SPDE and SPME

Comparison of Volatile Compounds in Water

SPDE with cooled needle and SPME - both with cold trap

EXPERIMENT AND INTERPRETATION

SPDE and SPME work without extraction solvents and enable automated extraction and desorption. The enrichment of volatile organic compounds (VOC) from an EPA standard mixture: SPDE with cooled needle and SPME is compared. Both methods use a cold trap for focusing prior to chromatographic separation.

The SPDE Extraction Cooler allows the needle to cool down to -25°C. The compounds investigated belong to the substance programme of EPA Method 524.2 for surface, ground and drinking water. The focus is on highly volatile components such as vinyl chloride and chloroethane.

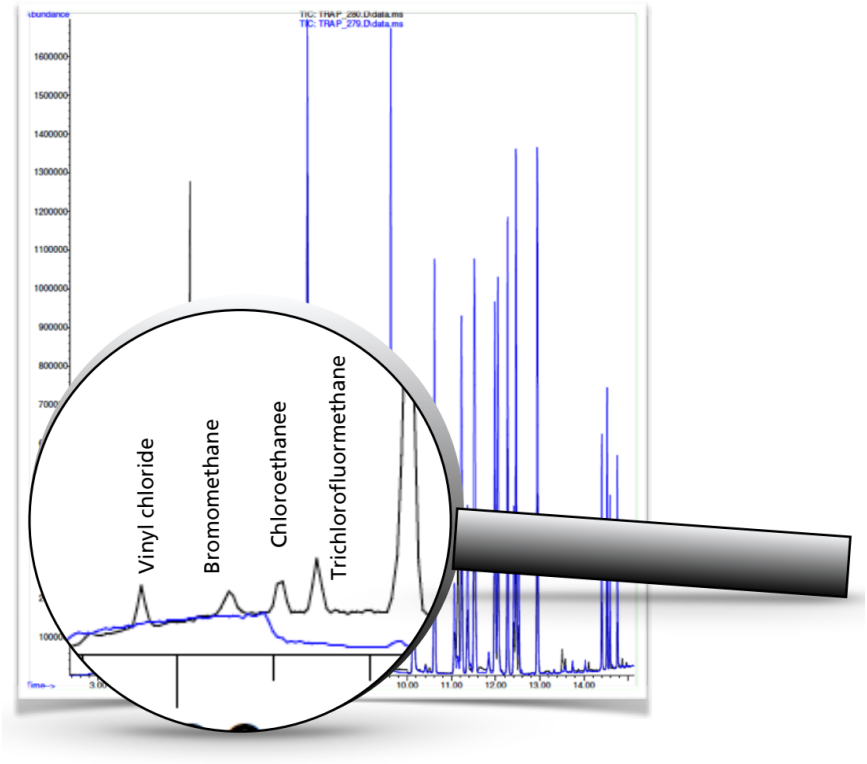


FIG. 1: Total ion stream (TIC) of the EPA-VOC standard mixture. SPDE black, SPME blue; both methods with cold trap. The magnification shows the area of the early eluting compounds.

The following figures compare selected ion traces. Comparison: 16.02.2015.

