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Rapid Identification of Heroin with Handheld Raman

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Introduction

Raman Spectroscopy is a widely adopted tool in forensic analysis for identification and verification of unknown materials. The availability of handheld instruments with libraries of controlled substances, explosives, and a whole range of other materials provides a reliable nondestructive tool for law enforcement and safety and security personnel to identify materials in the course of their work at the time and place where suspect materials are encountered.

The majority of materials are Raman active and show sharp distinctive peaks with Raman, and can be identified by the Raman signature. However, many street samples and real-world samples are dark in color and not pure. The dark color, often due to impurities, gives rise to fluorescence that interferes with the Raman measurement. One method to suppress the fluorescence of a sample and enhance the Raman activity / signal is by the use of Surface-Enhanced Raman Spectroscopy (SERS). Low concentrations of samples are dissolved in a solvent and applied to a SERS substrate which is manufactured with metal nanoparticles that enhance the Raman signal of the molecule of interest.

Heroin (3,6-diacetylmorphine) is a highly Raman active substance that in its pure state, gives a distinct Raman signature. Most heroin seized on the street is not high purity, and may be blended with cutting agents, colorants and even other narcotics, all of which can make it difficult to measure a Raman spectrum without fluorescence. The application of the TacPac SERS in conjunction with the TacticID handheld Raman provides a rapid heroin identification test.

A small amount of the drug is used for the test, which gives an identification results in less than a minute. The user can enter notes with each result, keeping record of the sample, case ID, and other identifying information for traceability. This will be included in the scan report, which is date and time stamped and synchronized to a secure database from which records cannot be modified.

Figure 1: Heroin identification results on TacticID®

The sample is placed in the TacPac adaptor and the measurement is initiated from the touch screen.

Figure 2: SERS test sample placed in TacPac adaptor for measurement.

Figure 3: TacticID Scan Interface

Results are available on the handheld unit, which can be synchronized to a computer for reporting and secure data storage. The reports generated from the database include the results along with the full traceability and user-entered notes for each record.

Additional Resources

TacticID Datasheet
B&W Tek TacticID for Narcotics Identification
B&W Tek Raman Solution Suite for Forensics Applications
The Use of Portable and Handheld Raman Spectroscopy for Forensic Investigations in Raman Technology for Today's Spectroscopists June 2014

If you have any questions about the application or would like to know how Raman would work for your application, please contact us at appnote@bwtek.com or call us at +1 (855) 297-2626 to speak with an expert.

