## C40 Carbon Isotope Ratios of PAHs in Urban Background Soil

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After attending this presentation, attendees will learn a method for comparing and contrasting source samples with low concentration potential background samples

This presentation will impact the forensic community and/or humanity by further refining the source allocation of PAHs in urban environments

A GC/IRMS (gas chromatograph with an isotope ratio mass spectrometer) is capable of measuring the ratio of the two natural isotopes of carbon for individual PAHs in a sample. This method yields a compoundspecific carbon isotope ratio (CSIR). Researchers have noted that the CSIRs of PAHs from different hydrocarbon sources (coal, oil, biomass) are often different. Other studies indicate that the CSIRs of PAHs from refined petroleum products, coal tar products, and vehicle exhaust will also be different because the carbon originated with different coals or oils. Finally, it has been documented that the CSIRs of tars from different MGPs can be reproducibly different and can differ significantly from PAHs from other non-MGP sources. Several dozen surface soil samples from cities across the USA were collected from randomly selected locations and analyzed by GC/IRMS and GC/MS. Some samples were analyzed in duplicate or triplicate to assess variability inherent in the method. In addition to the surface soil samples, a substantially contaminated sample from an MGP site in each city was analyzed for CSIRs. All these surface soil samples contained PAHs in a pyrogenic pattern. The PAH concentrations ranged from about 500 to 50,000 lg/kg total PAHs. Further, all of the samples appeared to be “weathered” with much lower concentrations of 2and 3-ring PAHs than higher molecular weight compounds. The MGP site samples contained tarry residues with PAH concentrations in the many thousands of parts per million. A comparison of the PAH profiles and the CSIR values from these samples show that, for some MGP sites, CSIRs can clearly distinguish between MGP PAHs and general urban background.

**Isotopes, Background, PAHs**

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