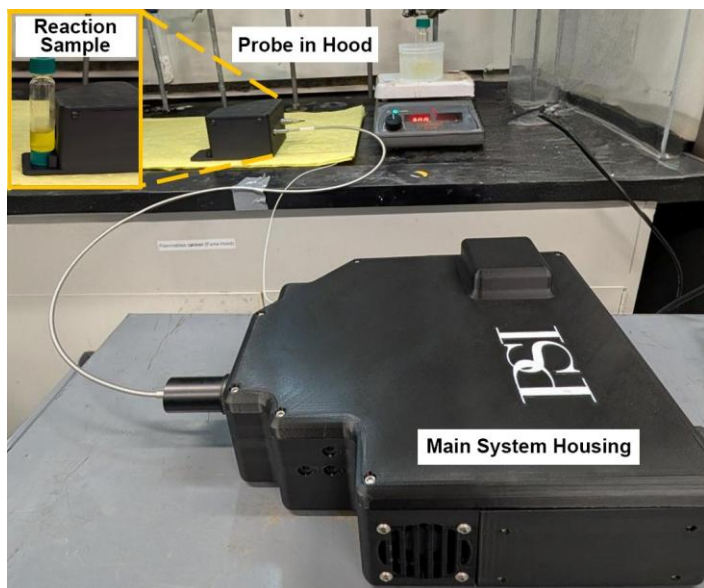
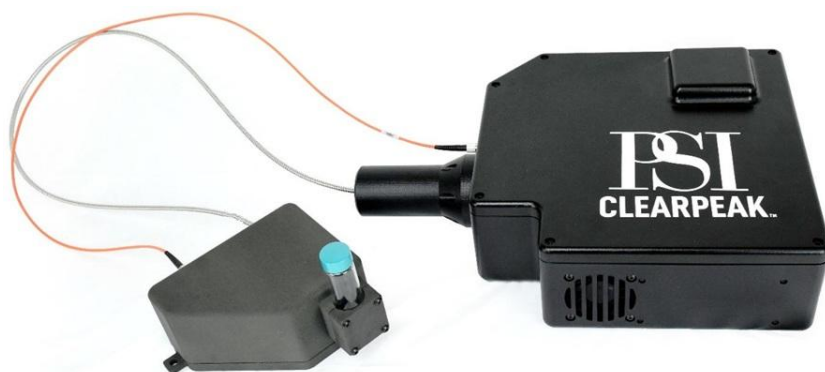


ClearPeak™ Raman System

A compact interferometric Raman spectroscopy system designed for high-sensitivity, low-variance measurements across laboratory and industrial environments.

The **ClearPeak™** is a portable Raman spectroscopy system built around a high-optical-throughput interferometric spectral engine based on Spatial Heterodyne Spectroscopy (SHS), enabling simultaneous acquisition of the full spectral range with no moving parts.

The **ClearPeak™** system includes the excitation laser, optical filters, a 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.



ClearPeak™ with the sensor probe in a chemical fume hood interrogating a reaction sample for in-process monitoring.

ADVANTAGES

- **High Optical Throughput (SHS Architecture):** Up to 100× higher photon collection vs. slit-based systems.
- **Representative Sampling of Heterogeneous Materials:** Reduced microheterogeneity-driven variability in powders, blends, and turbid systems.
- **High Sensitivity and Low Detection Limits:** High spectral SNR supports detection of low-concentration and trace components in complex mixtures.
- **Fast Measurement Speed:** Efficient signal collection enables shorter integration times without sacrificing data quality.
- **Through-Container Measurement Capability:** Wide FOV sampling enables analysis through opaque and scattering containers, including plastic containers up to ~3 mm thick and paper barriers.
- **Compact, Fiber-Coupled Design:** Portable system with flexible probe for in situ measurements (e.g., fume hoods, process lines).
- **Stable Operation:** No moving parts with high mechanical stability for repeatable measurements.
- **Robust and Easy to Deploy:** Fully integrated system ready for immediate operation.

