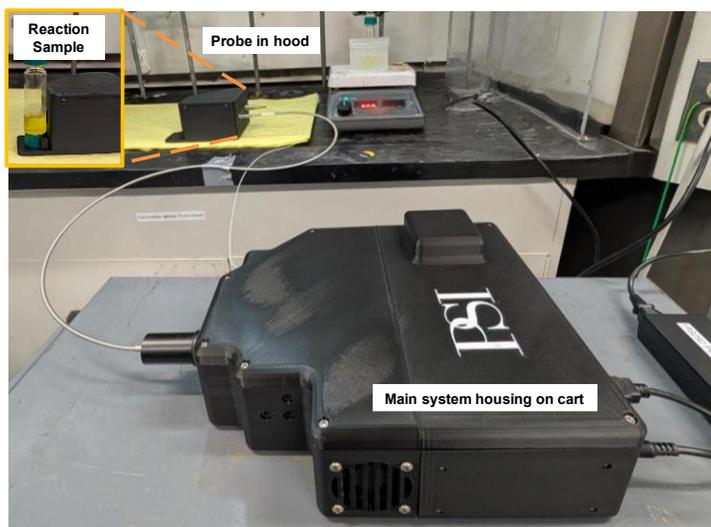


ClearPeak™ Raman System

A compact interferometric Raman spectroscopy system for highly sensitive measurements in university, industrial, and field research laboratories.

The **ClearPeak™** is a portable, small form factor Raman spectroscopy system built around a high-throughput interferometer that delivers exceptional sensitivity and high spectral resolution. The core spectral engine is a Spatial Heterodyne Spectrometer (SHS) that enables simultaneous acquisition of the full spectral range with no moving parts. The **ClearPeak™** architecture provides exceptional mechanical stability and repeatable performance with optical throughput up to 100× higher than conventional slit-based spectrometers at comparable spectral resolution. The increased throughput directly improves signal collection efficiency enabling high spectral SNR, fast integration times and low detection limits for trace components in complex mixtures. **ClearPeak™** is ideally suited for both solid and liquid samples across demanding applications—from real-time process monitoring to rapid material identification. **ClearPeak™** supports a wide range of applications, including bioprocess monitoring, environmental analysis, industrial process control, and defense and security, where real-time, non-contact, through container, and high-sensitivity chemical identification is critical.



ClearPeak™ with the sensor probe in a chemical fume hood interrogating a reaction sample for in-process monitoring. The **ClearPeak™** system includes the excitation laser, optical filters, the sensor probe head with the required optics to switch between a narrow and wide FOV, and acquisition software running on a single board computer equipped with Windows 12.

ADVANTAGES

- **Unmatched Light-Gathering Power:** The absence of a traditional entrance slit allows an SHS to collect up to 100x more photons than dispersive spectrometers.
- **High spectral SNR, fast integration times and low detection limits** for trace components in mixtures.
- **Compact, portable design with a flexible external fiber probe** to enable simple and safe monitoring of chemical reactions inside fume hoods.
- **Capable of wide field of view (FOV)** sampling to enhance signal collection through opaque containers.
- **No moving parts.**
- **Includes everything to work right out of the box.**



ClearPeak™ Specifications

Parameter	Value	
Laser Wavelength	830 nm (785 nm and 532 nm are also available)	
Laser Power at Sample	450 mW max (variable under software control)	
Raman Spectral Range	100 – 1800 cm^{-1}	
Spectral Resolution	13 cm^{-1}	
Etendue	6.5e-3 cm^2sr	
Detector	Sony IMX428 CMOS (-5°C to -10°C)	
Interrogation Area Diameter	<i>Narrow FOV</i> : 1.4 mm	<i>Wide FOV</i> : 14 mm
Illumination Diameter	<i>Narrow FOV</i> : 0.25 mm	<i>Wide FOV</i> : 2 mm
Working Distance	<i>Narrow FOV</i> : 12.5 mm	<i>Wide FOV</i> : 50 mm
Typical Integration Times	1 sec to 60 sec (depends on the chemical target)	
Signal-to-Noise Ratio ^{†‡}	Liquid: 1,500; acetonitrile in quartz cuvette Solid: 1000; polystyrene	
Chemical Container Types	Cuvettes, clear or opaque glass containers, plastic bags, plastic bottles	
Dimensions	Main body: 14×11×4.5 cu. in. Fiber attachment: 5.9×6.4×4.5 cu. in.	
Weight	12 lbs.	
Power	Universal AC single-phase input power; 100-240 V AC; line frequency 50 – 60 Hz; 37 watts (max)	
Laser Safety	Class 3b	

