



### **B44 Forensic Glass Analysis by LA-ICP-MS: Assessing the Feasibility of Correlating Windshield Composition and Supplier**

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After attending this presentation, attendees will have a statistical context in which to interpret trace elemental data for glass, automotive windshield homogeneity, and population variation and batch consistency will be discussed as well.

This presentation will impact the forensic community and/or humanity by providing practical information as to the typical variation of trace elements in a discrete sample of float glass, a large number of float glass samples and multiple samplings of three float glass manufacturers. With this information, the forensic community can address the question: How individualized is the chemical composition of glass?

This poster will show the potential utility of compositional data in correlating recovered automotive glass fragments to a particular manufacturer. Recently, much attention has turned to the use of chemical analysis in differentiating glass fragments of varying sources, which may appear similar by conventional methods of forensic analysis such as refractive index (RI) measurement. A thorough characterization of chemical composition provides the possibility to discriminate between glasses that do not share a common source, despite a common basic history of manufacture. In particular, the trace elemental profile of glass seems the most discriminating characteristic available to forensic analysts. Trace elemental analysis for this study is accomplished using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS).

Trace elemental data for automotive windshields is presented to show the potential of associating trace elemental profiles and glass manufacturers; this study also provides a statistical basis for associating glasses of similar compositions. This sample type was chosen because information regarding the date and location of manufacture is readily available. Additionally, automotive windshields belong to a class of glass commonly encountered in trace evidence – float glass.

To be addressed in this study is the elemental variability observed: (1) within a single windshield; (2) among windshields produced by a single manufacturing plant; (3) among windshields produced by various manufacturing plants; and, finally, (4) within three sets of float glass manufacturing batch samples. Each impacts the level of discrimination available to forensic glass analysts, and the potential of developing a searchable database of automotive glass compositions. Such a database would greatly aid in the investigations of automobile-involved crimes, where no information can be obtained as to the make and model of the vehicle used in the offense. Of more practical use is the potential for the database to serve in a bookkeeping capacity. As more glass is profiled, the uniqueness of any one profile can be tested.

**Glass Analysis, LA-ICP-MS, Trace Element Profiling**