

CHARACTERISATION OF MULTICAPILLARY GAS CHROMATOGRAPHY WITH A JET SEPARATOR INTERFACE TO ORTHOGONAL ACCELERATION TIME-OF-FLIGHT MASS SPECTROMETER FOR FAST ANALYSIS OF VOLATILE ORGANIC COMPOUNDS

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A fast GC/TOFMS analytical instrument for volatile organic compounds (VOCs) is being developed to exploit new multicapillary column (MCC) technology.^{1,2} The 1 m long MCC comprises a 'bundle' of 900 capillaries each with a diameter of 40 μ m (id) and a phase thickness of 0.2 μ m (Figure 1). The columns have higher capacity than conventional capillary columns and they work in parallel to maintain high efficiency across a broad flow-rate range. Therefore, high carrier gas flow rates (e.g., 30-40 mL/min) can be used to separate 17 VOCs in less than 4 minutes. At these analysis speeds a conventional scanning mass spectrometer cannot keep up with the chromatography and this leads to insufficient spectra across chromatographic peaks and skewed mass spectra. Thus TOFMS is a more suitable choice of mass analyser. However the high flow rates required for the fast analysis are not compatible with direct GC/MS interfaces because of the limits of the throughput of the ion-source vacuum pump. Based on earlier published work³, an all-metal jet separator has been constructed to reduce the carrier gas flow to the ion source of a linear 1.5m drift region oa-TOFMS⁴ without drastically reducing the transfer efficiency of VOCs to the ion source. Preliminary results indicate an optimum gap distance of 200 μ m for the enrichment of chloroform and carbon tetrachloride. This paper will present the latest results in the performance of the fast GC/MS configuration.

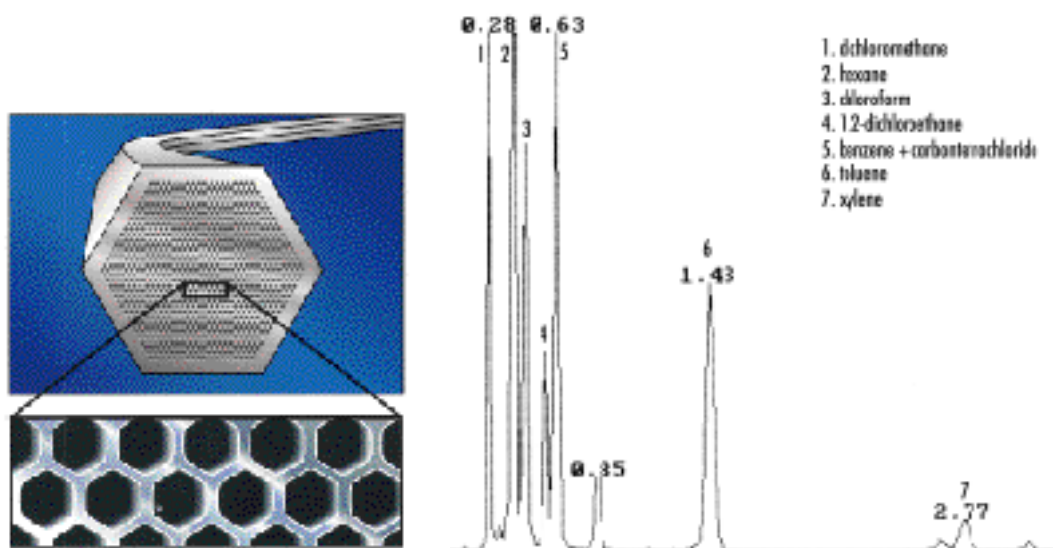


Figure 1

1. "Bringing Speed to Gas Chromatography", Alltech Bulletin #328, **1995**, Alltech Associates Sydney.
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A copy of this presentation is available at:

<http://www.chem.unsw.edu.au/research/AnalyticalMassSpec/>