

Surface-Enhanced Raman Spectroscopy (SERS) Sample Systems

Simple SERS Vials

Trace chemical analysis by Surface-Enhanced Raman Spectroscopy (SERS) is made quick and easy with sample vials containing our patented sol-gel SERS coating(s). A solution containing the chemical of interest is simply placed into the vial, which is then analyzed using a Raman spectrometer.

Raman signals are enhanced in some cases more than 1 million times allowing measurements of sample concentrations as low as 10 ppb!

The measured SER spectrum consists of a wavelength distribution of bands corresponding to molecular vibrations specific to the chemical being analyzed. This allows identification of numerous chemicals, biochemicals and pharmaceuticals.

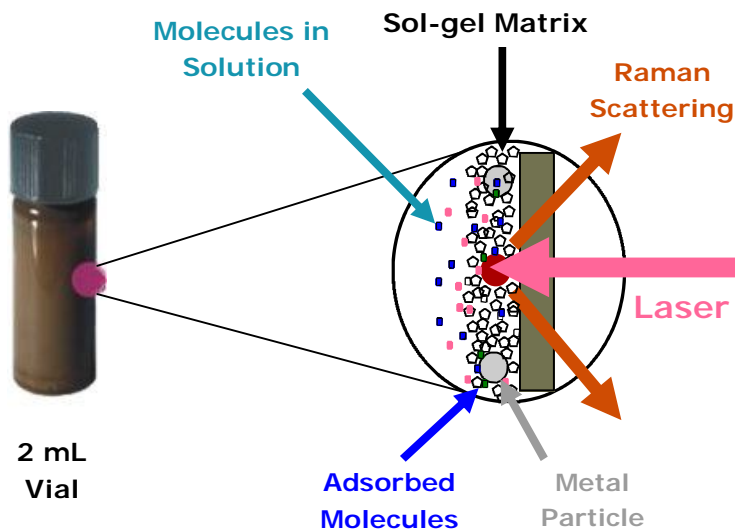
We have successfully measured more than 500 chemicals and biochemicals in various solvents (aqueous and organic). We have also measured both polar and non-polar compounds. The vials can be used with any commercial Raman instruments, regardless of excitation wavelength. The vials are manufactured using very specific conditions and sold in batches of 10 to 100. These manufacturing conditions reproduce film thickness and SERS enhancement allowing repeatable and quantitative measurements. The measured standard deviation for 1ppm Benzoic acid from vial-to-vial in different batches is less than 10%.

Advantages:

- Small sample volumes (mL)
- No sample preparation
- No drying required
- Suitable to multiple solvents
- Suitable to acids or bases
- Suitable to VIS-NIR excitation

Capabilities:

- Signal enhancements of 10^6
- Detection limits: ppb, nM, mg/L
- Fast response time (< 1 sec)
- RSD (vial-to-vial) < 10%
- Long shelf life (> 0.5 year)



Simple SERS vial schematic diagram showing mechanism of SERS

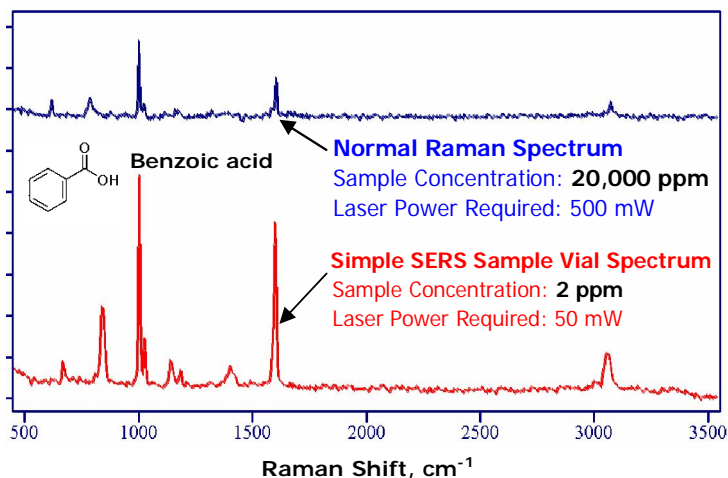


SERS Capillary with syringe for sample introduction.

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SERS Vial Common Applications:

Biochemical:	chemicals of life (amino acids, nucleic acids)
Biomedical:	physiological chemicals in blood and urine
Chemical:	trace component analysis (organics, inorganics, organometallics, etc.)
Drug Enforcement:	trace drug detection on surfaces
Environmental:	contaminants in water (inorganics, pesticides, etc.)
Forensics:	trace drugs in blood and urine
Pharmaceutical:	drug discovery and development (drug and metabolite detection)
R&D:	liquid chromatography detectors



Spectra were collected in 90 seconds using 1064 nm excitation. The Raman signal is enhanced by a factor of 1×10^5 even at this wavelength!

Additional formats and chemistries available:

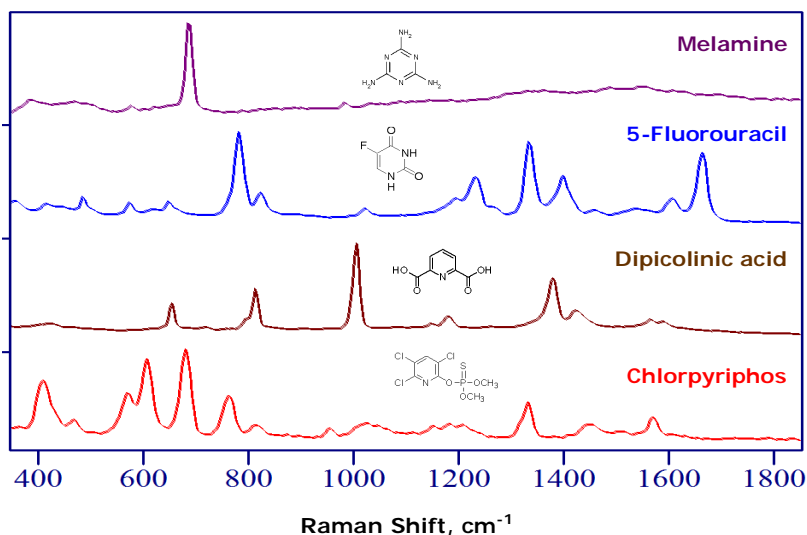
- Capillary tubes
- 96-well plates
- Silver or Gold substrates
- Functionalized substrates
- Custom



Contact Us:

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Application Examples: (top to bottom) Food adulterant, Chemotherapy drug, Bacterial endospore, Pesticide. All measured at or below 1 ppm (60 second analysis time).