

Klarite®

Substrates for Surface Enhanced Raman Spectroscopy



Mesophotonics' Klarite® substrates provide a unique solution for trace level molecular analysis using Surface Enhanced Raman Spectroscopy (SERS).

Raman spectroscopy is growing rapidly as a molecular analysis tool in many industries, providing fast, non-invasive compositional analysis.

However, Raman is relatively insensitive and can be used only for concentrations higher than approximately 1% w/v.

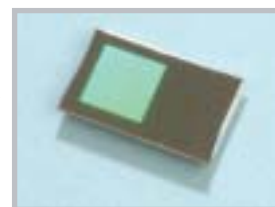
Surface Enhanced Raman Spectroscopy (SERS) can increase the sensitivity by many orders of magnitude, extending the range of Raman measurements to as low as parts-per-billion levels.

Although known for over 30 years, SERS has never been adopted as a routine analytical technique due to the poor reproducibility of the substrates.

Reproducibility is designed into Klarite substrates by using volume manufacturing procedures from the semiconductor industry. Tests have shown that relative standard deviations in signal levels of <10% are achieved with laser excitation at 633nm or 785nm. This includes all variations between different chips without any data selection or filtering.

Klarite substrates feature a systematically designed sub-micron scale patterning of a gold coated silicon surface. Comprising regular arrays of holes, the surface patterns form photonic crystals that control the surface plasmons, which, in turn, govern the SERS amplification. By leveraging its experience in photonic crystal design, Mesophotonics is able to control the surface plasmon effects and thus control the enhancement of the Raman signal.

Unmounted chip showing active area



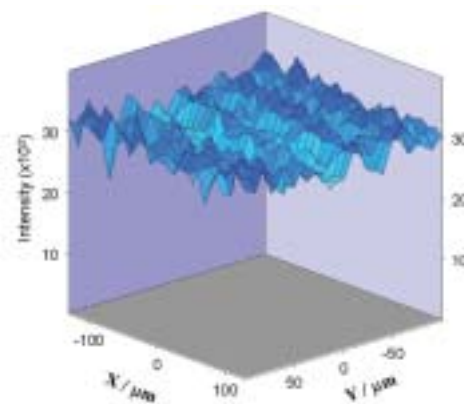
KEY FEATURES

- Exceptional signal reproducibility
- High Raman signal enhancement
- Compatible with standard Raman spectrometers

APPLICATIONS

- Analytical chemistry
- Pharmaceutical drug development
- Forensics
- Medical diagnosis
- Trace analysis
- Homeland security
- Chemical and biological detection

REPRODUCIBLE SERS SIGNAL OVER 200µM X 260µM AREA



Spectra taken with a Raman microscope, 10mW, 785nm excitation confocal configuration, 1s exposure time. Intensity of 1072cm⁻¹ Benzenethiol Raman peak is shown.



Surface Enhanced Raman Spectroscopy

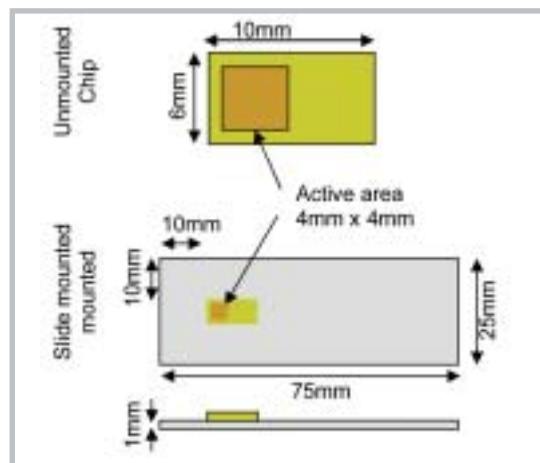


Klarite® Specifications

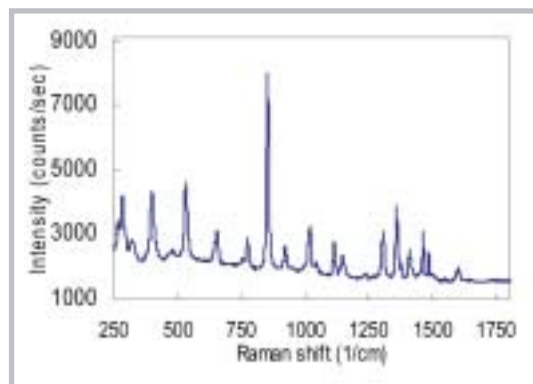
Device Parameters

Klarite SERS*	Slide Mounted	Unmounted Chips
Size (mm)	75 x 25 x 2	6 x 10 x 0.5
Active area	4 mm x 4 mm	
Active surface	Gold coated textured silicon	
Sampling methods	Evaporated from solution Materials that bind to gold can be measured in solution	
Raman excitation parameters	633 nm, 785 nm >5 microns spot size (>100 microns recommended) 2mW per 10 square microns	
Enhancement factor, relative to a non-enhancing surface	>10,000 for most materials >1,000,000 for binding molecules	
Product code	302	303

Chip & Slide Dimensions



Typical Spectrum of 0.5 mM L-Alanine



Ordering Information:

Klarite substrates are supplied in a minimum quantity of 5 units, either premounted on a standard glass microscope slide or as unmounted chips.

Orders may be placed by credit card or company purchase order.

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* patent applied for.

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