

Real-Time Analyzers' **Chemical Residue Detector** can identify trace chemicals on surfaces or in liquid samples in just seconds, *even if they cannot be seen*. This hand-held analyzer (5 lbs) has been designed specifically for operation in the field to support the US Military, Department of Homeland Security, Federal Drug Administration, Drug Enforcement Administration, Forensic & Crime Labs, as well as State and Local Hazardous Materials Response Teams.

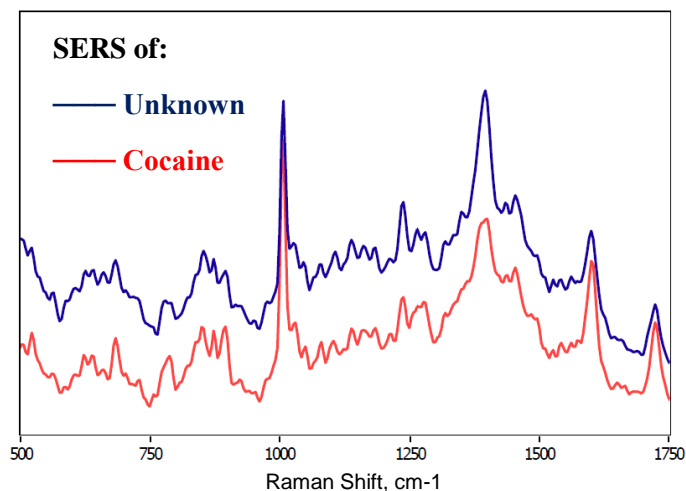
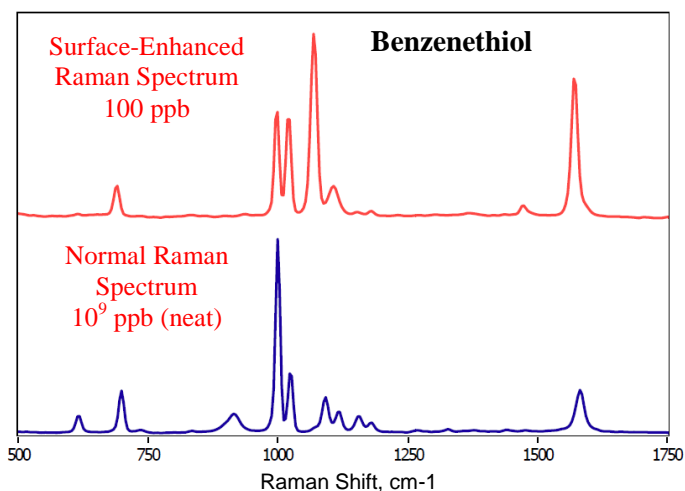
## Residue Identification

**The ability to identify residues on surfaces, even if they cannot be seen, can answer many critical questions.** TNT can be detected and identified on a suspected terrorist's fingertips. Cocaine can be detected and identified on a surface, even when only a residue is apparent. Pesticides can be identified and detected on food surfaces, such as fruits and vegetables. Melamine can be detected and identified in noncompliant food. Pharmaceutical drugs, illegally added to "natural" health supplements, can be detected and identified. For all of these samples, the user simply collects the residue sample using pipettes, swabs, or tape, transfers the sample into one of RTA's **Simple SERS Sample Vials**, places the vial in the **Chemical Residue Detector** sample holder, clicks **Measure Sample** on the computer, and within seconds, the unknown material is identified. No drying is required.



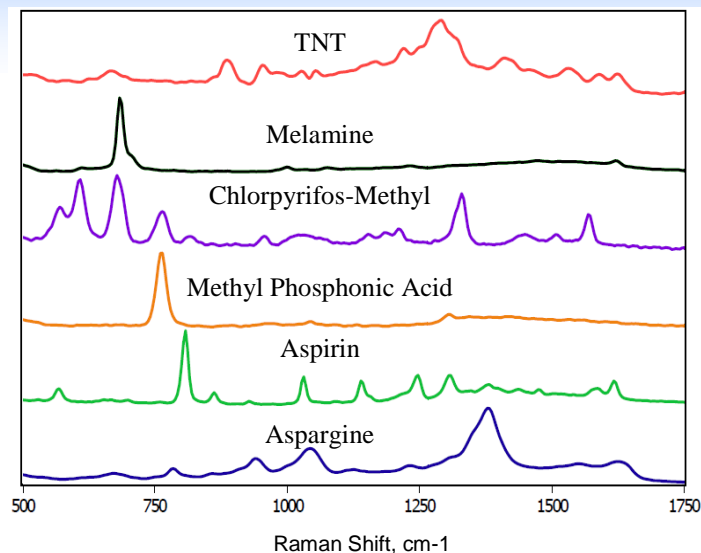
In addition to these applications, trace chemicals in liquids can be analyzed by simply adding them to the vials and measuring their spectra. Examples include poisons in water or trace chemicals (e.g. drug intermediates) in reaction mixtures. With a little sample pre-treatment (e.g. solvent extraction), additional applications can be performed, such as drugs or biochemicals (e.g. amino acids, nucleic acids, biomarkers) in body fluids, or bacteria on surfaces.

The **Chemical Residue Detector** is the first hand-held analyzer that employs surface-enhanced Raman spectroscopy (SERS) to detect and identify trace chemicals in the lab or the field. The patented **Simple SERS Sample Vials** enhance the Raman scattering efficiency of chemicals by a million times or more allowing trace chemical detection (as shown for benzenethiol below). The **Chemical Residue Detector** measures the SERS spectral signature of an unknown sample, matches it to one of hundreds of SERS signatures stored in memory (spectral library), and displays the unknown identity (as shown for cocaine below). Virtually every residue, including chemicals, drugs, explosives, even some biological substances, has a unique Raman signature that allows a positive match, and therefore a positive identification.



## Advantages and Features

- Small Sample mass or volume ( $\mu\text{g}$  or  $\mu\text{L}$ )
- No sample preparation (just add water or solvent)
- Suitable for all common solvents
- No solvent removal by drying required
- Suitable for wide pH ranges
- Signal enhancements of  $10^6$  typical
- Detection limits: ppm and below
- Fast response time (<10 seconds)
- High vial-to-vial reproducibility
- Long shelf life (months)
- Over 300 chemicals measured
- SERS-Active Capillaries also fit Sample Holder



## Specification

## Chemical Residue Detector

### Operation

Warm-up Time	Less than 1 minute
Measurement Time	Less than 1 minute (10 seconds typical)
Sampling	Light-tight compartment for Simple SERS Sample Vials or Capillaries
Calibration	Factory set using NIST standard

### Analyzer

Measurement Principle	Surface-Enhanced Raman Spectroscopy
Light Source	785 nm, 75 mW, 0.1 nm linewidth (Class 1 Laser Product)
Detector	Si CCD
Spectral Resolution	8 - 16 $\text{cm}^{-1}$
Spectral Range	500 - 1750 $\text{cm}^{-1}$

### Data System

Embedded Computer	400MHz, 1GB RAM (7" touch screen)
Operation System	Windows XP
Software	RamanID/ChemID (with 100 spectra initial library)
Data Export	Ethernet/USB/SD/WiFi

### Environment

Dimensions	5x10x3.4" (127x254x86 mm)
Weight	5 lbs (2.25kg)
Power	Battery (2 hours- rechargeable) / Electric (120/240 VAC 50/60Hz)
Carrying Case	Rugged
Sample Kits	Kits contain 25 or 100 pipettes and vials