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VariGATR™

The *VariGATR*™ grazing angle ATR accessory is a revolutionary approach to the analysis of monolayers on semiconductor and metallic substrates. The *VariGATR*™ is variable angle, so the incident angle can be optimized for the highest sensitivity with these types of samples. Its specially designed pressure applicator is optimized for delivering good contact between the sample and the Ge ATR crystal. The *VariGATR*™ provides at least an order of magnitude increase in sensitivity relative to grazing angle methods, in addition to the convenience of an easy to use, fully prealigned, horizontal sampling accessory.

APPLICATIONS

- Analysis of monolayers and adsorbed species on semiconductors and metals.
- Rapid, repeatable measurements.



FEATURES

- Convenient horizontal sampling surface.
- Built-in pressure applicator with slip-clutch for reproducible pressure application.
- Continuously variable angle from 60º to 65º allowing optimization for maximum sensitivity.
- Anti-backlash mechanism allows for accurate, reproducible angle selection.
- Mounted Ge ATR crystal.
- Accommodates samples up to 8” in diameter with center-sampling of discs up to 6” in diameter.
- PermaPurge™ for rapid purging of the system.
- Options include:
  - Wire Grid Polarizer for enhanced spectral contrast and orientation studies. Includes slide plate mount.
  - Force sensor with digital read-out for precise measurement of the force applied to achieve contact between the ATR crystal and the sample.
  - Low-torque slip-clutch available.
  - Angular scale viewing aide for large samples.

INCLUDES

- Ge hemispherical ATR crystal.
- Built-in pressure applicator, designed to accommodate large samples.
- Mounting hardware for the specified spectrometer.

ORDERING INFORMATION

	CATALOG NO.
VariGATR™	GAT-V-XXX*

Options and Replacement Parts

Force Sensor with Digital Read-Out, 110V	GAT-V1-FSD
Force Sensor with Digital Read-Out, 220/240V	GAT-V2-FSD
Slip-Clutch, 24 in-oz (169 mN-m)	SLP-CLL
Angular Scale Viewer for Large Samples	GAT-V-VMR
Mounted Ge ATR Crystal	GATR-ATR-J1
VariGATR™ Wire Grid Polarizer (KRS-5 substrate). Includes mount and polarizer	PWD-GATR-XXX*
Wire Grid Polarizer Mount for the *VariGATR*™ (use with PWD Polarizer)	PWC-GATR-XXX*

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The *VariGATR*™ is a single reflection ATR accessory designed for analyzing monolayers and adsorbed species on semiconductor and metallic substrates.

The *VariGATR*™ integrates the theoretical conditions that provide the highest sensitivity to these extremely thin films[1,2,3] in a convenient horizontal ATR sampler. The *VariGATR*™ features a Ge ATR crystal for use from 5000 to 650 cm^{-1}. Its incident angle can be varied from 60º to 65º, making it possible to optimize the angle for any given spectrometer and sample. Its specially integrated Slip-Clutch pressure applicator optimizes contact between the sample and the relatively small active portion of the crystal. For greater sensitivity, a polarizer can be added to the *VariGATR*™ and, for more precise measurements of the force applied to the sample by the pressure applicator, a force sensor with digital read-out is available.

Figures 1 and 2 demonstrate the high sensitivity of the *VariGATR*™ to monolayers. Figure 1 is a spectrum of an organic monolayer on a polished silicon surface. Figure 2 shows the spectrum of a monolayer on a gold-coated glass substrate. Figure 3 shows spectra of a thin film on Si for two different angles. For this particular film, the lower angle was closer to the experimental critical angle and hence provided stronger band intensities.

For sampling versatility, the *VariGATR*™ can also be used to analyze liquids, powders, pastes, and other solids. It is especially useful for samples with intense spectral bands. Such samples might otherwise exhibit too high absorbance or band distortions.

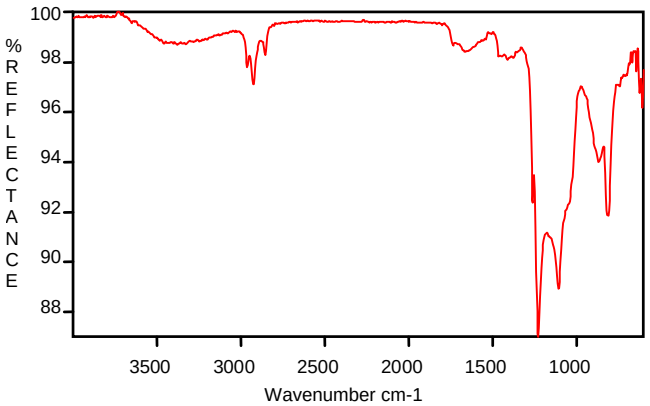


Figure 1. ATR Spectrum of an Organic Monolayer on Silicon, Measured at a 65º Incident Angle.

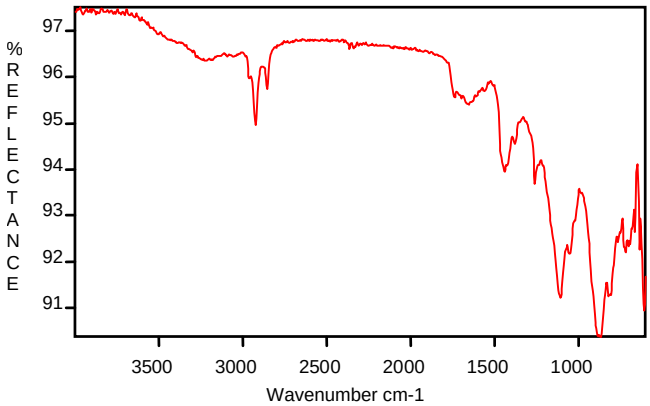


Figure 2. ATR Spectrum of an Organic Monolayer on Gold, Measured at a 65º Incident Angle.

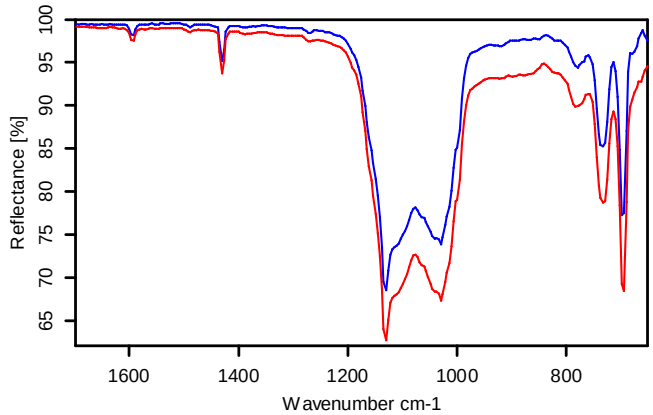


Figure 3. ATR Spectrum of a Thin Film on Si, Measured at Incident Angles of 60˚ (red) and 65˚ (blue).

[1] M. Milosevic and S. L. Berets, '*ATR of Monolayers on Si and Neat Powders by Single Reflection ATR*,' PittCon 2002 invited paper.

[2] M. Milosevic, S. L. Berets, and Y. Fadeev, '*Single Reflection Attenuated Total Reflection of Organic Monolayers on Silicon*', *Appl. Spectros.*, 57 (6), 4724 (2003).

[3] Milan Milosevic, Violet Milosevic, and S. L. Berets, '*Grazing Angle Attenuated Total Reflection Spectroscopy: Fields at the Interface and Source of the Enhancement*', *Appl. Spectros*, 61(5), 530 (2007).

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