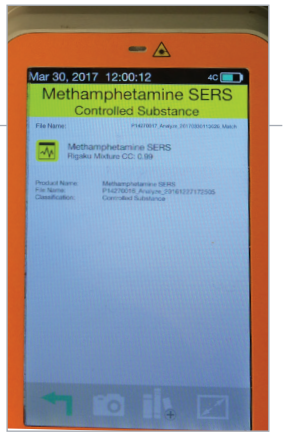
LEADING WITH INNOVATION.

Rigaku Analytical Devices

NARCOTICS IDENTIFICATION USING HANDHELD RAMAN COMBINED WITH SIGNAL ENHANCEMENT KIT

- Expand capabilities with increased Raman signal
- Identify lower concentrated chemicals
- Reduce fluorescence interference

Handheld Raman analyzers provide law enforcement and border protection with a way to immediately identify suspicious substances as narcotics or illegal drugs. Because street drugs are typically contaminated with degration products, impurities, diluents, or even disguised in packaging, this can make identification more difficult. Traditional handheld Raman utilizing 785nm laser excitation is prone to fluorescence interference issues when analyzing samples such as this. Progeny™ ResQ™ handheld Raman utilizes a 1064nm and thus has the expanded capability – without fluorescence interference – to analyze colored substances or through colored packaging, which is more typical of what is found by law enforcement.



Results using the Rigaku Signal Enhancement Kit

SIGNAL ENHANCEMENT KIT OVERVIEW

Another common analysis barrier of Raman spectroscopy is the low concentration level of the active chemical in the sample. To overcome some of the limitations, the Rigaku Signal Enhacement Kit – combined with Progeny ResQ – will provide users with the complete package to properly analyze the toughest sample types. Our Signal Enhancement Kit uniquely uses Surface Enhanced Raman Spectroscopy (SERS) as a Raman technique. This greatly enhances the Raman signal from Raman-active analyte molecules that have been absorbed.

Because SERS spectra do differ in the spectral peaks seen, the building of an external Raman database is needed. The SERS library then needs to be validated against the materials.

EVALUATION OF A SERS SUBSTRATE FOR THE IDENTIFICATION OF NARCOTICS

The Signal Enhancement kit consists of a P-SERS substrate strip (Figure 1). For a liquid sample, dip the silver SERS strip into the sample. Shake to remove excess liquid. Perform the analysis on the strip. For a powder sample, dissolve in appropriate solvent, and follow the same steps as an original liquid sample. For this study, the materials shown in table 1 were analyzed.

It is recommended that the user create a new library specific for SERS' analysis and that the silver anSERS strip is used (Rigaku part #1018534).

Sample	ID on Instrument	CC
Alprazolam SERS	Alprazolam SERS + Diazepam	0.95
Clonazepam SERS	Clonazepam	1
Fentanyl SERS	Fetanyl SERS	0.99
Heroin SERS	Heroin SERS	1
MDMA SERS	MDMA	1

Table 1. Progeny ResQ combined with the Signal Enhancement kit has the ability to analyze even the most difficult street drugs.

Figure 1. P-SERS substrate kit.

CONCLUSION

The combination of the Signal Enhancement Kit with Progeny ResQ provides users with a fast, easy, and accurate method to identifiy chemicals in low concentration levels. The kit procedure consists of just a few simple steps and there is no need to wait for strips to dry, as with other SERS kits available. In addition, Progeny ResQ has the ability to analyze more substances and identify a wider range of drugs.

Abacus ANALYTICAL SYSTEMS GMBH
Abacus Analytical Systems GmbH
Berlin, Germany
+49(0)30 5130132-0
www.abacus-lab.de