DeltaNu Application Note

Identification of Illicit White Powders with Mobile Detection Technology

Discover the Raman Advantage!

Illicit drugs come in many different forms. The most common colors and consistencies of a controlled substance are white, off-white, pinkish powders or crystals (Figure 1). A short list of controlled substances that appear in white powdered form includes cocaine, methamphetamine, heroin, phencyclidine (PCP), α-methylfentanyl (AMF), dextromethorphan (DXM), gamma-hydroxybutyric acid (GHB), ketamine, and rohypnol. Many legal cutting agents also occur in a white crystalline or powdered form— such as caffeine, ephedrine, lactose, and cleaning powders. The identification of illegal substances cannot be based with high certainty upon odor or visual appearance. Chemical identification of an unknown substance is mandated by law for an officer to determine probable cause to make an arrest if the suspect has dominion or control of the substance in question.

Figure 1. White powder

Traditional Illicit Drug–Testing Methods

Traditional mobile drug-testing methods utilized by law enforcement are wet chemical testing kits. A kit typically comprises a series of chemical reagents sealed in a glass ampoule or reagent absorbed on a swab for surface-residue testing. A positive test is indicated by a subjective color change. These are destructive, methodical, and discriminatory tests that specify selection of the proper vial or swab for identification of the unknown sample. Raman spectroscopy provides a nondestructive, simple, and rapid test for identifying controlled substances. Until recently, this technology was limited to the laboratory. It is now available for mobile use.

A Modern Illicit Drug–Testing Method

The ReporteR is a lightweight (11 oz) Raman system for presumptive identification of controlled substances (Figure 2). This is a nondestructive test that can be performed on less than 100 mg of material enclosed in a plastic bag or glass vial. Samples can also be measured directly. This method minimizes user contact with seized evidence, and samples can be archived for laboratory testing. This is particularly important if very little sample evidence is captured. Results of each test are displayed onboard the device. Each test is performed in less than 10 seconds by a rapid comparison of the unknown sample to a library of controlled substances stored in the system (Figure 3).

Figure 2. Testing unknown white powder with ReporteR

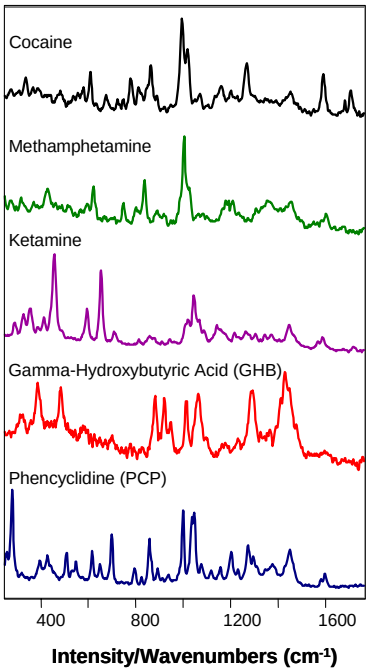

Figure 3. Raman spectra of five illicit drugs

Summary

The ReporteR provides crime scene investigation (CSI) agents and law enforcement personnel a mobile system for presumptive testing of controlled substances. Suspicious white powders can be identified only through molecular identification. This system can also be used to delineate sample evidence at crime scenes to prioritize and minimize samples tested in the laboratory.

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