

Praying Mantis Diffuse Reflectance Accessory For the Evolution Pro UV-Visible Spectrophotometers

The Thermo Scientific™ Praying Mantis™ UV-Visible Accessory allows scientists to probe the surface of very small samples of powder by diffuse reflectance. Whether you need to perform reflectance measurements on pharmaceutical samples, explore the electronic effects of nanomaterials, or find the band gap of semiconducting materials, the Praying Mantis Accessory can measure samples as small as 3 mm diameter.

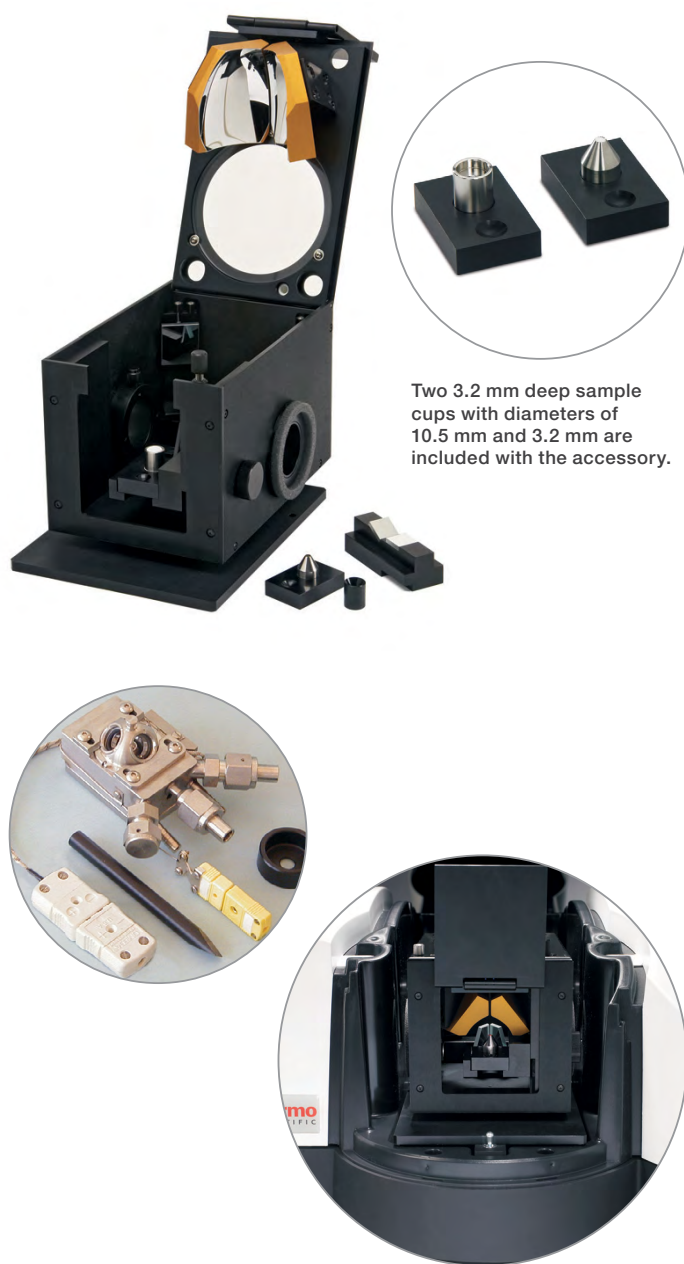
Product specifications

The Praying Mantis Accessory features MgF₂-coated aluminum optics, which provide excellent reflectivity throughout the UV, visible, and near-infrared (NIR) regions of the spectrum. Two 90° off-axis ellipsoids form a highly efficient diffuse reflection illumination and collection system. This unique configuration deflects the specular reflectance away from the collecting ellipsoid, minimizing the associated spectral distortions. As it has no electronics of its own, this accessory utilizes the spectrophotometer's high-quality, built-in detector, so it is "hot-swappable" and easy to install. Equipped with light and gas sealing tubes on both sides and an inlet valve on the top, the Praying Mantis Accessory can be purged with the inert or dry gas of your choice during measurements.

