
HIGH-THROUGHPUT MULTIPLEXING CHROMATOGRAPHY

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Finding highly efficient catalysts, screening of potential drugs and lead structures or disease markers in medical diagnostics is of considerable scientific and economical interest. Parallelized high-throughput assays in combination with sophisticated analytical techniques are currently used to identify and quantify reaction products and to determine conversions. Especially the determination of ee values by enantioselective chromatography is often time consuming, because fast separation methods are hardly available. Like in continuous wave spectroscopy the overall duty cycle of chromatographic systems is low and typically most of the acquisition time is spent for recording detector noise. Despite these limitations, performing kinetic studies on large catalyst libraries is a much sought-after objective to get conclusive insights into reaction mechanisms for future developments of advanced materials and catalysts.

Multiplexing techniques, e.g. Fourier and Hadamard transformation (FT and HT), are commonly used in spectroscopy and mass spectrometry to increase the duty cycle and improve the signal-to-noise ratio (SNR, Fellgett advantage). Previous attempts to apply multiplexing to separation techniques focused only on the SNR improvement of a single sample.

Here, a novel technique based on multiplexing [1,2] and examples are presented, which demonstrate how to inherently increase the sample throughput in (enantioselective) analysis by gas chromatography.[3] A throughput of up to 550 samples/h on a single instrument and column can be achieved.

[1] O. Trapp, *Angew. Chem. Int. Ed.* 2007, 46, 5609-5613.

[2] Highlighted in *Science* 2007, 317, 18-19.

[3] O. Trapp, *J. Chromatogr. A* 2008, 1184, 160-190.