

SPDE Extraction Cooler



Both SPDE as well as SPME represent solvent-free extraction techniques having gained wide acceptance for many years in routine operation, enforced by the advantage of fully automated extraction and desorption steps.

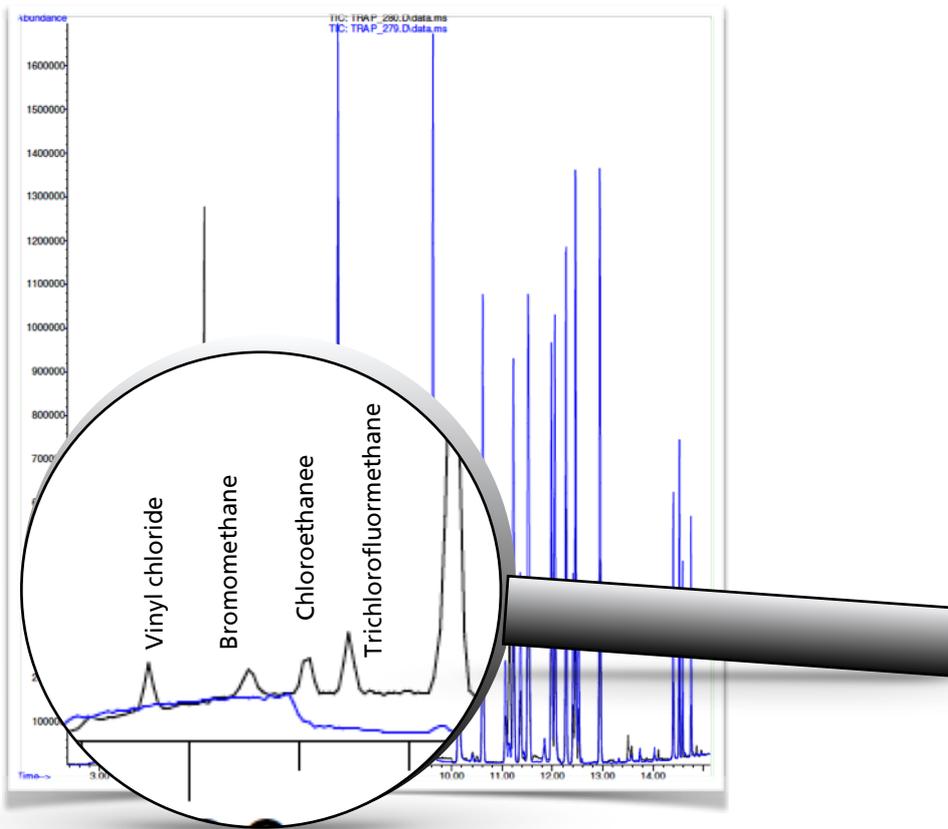
Both techniques are suitable for the extraction of volatile and semi-volatile compounds, from headspace as well as directly out of the liquid phase of the sample.

The SPDE technique also offers the unique opportunity of cooling the SPDE needle (down to $-25\text{ }^{\circ}\text{C}$) and thus also allows the

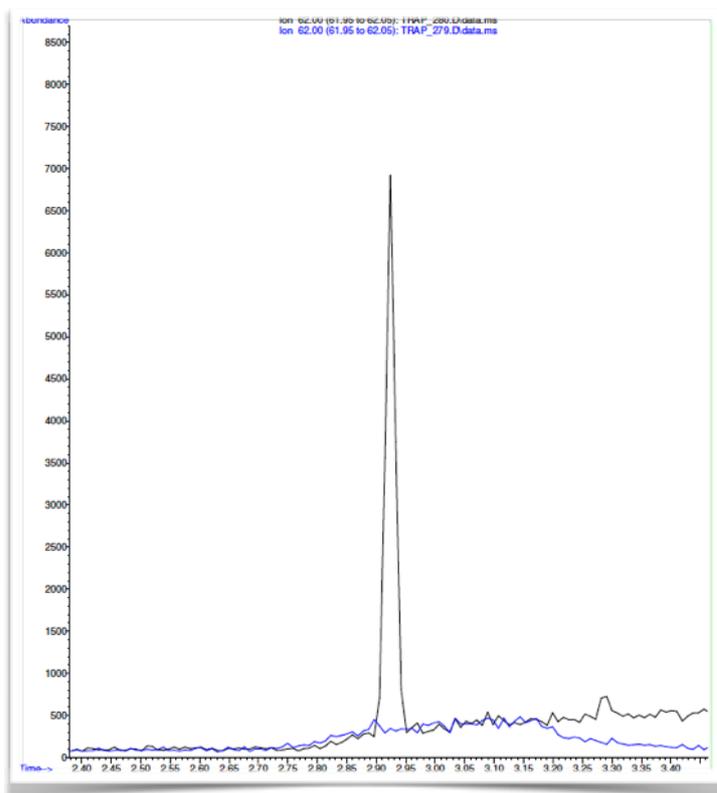
extraction of very volatile , difficult or impossible to be detected by SPME analytes , such as Vinyl chloride, chloroethane, MTBE etc.

