Forensic Glass Comparison Summary

Maureen Bottrell, a geologist and forensic scientist at the FBI Laboratory released a report in 2009 documenting the background information that ought to be used when comparing glass samples with data. She notes that the vast majority of raw materials used to make glass are derived geologically and that North American glass makers use more than 20 million tons of raw materials annually. All of these materials contain several impurities that result in perceived differences in glass products.

While it is highly unlikely that glass fragments will be found on people unless they have been present at the time glass breaks, glass analysis is of vital importance in forensic science as it allows us to test if the glass fragment is the same as the glass at a crime scene. Bottrell states that physical properties such as color, curvature, fluorescence, thickness, and surface features should first be used to determine if the material fragments are glass. Once we know a sample is glass, Bottrell recommends using optical properties, particle immersion, density, and elemental analysis to differentiate between types of glass. In this study, we focus on optical properties, specifically the refractive index, and elemental analysis to classify whether glass samples came from a window or not.

Since glass is made up of several raw materials and certain elements impart specific properties, we can find out a lot about the glass if we analyze the chemical composition. Glass made on the same manufacturing line over a period of time can often have highly variable properties as mixtures of raw materials can have drastically different chemical compositions.

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