

## Hyphenated chip-based HPLC

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HPLC on microfluidic chips enables a seamless integration of various functionalities on a single device. This avoids swept and dead volumes and at enables novel hyphenation concepts. Such devices can be straightforwardly coupled with mass spectrometry due to a monolithically integrated electrospray emitter. When slurry packed columns are integrated in high pressure resistant glass devices any commercial particulate HPLC-Phase material can be used which facilitates method transfer from classical HPLC. Due to the low thermal masses, chip-HPLC allows to generate high speed temperature gradients which is an attractive alternative to common solvent gradient elution. The seamless interconnection of two columns on a single device enables two dimensional chip-HPLC/MS. Beside MS-coupling, optical techniques such as fluorescence and Raman and detection can be applied straightforwardly and utilized simultaneously. The on-chip integration of HPLC and droplet microfluidics combines two powerful microfluidic tools, opening up new avenues for novel integrated multifunctional chip devices.