To improve the chromatographic peak shape , especially for the above-mentioned extremely volatile components the method of cryofocussing with a "cold trap" is recommended, which found its use in the context of this analytical comparison for both techniques, SPDE and SPME. This results in narrow bands ("peaks") especially in the early eluting compound area of the chromatographic run.

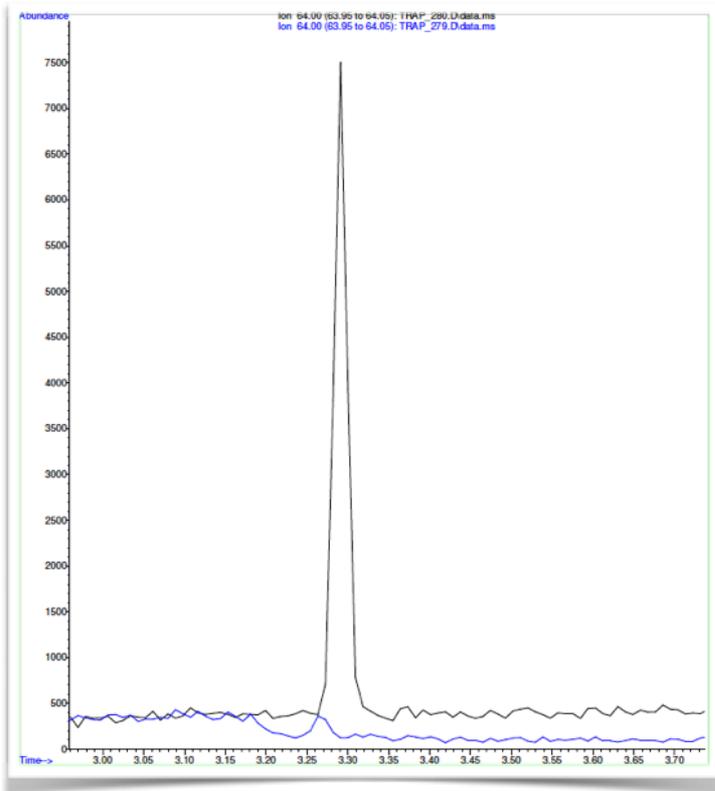
The following pictures show extracted ion traces of selected substances for the purpose of VOC analysis of the examination catalog according to EPA method 524. US EPA Method 524.2 provides a general purpose method for the identification and simultaneous measurement of volatile organic compounds in surface water, ground water, and drinking water. When combining the SPDE technique with the SPDE Extraction Cooler it is obvious that especially in the range of the highly volatile , low-boiling components, significant advantages in terms of extraction assets. Some substances are recognized only to the SPDE technique and cooled SPDE needle!



