Laser Ablation
Forensic Tool for the End User

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Laser Ablation in a Forensic Laboratory

- New Wave Research
- 213 nm Nd:YAG Laser
- Connected to a ICP-MS
Advantages of Laser Ablation in Forensic Science Applications

- **Minimal Sample Size and Consumption**
  - Typical minimum sample size of \( \sim 300 \times 300 \times 100 \) microns
  - Approximately 300 ng of sample consumed during analysis

- **Minimal Sample Preparation**

- **Coupled with an ICP-MS system provides rapid multi-element detection**
  - Parts per billion elemental detection limits
  - Currently the most discriminating examination for the elemental profiling of glass evidence
Laser Ablation – Forensic Science
End-User

• Of the approximately 400 Forensic Laboratories in the United States - 12 laboratories have adopted the Laser Ablation-ICMP-MS technique for the elemental analysis of trace evidence
• Types of physical evidence that can be examined using Laser Ablation
  – Glass
  – Paint and Polymers
  – Paper
  – Tapes
  – Inks
• Type of cases examined has included
  – Homicide Cases, Hit and Run Cases, and Burglary Cases
• Research projects conducted by our laboratory
  – Elemental Profiling of Automotive Windshield Glass (NIJ Funded Project)
  – Elemental Profiling of Soda-Lime Container Glass
Laser Ablation and the End-User

Concentration in ppm

- Mn55
- Rb85
- Sr88
- Zr90

#004-KW01 (Known-All Fragments)
#001-LRA05 - (Question)
#002-LRA06A - (Question)
#002-LRA06B - (Question)
#003-DD03A - (Question)
#001-DD03B - (Question)
#001-DD03C - (Question)
Current Status of Laser Ablation in Forensic Science Laboratories

• Drafting an ASTM Guideline for Analysis of Glass by Laser Ablation – ICP-MS

• Elemental Analysis Working Group (EAWG)
  – National Institute of Justice (NIJ) sponsored funding for research in the elemental analysis of forensic evidence
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