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Comprehensive insights into tobacco smoke using TD-GCxGC-TOF MS with tandem ionization

The hazardous constituents of cigarette smoke have attracted considerable attention lately, especially with increasing regulation around the world limiting or banning smoking in public places and even in private cars if children are present. From an analytical perspective, however, there is much that remains to be learnt about the composition of cigarette smoke; because of its high degree of complexity-tobacco smoke is thought to contain thousands of components across multiple chemical classes and wide concentration ranges. Comprehensive two-dimensional gas chromatography (GC×GC), when coupled with time-of-flight mass spectrometry (TOF MS), has been shown to provide improved chemical fingerprinting of complex samples in areas of study as diverse as petrochemical analysis and fragrance profiling. However, commonly-used thermal modulation devices are unable to successfully modulate the most volatile components. In this study, we use thermal desorption (TD) for collection and analysis of whole cigarette emissions, and couple it with flow-modulated GC×GC-TOF MS, to enable the constituents of whole smoke to be routinely and confidently sampled, separated and identified. The use of novel tandem ionization is also harnessed to increase the analytical resolution of the system, by providing both reference-quality 70 eV spectra and soft electron ionization (EI) spectra simultaneously in a single analysis. The complementary soft EI spectra provide a powerful means of identifying compounds that exhibit similar mass spectral characteristics (or extreme fragmentation) at conventional 70 eV energies, but without the inconvenience typically associated with conventional soft ionization techniques.

Biography

Peter J Baugh is currently the Environmental and Food Analysis Special Interest Group Leader for British Mass Spectrometry Society. He has published over 70 papers in a variety of Radiation and Environmental fields and in respected journals.

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