† SNR values measured at 450 mW laser power and 20 sec integration time

‡ The SNR is defined as the ratio of the Raman signal intensity to the noise in an area without a peak. The specified SNR was determined from baseline-subtracted, amplitude-corrected Raman spectra of:

- **Acetonitrile:** the signal is the amplitude of the main acetonitrile Raman feature at 921 cm^{-1} . The noise is given by one standard deviation in the spectral region between 1000 and 1040 cm^{-1} .
- **Polystyrene:** the signal is the amplitude of the main polystyrene Raman feature at 1001 cm^{-1} . The noise is given by one standard deviation in the spectral region between 300 and 340 cm^{-1} .

For more information, please contact Evolve Sensing:

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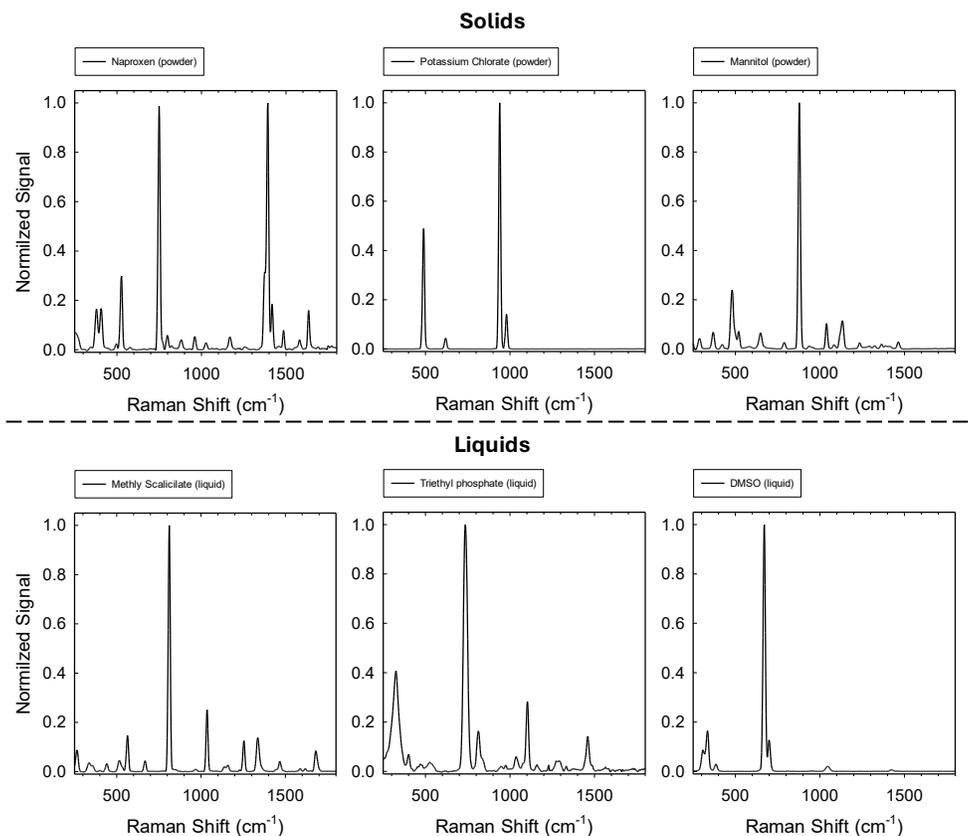
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Example Spectra from the ClearPeak™ System

