

TOWARDS SEPARATION OF TEN THOUSAND COMPOUNDS WITH COMPREHENSIVE MULTIDIMENSIONAL GAS

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Multidimensional gas chromatography (MDGC) is a high-performance separation technique with enhanced peak capacity for analysis of multi-component samples such as petroleum, essential oils, food, beverages, pharmaceutical and environmental. Hyphenation with mass spectrometry (MS) provides high confidence identification of several hundred volatiles within a single analysis. In this presentation, experimental design, instrumental and data analysis approaches in MDGC-MS comprising a range of comprehensive multiple heart-cut (H/C) and comprehensive two-dimensional GC (GCXGC) techniques will be demonstrated. A special focus is on the system employing a micro fluidic device called Deans Switch to perform comprehensive H/C MDGC with different H/C windows and number of injections. Data analysis approaches will be presented so that the experimental results can be represented as contour plots and evaluated according to peak capacity and the number of separated peaks. To this end, the 'continuum in MDGC' technology can be established via plots of analysis time vs separation performance. It will also be illustrated that this simple system can offer up to 10,000 analyte peak capacity which is ~10 times compared with that provided by conventional GCxGC. This work describes a proof of theoretical concept with simple configuration for effective practical application, making valuable contribution to high resolution chromatography research.