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	10 cm^{-1}	
Etendue	6.5e-3 cm^2sr	
Detector	Sony IMX428 CMOS (-5°C to -10°C)	
Interrogation Area Diameter	Narrow FOV: 1.4 mm	Wide FOV: 14 mm
Illumination Diameter	Narrow FOV: 0.25 mm	Wide FOV: 2 mm
Working Distance	Narrow FOV: 12.5 mm	Wide FOV: 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

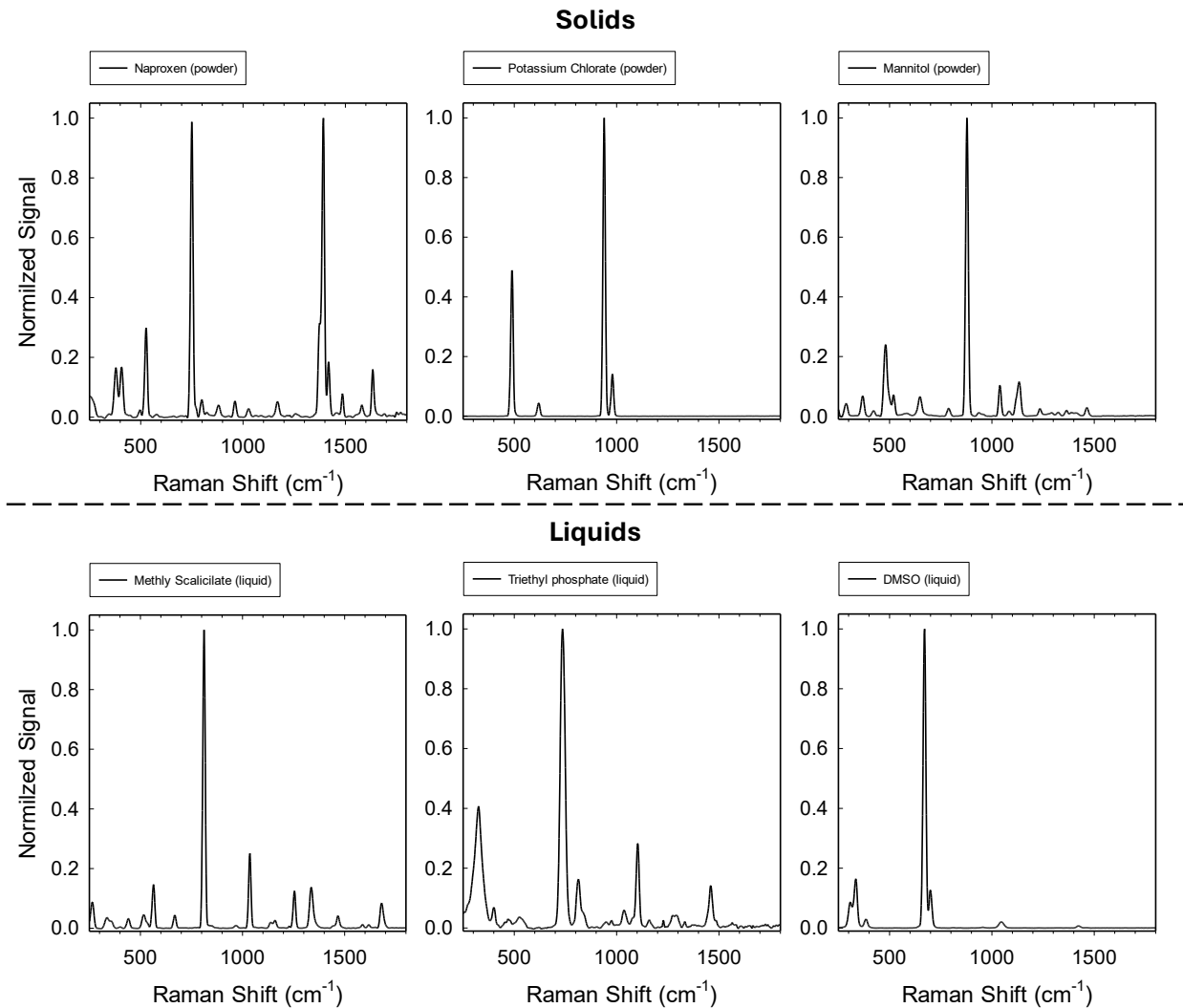
†† The SNR is defined as the ratio of the Raman signal intensity to the noise in an area without a peak. The specified SNR was determined from baseline-subtracted, amplitude-corrected Raman spectra of:

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} .