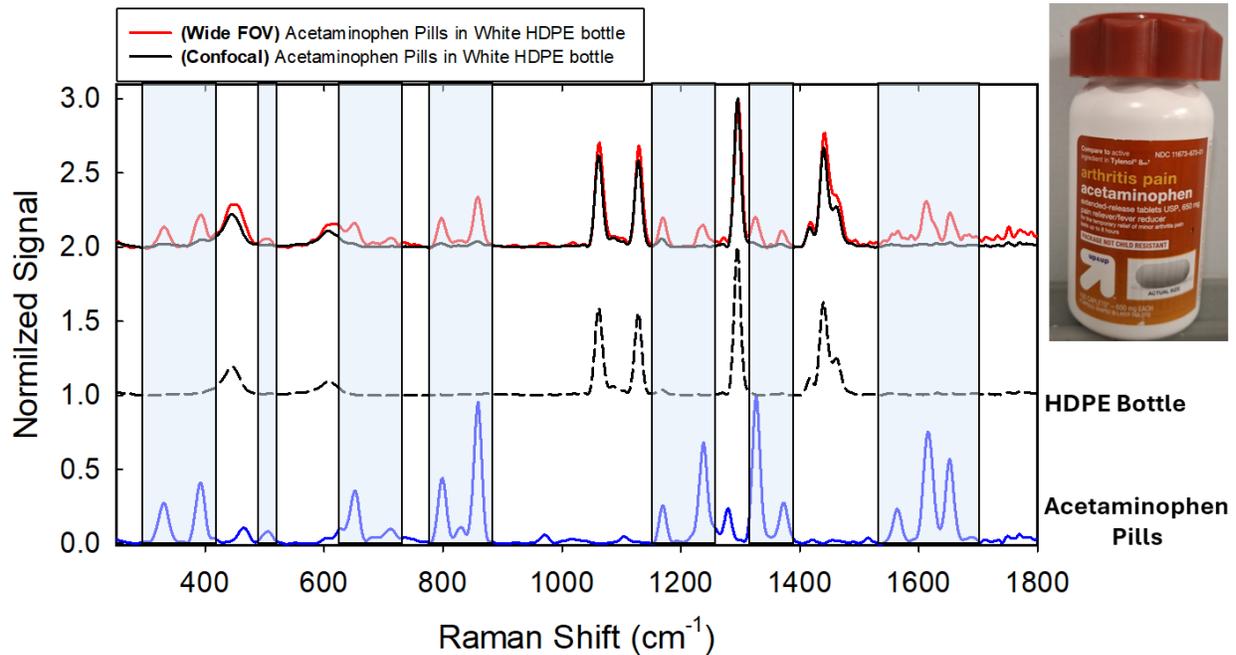
Spectra collected with the narrow FOV sensor probe: The narrow FOV sensor probe is best for solids and liquid samples in cuvettes, reaction glassware, and thin transparent plastic bags (e.g. Ziplock bags). The spectra below were collected with 450 mW of 830 nm excitation. The signal integration time was 20 seconds.



Spectra collected with the wide FOV sensor probe: For solid and liquid samples in translucent, frosted, or white opaque containers, the wide FOV sensor probe is best. In this configuration, Raman photons are collected over an extended spatial region around a central excitation spot resulting in signal acquisition from deeper within containers/barriers. This contrasts with conventional confocal style acquisition where photons are collected from a sub millimeter sized region overlapped with the focused laser excitation spot. This depth enhanced wide field of view (FOV) approach enables penetration through visually opaque containers with performance demonstrated against plastic bottles up to 3 mm thick, as well as paper envelopes.

A representative example is shown below. Specifically, the plot shows two spectra of acetaminophen pills measured through the wall of a white high-density polyethylene (HDPE) brand container using the ClearPeak™ configured for wide FOV signal acquisition (solid red line) and a narrow (confocal) FOV (solid black line). Spectra of pure acetaminophen pills and the HDPE bottle collected with the ClearPeak™ are also plotted. The spectra measured with the systems probe in a confocal configuration is dominated by the HDPE Raman signatures while the spectra measured with the wide FOV probe head has key features of acetaminophen (indicated by vertical lines and transparent boxes).

Example Spectra from the ClearPeak™ System



Measured spectrum of commercially available acetaminophen pills through an HDPE brand container measured with the **ClearPeak™** system. Spectra of pure acetaminophen pills and the HDPE bottle collected with the **ClearPeak™** are also plotted as blue solid and black dashed lines, respectively. Vertical lines and boxes are guides to the eye and denote key acetaminophen spectral features. The spectra were collected with 450 mW of 830 nm excitation. The signal integration time was 20 seconds.



Contact us for more information about the ClearPeak™!

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