

IONIC LIQUIDS AS GC STATIONARY PHASES IN THE FLAVOUR AND FRAGRANCE FIELD

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Analyses of essential oils and natural fragrances cover a wide range of subjects going from quality control to marker identification and quantitation. The present trend implies that the chromatographic system provides a combination of efficiency and selectivity suitable to give a baseline separation of all markers in a single analytical run. Samples in these fields are, in general, complex and often consist of isomeric components with similar structural and physical characteristics (e.g., mono- and sesquiterpenoids). Isomeric compounds are sometimes difficult to identify because of their similar mass spectra that makes chromatographic data indispensable for their correct identification, and, often challenging to separate with conventional GC stationary phases. A continual search for new stationary phases with different selectivity and with good chromatographic properties, is therefore necessary to obtain separation patterns different from and/or complementary to those currently used based on polysiloxanes and polyethylene glycol. This lecture will explore the potential of IL stationary phases when applied to the GC analysis of essential oils and natural fragrances. Ionic liquids (ILs) as routine stationary phases for GC were commercially introduced in 2010 [1], and have opened new perspectives thanks to their peculiar and uncommon selectivity different from that of the above stationary phases used in routine. In 2016, the second generation of highly inert columns was commercialized: they afforded to overcome some problems of inertness with polar analytes emphasized from those of the first generation [2]. At the same time, a set of fully-water-compatible ionic-liquid (IL)-based GC capillary columns especially dedicated to the analysis of water was made commercially available [3]. Their use was very recently extended to the analysis of fragrances and products deriving from essential oils where water or ethanol/water are the main solvent. The second part of this lecture will deal with the application of two new groups of IL derivatives very recently proposed as GC stationary phases of high interest for the flavor and fragrance field. The first IL group is based on phosphonium cation combined with different anions [4], while the second one consists of metal-containing ILs (MCILs) [5]. In particular, the latter are based on trihexyl (tetradecyl)phosphonium cation and functionalized acetylacetonate ligands chelated to Manganese (II) and Dysprosium (III)

References

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