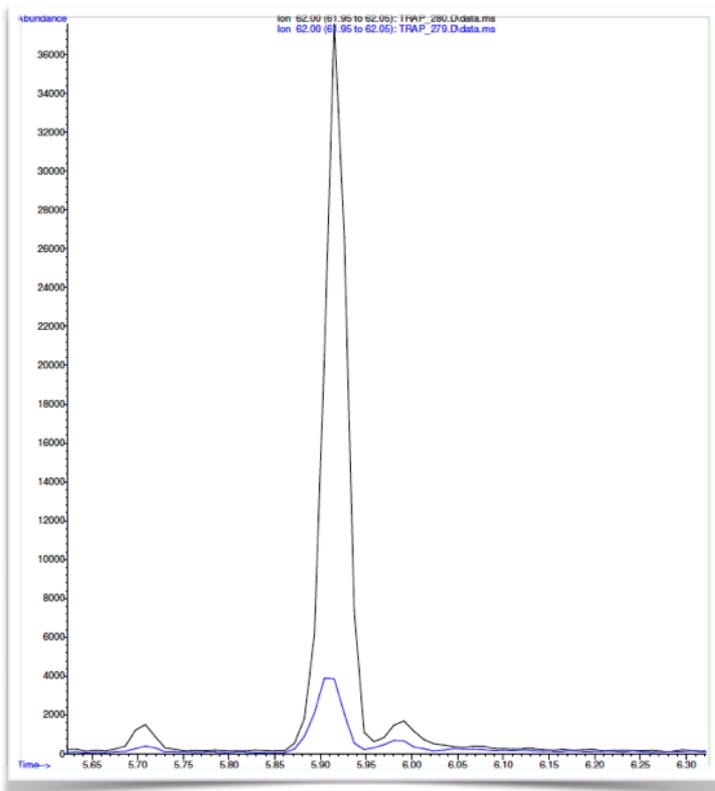
Picture 1: SPDE (black) vs. SPME (blue) comparison, both using a cold trap; EPA VOC STD-Mix (), TIC



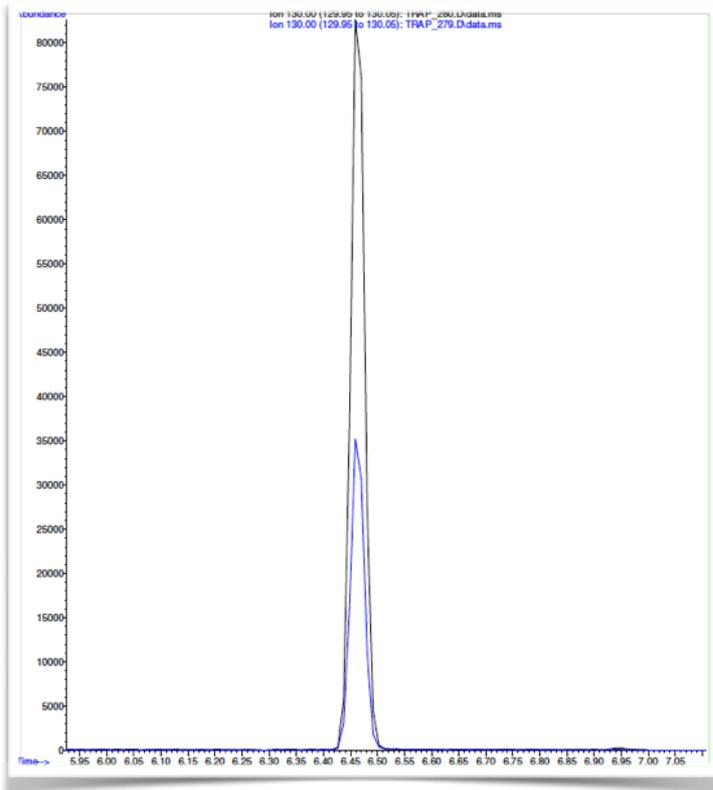
Picture 2: SPDE (black) vs. SPME (blue), Vinyl chloride, extracted ion m/z 62,



Picture 3: SPDE (black) vs. SPME (blue), chloroethane, extracted ion m/z 64



Picture 4: SPDE (black) vs. SPME (blue), 1,2-Dichloroethane, extracted ion m/z 62



Picture 5: SPDE (black) vs. SPME (blue), Trichloroethene, extracted ion m/z 130

Conclusion: The chromatograms above make clear how the SPDE syringe needle cooled by a Peltier element also allows the enrichment/extraction of such highly volatile compounds that are poorly or not at all captured with the SPME technique.