APPLICATION NOTE

Specific Separation for POPs Analysis using BPX90

INTRODUCTION

The analysis of persistent organic pollutants (POPs) using gas chromatography is demanding, and the use of complementary phases can offer benefits to complete separation. The use of highly polar phases is particularly interesting as their retention mechanism is orthogonal to other phases which can provide specific separation for POPs, and simultaneously generate an additional set of confirmatory data for identification purposes. Laboratories have always employed the use of a second column to confirm identification for analytes which frequently co-elute. Thus there is still a need for a column which can provide specific separation for complex samples such as those in POPs analyses.

An example is presented that highlights the enhanced separation for a specific POPs analysis that suffers from co-elution problems.

Complete analysis of polyhalogenated aromatics compounds such as PCBs, PBDEs, PCDFs and dioxins requires a high degree of resolution for congener mixes, and HT8 is the column of choice in many POPs applications for its unique selectivity. BPX90 is a thermally stable phase that offers complementary separation based on π-π interactions which can yield quite different separations.

RESULTS

Selectivity for pesticides and thiophosphate esters using columns of varying polarity is illustrated in Figure 1. Polar phase separation of thiophosphate esters shows a reversal of elution order for chlorpyrifos ethyl and methyl showing that BPX90 separation is dominated by π-π mediated rather than boiling point based separations. Steric hindrance of π-bonds and steric volume can contribute to separation using BPX90. The unique characteristics of BPX90 allow separation based on differences in aromatic electron density caused by different functional groups.

Other examples where BPX90 is used to resolve co-eluted analytes includes separation of HCCH isomers and HCB, mevinphos isomers and PAHs (1, 2).

Phase chemistry is an important consideration in selecting a GC column for both single and two-dimensional applications and BPX90 has demonstrated it is a highly polar phase that offers useful separations in its own right but also makes it an ideal complement to BPX5 or HT8 for POPs analysis.

REFERENCE

(1) Improving the selectivity of Analysis using Highly Polar Phases
(http://www.sge.com/documents/applications-information/posters#dioxin2005)

(2) Applications using Highly Polar Phases
(http://www.sge.com/documents/applications-information/posters#dioxin2005)

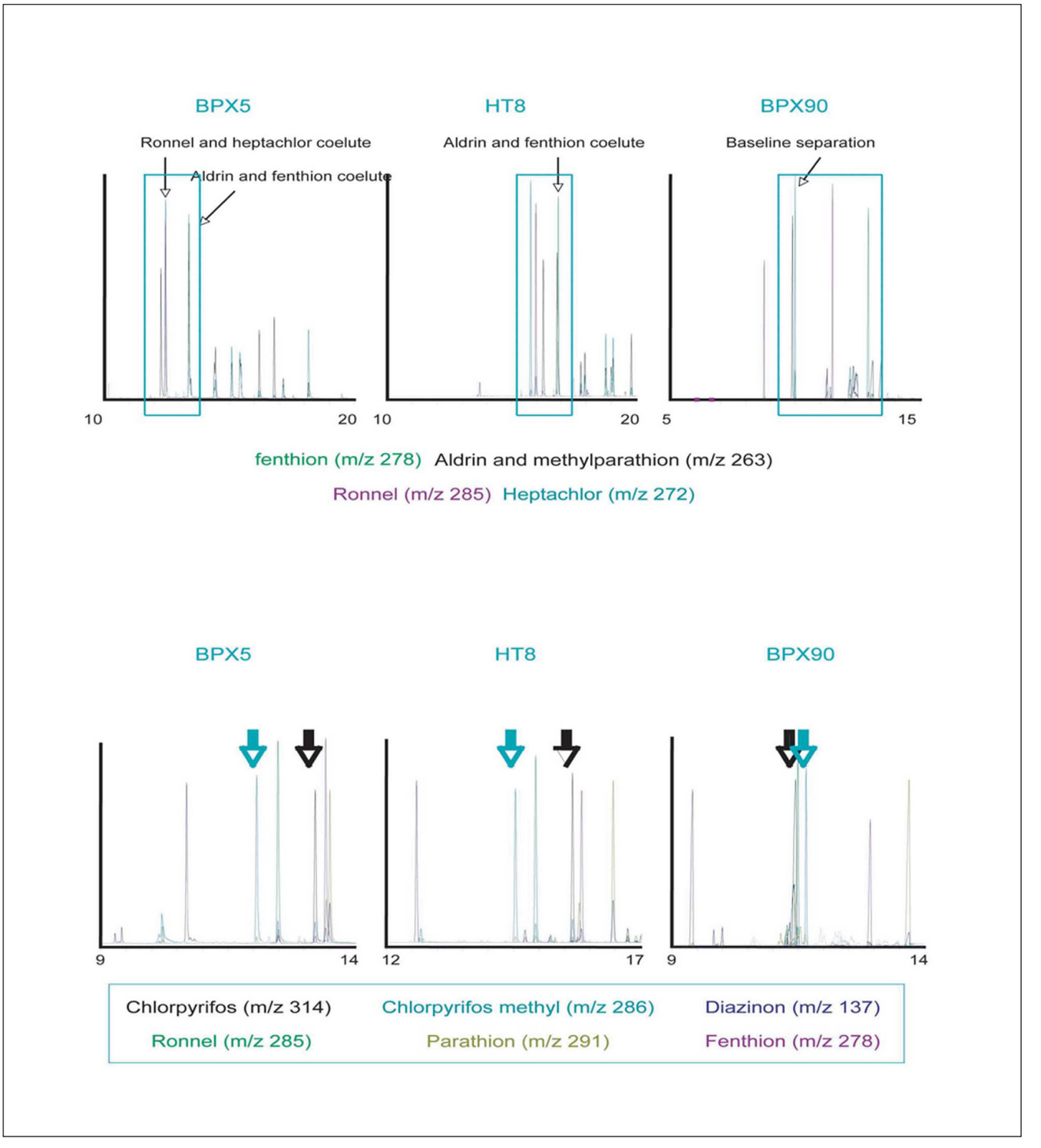

Figure 1. Comparison of selectivity for pesticides and thiophosphate esters