



A122 Application of the Raman Microscope to Forensic Science: From Trace Elements Analysis to Drug Identification

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After attending this presentation, attendees will have learned about Raman Microscopy in Forensics Applications.

This presentation will impact the forensic science community by providing information about using Raman microscopy in trace element analysis, fibers, and drug identification.

Raman microscopy was developed in the early to mid 1970s for chemical analysis with 1 micron spatial resolution. Early motivation was to identify substances/contaminants that appeared in crime scene evidence and manufactured products. However it was quickly applied to all types of materials analysis. Raman analysis has been recognized to have potential for solving an entire variety of problems of forensic science. However, one of the barriers to exploiting this potential has been the overhead of the technology – the cost of the equipment, its footprint, and the level of skill required for successful use. New Raman microscopes have been introduced at about quarter the cost of larger research systems, and they take up no more lab table space than an ordinary optical microscope. During this presentation, this new equipment will be described, as well as forensic applications including

identification of illicit drugs in their containers, counterfeit currency, fibers, and glitters. In particular, the difference in Raman spectra of Cocaine HCl and Crack (free base) will be shown as well as possibility to identify cocaine in plastic bag or vial will be shown. In an effort to aid law enforcement personnel and the public at large, the ability of Raman spectroscopy to identify a variety of polymers used in fibers has been investigated. "Fingerprints" of nylon 6, Kevlar, poly-styrene, PET, poly-propylene, and some others along with different types of Nylon (nylon 6, nylon 66, nylon 12 and others) will be shown. Using Confocal Raman Microprobe fiber(s) embedded in epoxy were identified. Because of the different fillers, a counterfeit \$20 bill was differentiated from legitimate ones. The entire Raman analysis can be performed in less than five minutes Raman spectra will be presented and method development will be described. It will be shown that commercial software is available that can provide quick identification of materials whose spectra have been collected in a library, or just matched to suspect material samples. **Raman Spectroscopy and Microscopy, Fiber Identification, Drug Identification**