The included reference beam tube allows the accessory to be used with the sample compartment open. This feature enables the use of plumbed reaction chambers that can be heated, cooled, or pressurized to allow you to perform *in-situ* measurements during reactions on a surface.

Designed for small samples

The Praying Mantis Accessory is the perfect choice for measuring valuable or hard-to-prepare samples such as pharmaceuticals, nanowires, nanotubes, organic and inorganic films, ceramics, or micro-electronic materials. The beam at the sample surface is less than 3 mm in diameter, allowing the selection of a precise measurement spot on small wafer samples. Additional sample cups are available to increase your sample throughput for multiple samples.

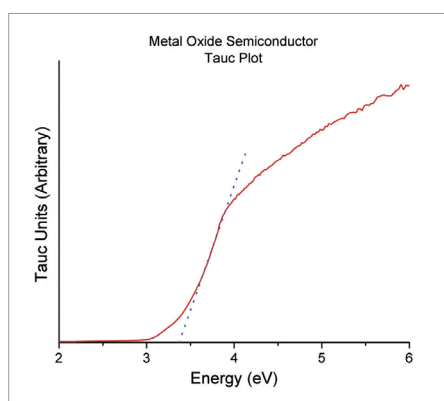


Two 3.2 mm deep sample cups with diameters of 10.5 mm and 3.2 mm are included with the accessory.

Product Specifications

Precise data for semiconductor bandgap analysis

Perform a wavelength scan on semiconductor materials and use the absorption edge to calculate the band gap. Reflectance and wavelength data can easily convert to Kubelka-Munk (K/S) units and energy in electron volts (eV). Combine these data in a Tauc plot¹ (Figure 1) and extrapolate the linear region to the energy axis to determine the band gap of the semiconductor.



Feature-packed software for control and calculation

Thermo Scientific™ VISION^{pro}™ Software packaged with the PC-control instrument gives the user complete control of the instrument for alignment and method development. Optional Thermo Scientific™ VISION^{lite}™ MaterialsCalc Software presents a simplified scanning interface and access to suites of calculations for materials applications.

Figure 1:
Tauc plot for semiconductor bandgap analysis

Measure dynamic processes

With the Praying Mantis, you can do UV-Visible measurements under a controlled atmosphere or while your reaction is in process. The Praying Mantis body can be purged with your choice of specialty gas. Optional low- and high-temperature reaction chambers offer gas flow at pressures from 10⁻⁶ torr to 30 psi and temperatures from -150 °C to 600 °C. A pressure dome for the high-temperature chamber accommodates pressures up to 500 psi. All reaction chambers are equipped with quartz windows to allow you to measure the absorbance/reflectance of surface species under your chosen conditions.

Ordering information

Product	Cat. No
Praying Mantis	222-220000
PTFE Disk*	268-826400
Additional large sample cup	268-826200
Additional small sample cup	268-826300
Low temperature reaction chamber	**
High temperature reaction chamber	**
High pressure dome	**
Heater assembly for reaction chambers	**

* Used for recording baseline spectrum

** Contact your Thermo Fisher Scientific Sales Representative for pricing

References

1. Tauc, R. Grigorovici and A. Vancu, Phys. Stat. Sol. 15, 627 (1966).

Specifications

Description	
Inert gas purge	Via integral purge connector
Sample volumes	
Large cup	Depth = 3.2 mm Diameter = 10.5 mm Volume = 0.277 cm ³
Small cup	Depth = 3.2 mm Diameter = 3.2 mm Volume = 0.026 cm ³
Optics	
Evolution Pro	MgF ₂ -coated, UV-enhanced aluminum mirrors 190 – 1100 nm
Accessories	
Low temperature reaction chamber	-150 °C – 600 °C 10-6 Torr – 1500 Torr
High temperature reaction chamber	25 °C – 600 °C 10-6 Torr – 1500 Torr
High pressure dome	With high temperature chamber to 500 psi (35 atm)
Heater assembly for reaction chambers	Reaction chambers are made of chemically resistant 316 stainless steel with quartz windows

Learn more at thermofisher.com/evolutionpro

thermoscientific

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