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Contribution of Raman and Surface Enhanced Raman Spectroscopy (SERS) to the analysis of vehicle headlights: dye(s) characterization

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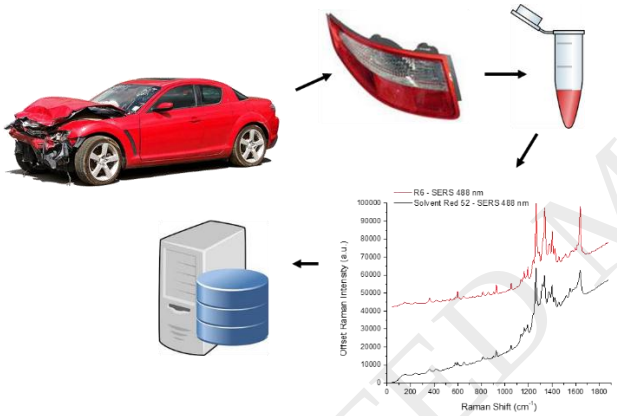

Highlights:

- Analysis of dye composition in colored vehicles headlight
- Sensitive measurement using Surface-Enhanced Raman Spectroscopy
- Extremely good discriminating power 90-100%
- Potential for forensic intelligence in hit-and-run cases

Abstract:

Although ubiquitous on accident scenes, the polymers from headlight optics are often neglected in hit-and-run cases, and their evidential value restrained to direct comparison once a corresponding vehicle is found. Multilayered automotive paint fragments are preferred for their access to corresponding databases (PDQ, EUCAP) to infer models and brands of cars. The potential of polymers headlights for providing forensic intelligence has never been exploited, principally due to the lack of diversity, of appropriate databases, and of case examples. The motives are very simple however. Headlight polymers suffer from a lack of differentiation, and about 90% of them are composed of polymethylmethacrylate (PMMA). The discriminating powers using techniques in sequence typically range from 30-60%.