

PLENARY FORENSIC

FORENSIC APPLICATIONS IN MASS SPECTROMETRY

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Advances in mass spectrometry have led to developments in the forensic analysis of a variety of evidentiary materials. As detection limits improve and techniques permit for better selectivity, the quality of the “evidence” improves. An overview of the advances in organic and inorganic mass spectrometry will be presented covering a number of different forensic applications. Detection and identification of explosives residues and flammable and combustible liquid residues are two examples of organic mass spectrometry applications. Comparisons between Ion Mobility Mass Spectrometry (IMS) and the more selective Ion trap (IT) techniques for the detection and identification of explosives will be presented along with other recent advances in both IMS and IT-MS including the analysis of flammables and explosives by MS-MS. Inductively Coupled Plasma Mass Spectrometry (ICPMS) and Laser Ablation ICPMS have emerged as excellent tools to characterize materials that are commonly found as transfer evidence. Several researchers have demonstrated the utility of elemental analysis of small glass fragments in the association of glass materials found at a crime scene to a known source of the glass in order to associate a person to a particular crime. The multi-element capability and the sensitivity of ICP-MS combined with the simplified sample introduction of laser ablation prior to ion detection provides for an excellent and relatively non-destructive technique for elemental analysis of glass fragments and other types of evidence. Examples of the application and utility of LA-ICP-MS, including the use of high resolution ICP-MS for glass and paint evidence are presented. Additional examples of the potential for the future impact of mass spectrometry in forensic science are also presented.