GladiATR Illuminate

AT A GLANCE

- UV/Vis light introduced from under the diamond ATR prism
- Diamond crystal design – will not scratch or fracture
- Full spectral range for the analysis in the mid-IR and far-IR regions
- Temperature-controlled options available
- Compatible with most FTIR spectrometers

TEMPERATURE CONTROL OPTIONS AVAILABLE

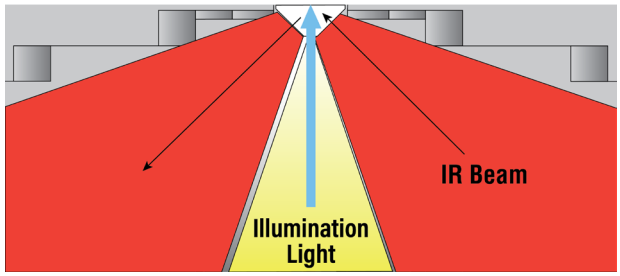


The GladiATR Illuminate is an ATR accessory designed for the analysis of photocuring or the solidification of liquid resins upon exposure to light.

The GladiATR Illumninate uses a liquid light guide to introduce UV/VIS light to the sample. The light is projected from underneath the diamond ATR element, allowing you to monitor solidification in real-time by tracking changes in chemical functionality. By observing this process, reaction kinetics may be determined, and resin formulations optimized. Applications include evaluating dental coatings and sealants, medical adhesives, photoresists, and 3D printing.

MECHANICAL AND OPTICAL DESIGN

Conventional photochemical setups irradiate samples from top-down, while IR measurements presented are being taken from the bottom-up. This disparity results in a difference in light intensity throughout the depth of the sample due to absorption and sample thickness nonuniformity, and limits the accuracy of analysis and mitigates characterization of opaque resins. The GladiATR Illuminate overcomes these challenges by illuminating from beneath the sample. This accessory design feature aligns the absorption cross section of the sample with the evanescent wave of the IR beam for characterization. To maximize the light introduced to the ATR crystal and sample, an optical lens is incorporate at the light guide tip.



Diamond crystal plate of the GladiATR Illuminate accessory; IR beam and illumination meet at the sample position.

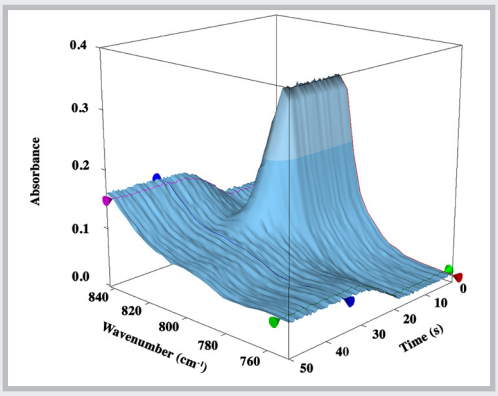
The GladiATR Illuminate optical design is all reflective, preserving the full spectral range inherent to diamond. For standard mid-IR FTIR spectrometers, the spectral range available with the GladiATR Illuminate is 4000–400 cm^{-1}. For FTIR spectrometers equipped with far-IR optics, the spectral range is extended to less than 50 cm^{-1}.

TEMPERATURE CONTROL

Temperature controlled crystal plates are available for thermal studies. The resistively heated diamond plate has a temperature range from ambient to 210 °C. The Digital Temperature Controller offers touch-screen operation, and may be used with TempPRO software. Data collection may be initiated as a function of time or temperature with most FTIR spectrometers. For applications requiring sub-ambient temperatures, liquid jacketed plates are available.

APPLICATION

The GladiATR Illuminate diamond ATR is an innovative accessory for monitoring photocuring reactions.



Acrylate photopolymerization spectrum, using 405 nm light. Waterfall plot showing the band change over time. Irradiation began at 19 seconds.

SPECIFICATIONS

ATR Crystal Choices	Diamond
Crystal Plate Mounting	User changeable plates
Crystal Type	Monolithic
Diamond Mounting	Brazed
Crystal Plate Housing	Stainless steel
Angle Of Incidence	45 degrees, nominal
Crystal Dimensions	3.0 mm diameter
Optics	All reflective
Pressure Device	Rotating, continuously variable pressure; click stop at maximum
Digital Force Adapter (option)	Load cell sensor for precise and reproducible pressure control. Attaches directly to GladiATR clamp. Digital readout.
Maximum Pressure	30,000 psi
Sample Access	80 mm, ATR crystal to pressure mount
Spectral Range, Diamond	4000 to 30 cm^{-1} (IR optics dependent)
Liquid Light Guides	Core: 3 mm; Length: 1.2 m
Heating Options	Diamond, 210 °C maximum
Accuracy	+/- 0.5% of set point > 100 °C +/- 0.5° up to 100 °C
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Control	Touch-panel display. PIKE TempPRO software for PC control with unlimited ramps and automated data collection.
Input	100–240 VAC, auto setting, external power supply
Output	4A/24 VDC 100 W maximum
Accessory Dimensions (W X D X H)	140 x 225 x 340 mm (excludes FTIR baseplate and mount)
FTIR Compatibility	Most, specify model and type

PART NUMBER	DESCRIPTION
	Base Optics
026-16XX	GladiATR Illuminate Base Optics
	Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. GladiATR Illuminate Base Optics include purge tubes, purge kit and spectrometer base mount. Liquid light guide sold separately.
	GladiATR Stainless Top *(must select one)*
026-2001	GladiATR Stainless Top
	Note: Stainless top is not required for temperature controlled plates.
	Crystal Plates for GladiATR and Temperature Controller *(must select one or more)*
026-2103	Illuminate Diamond Crystal Plate
026-4123	Illuminate Heated Diamond Crystal Plate, 210 °C
026-4125	Illuminate Liquid Jacketed Diamond Crystal Plate, 210 °C
076-1610	Digital Temperature Control Module
007-0207	PIKE TempPRO Software
	Notes: GladiATR Crystal Plates are pinned-in-place. Changing crystal plates is easy and fast to optimize sampling results.Temperature controller is required for heated crystal plates. If PC control is desired, TempPRO software must be purchased separately. Liquid jacketed crystal plates require customer-provided circulator.
	High-Pressure Clamp for GladiATR Illuminate *(must select for solid or powdered samples)*
026-3020	High-Pressure Clamp
076-6026	Digital Force Adapter for High-Pressure Clamp
	Notes: The High-Pressure Clamp is required for analysis of solids, powders and for use of liquids retainer and/or Digital Force Adapter (Digital Force Adapter may be used with samples at ambient temperature only). Pressure clamp includes a flat tip, a swivel tip and a concave tip.
	GladiATR Illuminate Liquid Light Guides
162-4920	Liquid Light Guide 340-800 nm
162-4922	Liquid Light Guide 420-2000 nm
	Notes: Liquid light guides are 1.2 m long, and have a 3 mm core. Contact us for alternative lengths or light guides themselves.
	GladiATR Sampling Options
026-5014	Flow-Through Attachment, 100 µL
026-5013	Liquids Retainer and Volatiles Cover Set
026-3051	Volatiles Cover
026-5010	Liquids Retainer
	Note: Flow-Through Attachment and Liquids Retainer are compatible with all crystal offerings (High-Pressure Clamp required).