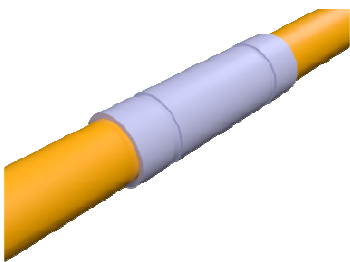


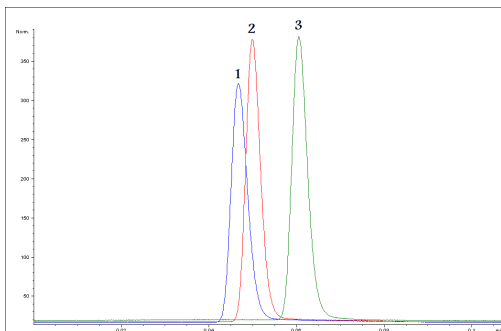
The Melfit technology applied to GCxGC: connections in the second dimension



In GCxGC the modulated second-dimension peaks are extremely narrow, typical widths at the baseline are in the range of 50–600 ms. This is due to the fact that the peaks are focused and re-injected very rapidly onto the second column by the modulator as a narrow pulse. Furthermore, the second-dimension separation is performed very fast on narrow and very short columns. Consequently, to install a connection after the modulator is a highly critical operation. The addition of a minimal dead volume can already lead to the loss of the analytical performance in the second dimension. Using small internal diameter glass tubes, it is now possible to make Melfit™ connections in the second dimension column which do not add any dead volume to the system.

1. Dead volume test in 1D

GC column: VARIAN CP-Wax (length 2 m, i.d. 0.1 mm, film thickness 0.2 μm), Inlet pressure: 0.5 bar, Test compound: methane at 45°C (isothermal).



1: No connections, 2: 1 Melfit, 3: 4 Melfits

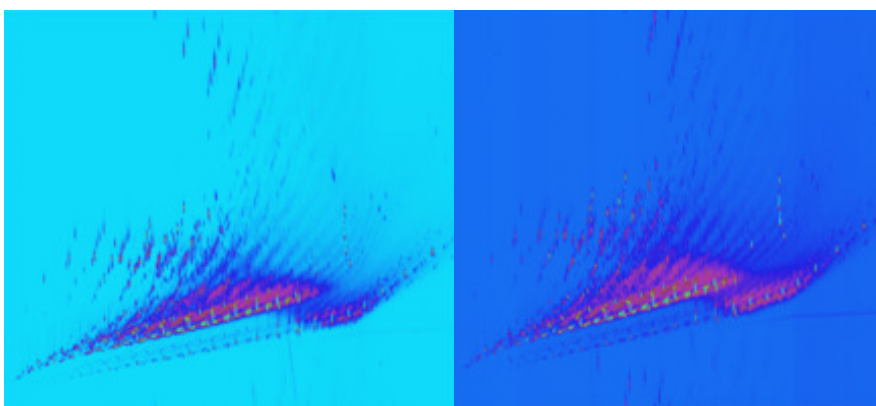
Asymmetry factor (at 10% height) and band width (n = 5)

# of Melfits	Asymmetry factor (-)	Peak width 50% height (sec)
0	1.32	0.22
1	1.32	0.23
4	1.34	0.23

2. Dead volume test in 2D

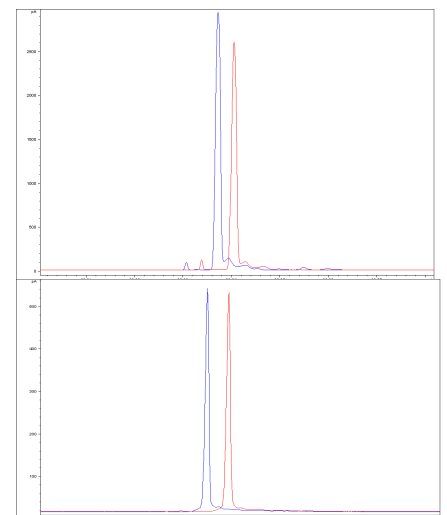
Column set: Supelco SPB-1 (15 m, i.d. 0.25 mm, film thickness 1 μm), Varian CP-Wax (2 m, i.d. 0.1 mm, film thickness 0.2 μm), Inlet pressure: 1.5 bar, Oven temperature program: 45°C (2 min) to 250 °C (20 min) at 3°C/min, Modulation time: 6 seconds, Test sample: diesel fuel.

2D chromatograms:



Left: No connections, Right: 1 Melfit in the 2nd dimension.

Second-dimension peaks:



Blue: No connections, Red: 1 Melfit in the 2nd dimension.