METHOD FOR PREPARING A TUBULAR MICRO-CHANNEL FOR GAS CHROMATOGRAPHY

Technological advantages

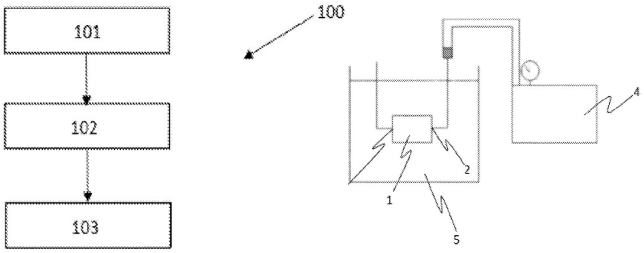
- Improved Support Deactivation: improved adhesion of the stationary phase.
- Superior Chromatographic Performance.
- Low-Temperature Functionalization.
- Precise Deposition Control.
- Dynamic and Continuous Process: homogeneous and reproducible functionalization.

Invention synthesis

The invention presents a method for preparing tubular micro-channels engraved on chips, specifically designed for gas chromatography. The major innovation lies in the chemical functionalization step of the micro-channel's inner support. This step involves introducing a highly concentrated reagent continuously and at a controlled flow rate. This approach ensures better surface deactivation, which significantly improves the adhesion of the subsequently deposited stationary phase. This functionalization can be performed at significantly lower temperatures (50-150°C) than traditional methods, making the process compatible with miniaturized MEMS technologies. The stationary phase is then deposited by evaporation with precise control over the deposition rate via a vacuum pump. The result is an improved retention, stability, and separation efficiency.

Potential applications

- High-Performance GC-MEMS Development.
- Embedded applications: Designing ultra-compact and portable chromatographs.
- On-Site Analysis: Accurate detection and quantification of chemical compounds.
- Biomedical and Diagnostics.
- Security and Defense: Rapid field detection of trace chemical substances (explosives, toxic agents).



Process implementation

100) method for preparing a tubular micro-channel for gas chromatography
(1) micro-channel etched on a chip
(2) micro-channel entry
(101) chemical functionalisation of the support in a micro-channel
(102) steps for the support treatment
(103) deposition of the stationary phase on the support

Commercial benefits

- Positioning in the growing segment of high-performance miniaturized analytical instruments.
- Reduced manufacturing and production costs.
- Competitive Advantage: Superior chromatographic performance in a miniaturized format.

Patented invention - under license.

For more information :

valorisation@cnes.fr