



A81 FT-IR Microprobe Analysis of Suspected Bioterrorism Hoaxes in a Sealed Cell

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After attending this presentation, attendees will obtain knowledge about the interaction of light with barium fluoride in both the visible and mid-IR spectral regions and discover the optimal experimental conditions for collecting quality mid-IR spectra of suspected bioterrorism hoaxes from microscopic samples in a sealed cell.

This presentation will impact the forensic science community by demonstrating the optimal experimental conditions for analyzing suspicious powders in a sealed cell with an FT-IR microprobe.

Bioterrorism hoaxes involving the use of white powder or labels to falsely suggest the use of a biological agent are frequently reported in the United States. Following 9/11 and the subsequent anthrax attacks, hoaxes have increased despite no occurrence of a genuine bioterrorism attack. The FBI and U.S. postal inspectors have responded to thousands of white-powder events and targets have included government offices, U.S. embassies, banks, and news organizations. Consequently, the analysis of suspicious white powders is of critical importance to both homeland security and public safety laboratories.

FT-IR microprobe analysis is a useful tool for the screening and identification of bioterrorism hoax powders. FT-IR spectroscopy can easily differentiate between powdered biological agents and many hoax powders due to the presence of protein in samples that contain biological material. There are two considerable advantages of using an FT-IR microprobe over traditional transmission FT-IR instruments: (1) the small sample size required for analysis; and, (2) the sample is directly viewed with a polarized light microscope with fluorescence capabilities. However, the analyst must be protected from potentially toxic samples, which prompted the development of the sealed cell. Sealed cells consist of an IR-reflective microscope slide with a barium fluoride cover slip attached with an impermeable adhesive, thus enabling the analyst to remain isolated and safe from the sample during FT-IR microprobe analysis. The use of barium fluoride as the cover slip is the best choice of material because of its resistance to chemicals, insolubility in water, and transparency in both the visible and mid-IR regions of the spectrum. However, barium fluoride disperses mid-IR radiation and it is important to understand this dispersive nature in order to maximize results. While the use of a barium fluoride cover slip introduces dispersion effects that are unavoidable, it is possible to adjust instrument settings when analyzing in the reflection-absorption mode of a FT-IR microprobe to almost completely compensate for dispersion and minimize its impact on the quality of the sample spectrum.

FT-IR Microprobe Analysis, Sealed Cell, Bioterrorism Hoaxes