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Highly volatile compounds

SPDE black · SPME blue · both with cold trap

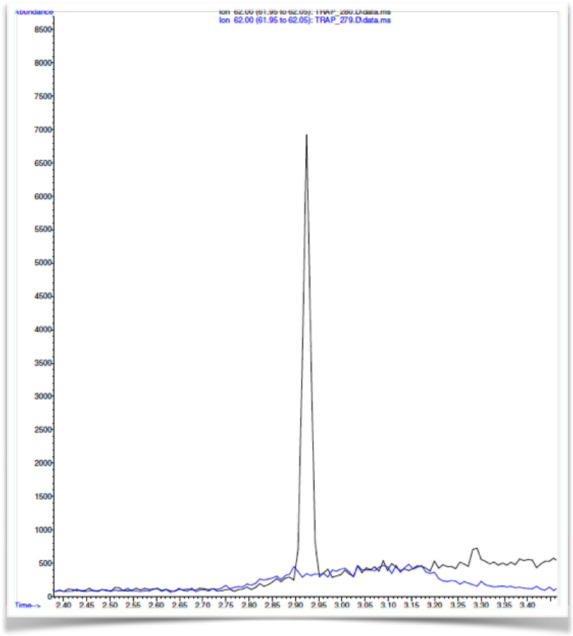


FIG. 2 shows vinyl chloride, extracted ion trace m/z 62 .

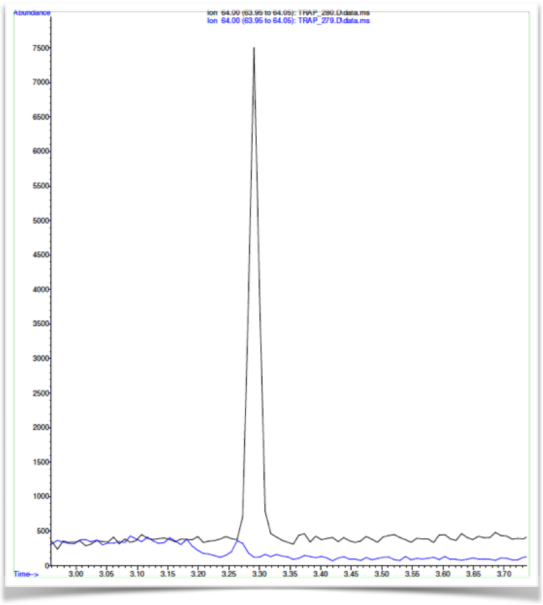


FIG. 3: Chlorethane, extracted ion trace m/z 64.

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Further comparison signals

SPDE black · SPME blue · both with cold trap

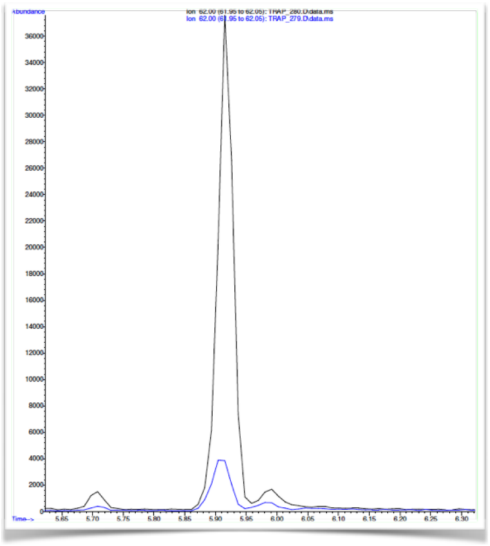


FIG. 4: 1,2-dichloroethane, extracted ion trace m/z 62.

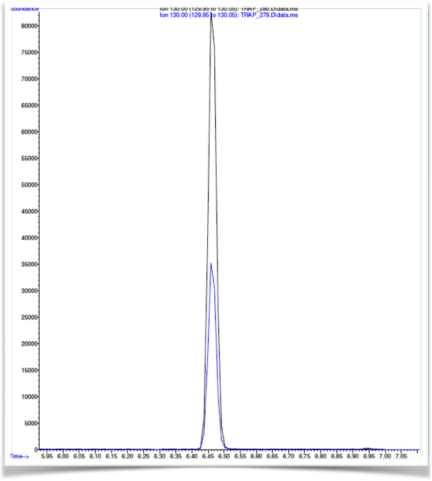


FIG. 5: trichloroethene, extracted ion trace m/z 130.

Result: SPDE with cooled needle delivers significantly higher signals for several readily volatile compounds than the SPME version used in the standard mixture under investigation. Vinyl chloride and chloroethane, in particular, can thus be enriched effectively. The results apply to the compared configurations and measurement conditions.

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