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Neutron activation analysis and X-ray fluorescence analysis of vehicle glasses for forensic purposes

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Vehicle crimes are often associated with the production of glass fragments. Shards found on the crime scene and microfragments attached on suspect clothing are traces available for Law Enforcement Agencies. The refractive index is often used as a parameter for glass profiling. As an additional characterization, chemical composition of glass fragments was studied by instrumental neutron activation analysis and X-ray fluorescence analysis. A set of 75 samples of vehicle glass was procured for the study. The collection included materials with known origin from two vehicle manufacturers in the Czech Republic as well as an arbitrary set of samples from several car brands collected at scrapyards. The combination of the two nuclear analytical methods provided results for more than 33 elements. The distribution of determined values for some elements was rather uniform. However, several elements are promising for forensic applications due to significant differences of their mass fractions in the studied samples (e.g., K, Mn, Se, Rb, Zr, Ce).

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