Example Spectra from the ClearPeak™ System

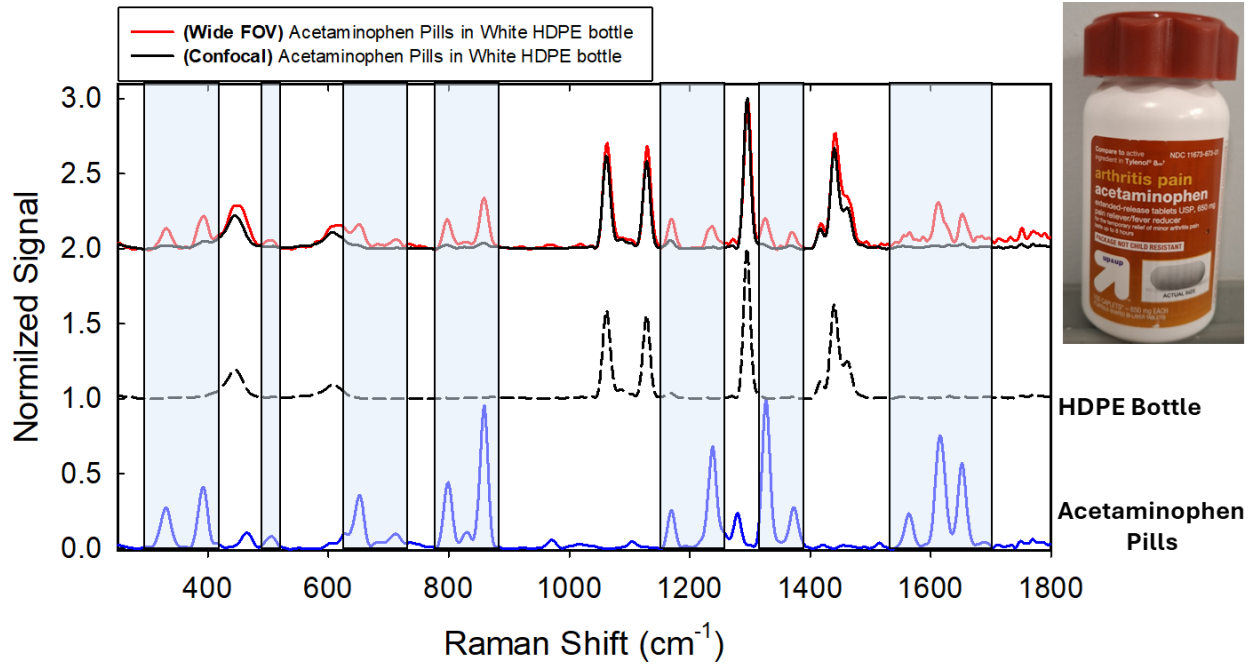
Spectra collected with the narrow FOV sensor probe: The narrow FOV configuration is optimized for localized, high-resolution measurements of solids and liquids in cuvettes, reaction glassware, and transparent containers. Spectra shown below were collected with 450 mW of 830 nm excitation and 20 s integration time.



Spectra collected with the wide FOV sensor probe: For samples in translucent, scattering, or opaque containers, the wide FOV configuration collects Raman signal over an extended spatial region around the excitation spot. This increases the effective interrogation volume compared to conventional confocal collection and enables sampling from deeper within the container. The result is improved signal collection through optically challenging materials and reduced sensitivity to local microheterogeneity. A representative through-container measurement is shown on the next page.

Example Spectra from the ClearPeak™ System

Spectra of acetaminophen tablets were measured through a white HDPE container using wide FOV (red) and confocal (black dashed) configurations.



Measured Raman spectra of commercially available acetaminophen tablets through an HDPE container: Wide FOV (red) and confocal (black dashed) measurements are compared with reference spectra of the tablets (blue) and container (gray). The confocal measurement is dominated by the container contribution, whereas the wide FOV configuration recovers the characteristic Raman features of acetaminophen (highlighted by vertical markers), demonstrating effective through-container Raman measurement. Spectra were collected with 450 mW, 830 nm excitation and 20 s integration time.

Contact us for more information about the ClearPeak™!



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