



B159 Classifying Aged Explosives to Determine Source

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After attending this presentation, attendees will understand how explosives recovered over the past 25 years from different regions of the world were characterized so that classification based upon source was achieved. Detection and identification of explosives and their residues are important functions that are routinely performed by forensic scientists in the field and in the laboratory. It has become important to extend the testing of these samples to include methods for determination of sample source. Determination of source may be important from an investigative perspective. This information may also be used in a court of law to classify or even individualize a sample.

This presentation will impact the forensic science community by describing the best method for testing these samples. Methods used to source explosives are different from methods used for identification. This presentation will discuss the methods and analytical approaches used, providing attendees with the background needed to effectively perform this testing in their laboratories.

Sourcing explosives is an important capability. Although identification of the explosive is necessary, in many instances, investigators are aware of the type of explosive used during a bombing very early in an investigation due to various on-scene indicators. In these instances, a more important role of the forensic scientist is to determine the source of the explosive. One way in which sourcing may be achieved is through the detection and identification of physical and chemical markers present in the sample. These markers may provide insight not only about the sample's manufacturing process, but also about the sample's history including source or origin and storage conditions. Determination of individuals or organizations responsible for providing explosives used will allow the investigator to successfully identify, apprehend, and adjudicate responsible parties.

In this study, explosives recovered from various bombings in the 1990s and 2000s were analyzed using various analytical methods. Classifications of these samples based upon chemical and physical markers present in the sample were performed. Taggants and other identifiers present in very low concentration (<0.1%) were detected and identified in samples that were more than 20 years old. Sampling and methods were evaluated and optimized so that a complete characterization and classification of each sample was performed.

The results of this research will be presented. Explosives analyzed include SEMTEX[®], dynamite, C-4, PENTEX[®], tetryl, and DETASHEET[®]. These explosives were from seizures in different regions of the world. Methods including light microscopy, infrared spectroscopy, Raman spectroscopy, and gas chromatography/mass spectrometry will be covered. Method features and limitations will be discussed.

Explosives, Taggants, Sourcing