B108 Environmental and Forensic Application of Isotopic Ratio Mass Spectrometry (IRMS)

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The goal of this presentation is to discuss IRMS and the identification of oils.

This presentation will impact the forensic community and/or humanity by demonstrating the technique which can be used to compare samples on the basis of their isotopic ratio, which is mostly used for lighter elements such as H, C, N, O and S. Through physical, chemical and bio- logical processes, isotopic ratios of these elements can change, introducing interesting features to material batches that can be used in comparison investigations.

Isotope ratio mass spectrometry can be used to compare samples on the basis of their isotopic ratio, which is mostly used for lighter elements such as H, C, N, O and S. Through physical, chemical, and biological processes, isotopic ratios of these elements can change, introducing inter- esting features to material batches that can be used in comparison investi- gations. Forensic scientists work on cases which have a need to establish a firm relationship between a source and spilled product, to identify the inflammables which have been contained in collected residues at the fire scenes of the arson with ones originating from suspects, and to identify engine oil on the victim of a hit and run incident with suspected vehicles'. The results obtained by gas chromatography (GC) and GC-mass spec- trometry (GC/MS) may be ambiguous or misleading because of weathering of the oils. Products such as gasolines, even if heavily weathered through evaporation, will still maintain their original isotopic signature in the weathered residue. In this manner, even though the GC fingerprints of a suspected source and product in the environment will appear very different, the isotopic composition of individual compounds in the two samples will still be able to show whether the samples are related or not. Oil samples from hit and run accident victims would be another application whereby it would be possible to relate oil spots on the victim with oil samples taken from the suspected vehicle through a combination of the isotopes and GC and GC/MS. This paper will present an overview of the techniques used to obtain carbon isotope data (bulk ä13C) for individual samples in gasolines and engine oils. S-oil was distinguished from others (HD and SK) in gaso- lines and engine oils regardless of weathering. Conclusively, this technique will be a powerful tool in particular cases involving a variety of environ- mental and forensic applications.

IRMS, Engine Oil, Identification

 ** Presenting Author*