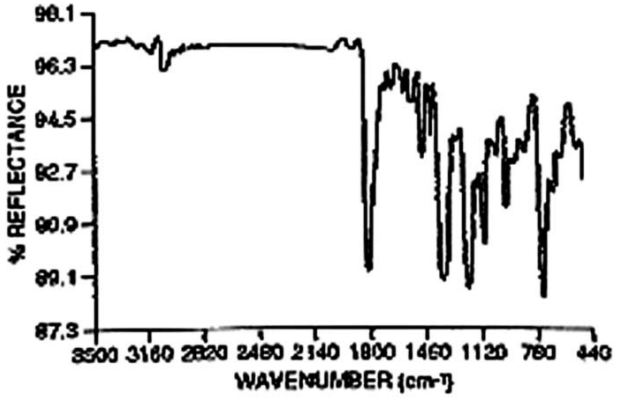

Figure 4. Internal Reflectance of a 20µm Poly(ethylene terephthalate) Fiber. ZnSe IRE.

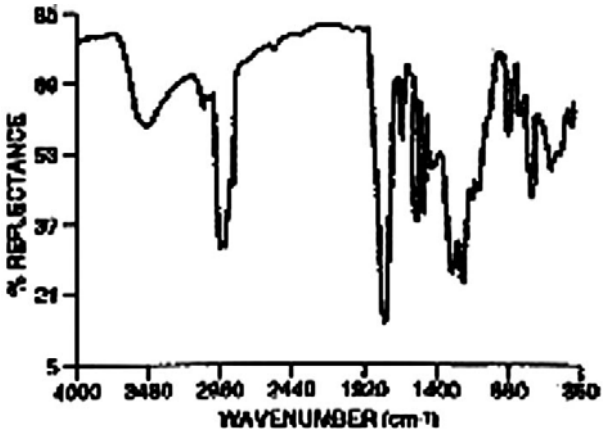

Figure 5. Internal Reflectance of a Paint Chip.

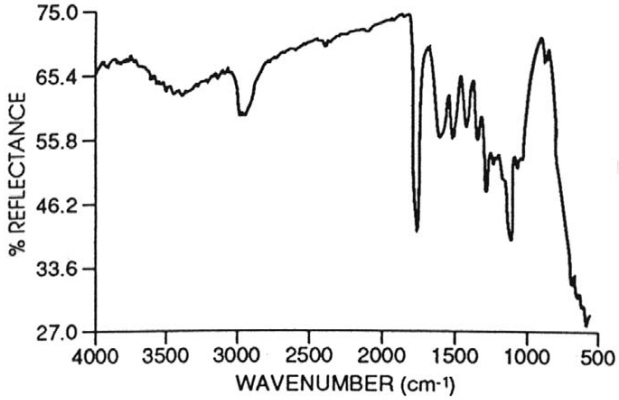

Figure 6. External Reflectance of a Lottery Ticket.