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TuP-06

HIGH SPEED GC/MS WITH NARROW BORE CAPILLARY COLUMNS AND ORTHOGONAL ACCELERATION TOFMS

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The demand for faster analyses and increased sample throughput has increased interest in narrow-bore columns to obtain high chromatographic resolving power and/or fast separation efficiency. Unfortunately, injection systems able to produce narrow input bands compatible with narrow-bore columns introduce very small sample volumes onto the column. For this reason, the minimum detectable amount (MDA) is far too high for many practical applications.

The advantage of coupling narrow-bore GC columns to MS is that the subatmospheric outlet pressures used with mass spectrometric detection results in a significant increase in the optimum carrier gas velocity, permitting faster analysis. In order to properly reconstruct the chromatographic separation and to keep mass discrimination effects within acceptable limits, the scanning speed of the mass spectrometer must be increased proportionally to the increase speed of analysis, affordable by the reduction of the column inner diameter. Scanning mass spectrometers, being limited to about 5 spectra per second) cannot follow chromatography at the high speeds offered by the narrow-bore GC/MS configuration. TOFMS is a non-scanning alternative analyser with the potential to record 100 or more spectra per second with higher sensitivity than scanning instruments.

In this work, the combination of high-speed narrow-bore capillary gas chromatography with an orthogonal acceleration time-of-flight (OA-TOF) MS is evaluated. Special attention is paid to the scan speed. Also, the quality of the mass spectra and the mass resolution have been studied. The performance of the GC/MS system is demonstrated by an fast chromatographic separation.
