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A Microfluidic HPLC-Chip

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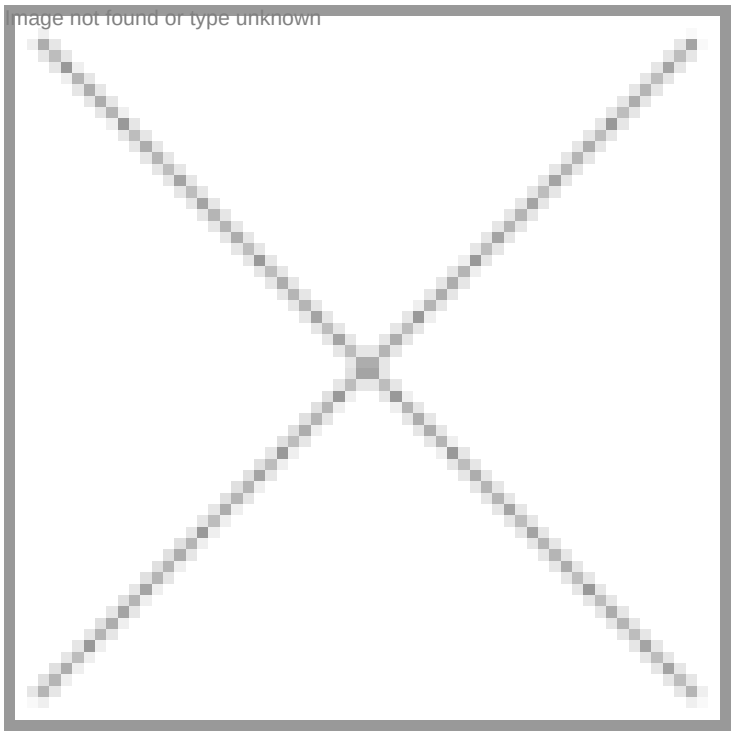

A Microfluidic HPLC-Chip

Microfluidics based nano HPLC device can be used for reproducible and rugged chromatography coupled to Mass Spectrometry.

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Dr Ajit Srivastava
He is the Manager for Agilent Technologies LCMS business in India since 2005. A scientist by education with a management degree, he started his career in 1994 as a scientist and later shifted into the field of Mass Spectrometry. He holds a vast experience of over 10 years in LCMS for Life Science & Chemical Analysis.

Nanoflow chromatography coupled to Mass spectrometry is often the method of choice for analyzing samples that are very small in volume (typically 1 to 2 microlitre) and low in concentration. The application areas of nanoflow chromatography span from proteomic analyses to small molecule analyses. It provides a specific and highly efficient technology for analyses of low volume and low concentration samples despite challenges associated with it.

Plumbing a nano HPLC without leakages can be a herculean task in itself and requires a lot of expertise and experience on the user front. The dead volume contributed by the capillaries, fittings and the tubing causes chromatographic degradation and leads to irreproducible and low confidence results

Micro fluidic chip devices are designed to be used at Nano and Pico flowrates and can integrate most functional components

of a conventional nanocloumn directly onto a chip. A microfluidic HPLC-Chip can integrate enrichment and analytical nanocolumns, nanospray emitter, fittings and connection capillaries directly on a reusable biocompatible polymer chip. An automated HPLC-Chip interface ensures solvent and sample delivery to the chip, high pressure flow switching and automated chip loading and positioning in front of the MS inlet.

The Chip interfaces with the Mass spectrometer in a seamless fashion through a device which is mounted on the mass spectrometer. It has a Chip loading and ejection mechanism and connects to the nano flow pumps and autosampler. It is equipped with a microvalve for switching the solvent flow through a rotor and stator arrangement.

The HPLC chip has all the embedded electrical connections and can be replaced in seconds. It can also have a radio frequency (RF) tag for identification. The chips are reusable like any other conventional nano columns and gives a higher performance in terms of reproducibility and ruggedness. It provides ease of use by reducing the problems associated with conventional nanoflow HPLC and gives higher throughput by reducing the chromatographic runtimes with much more efficient and better results.

The technology can be used for proteomics and small molecule applications with equal efficiency and robustness. The reproducibility and sensitivity of the technology makes it an ideal choice for low volume and low concentration samples.

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