CHROMATOGRAPHY SYSTEM

Technological advantages

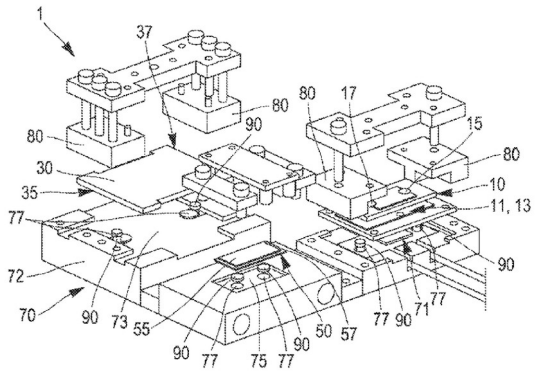
- Increased Mechanical Robustness: The unibody design provides resistance to vibrations and shocks.
- Advanced Miniaturization : use of MEMS reduces the mass, volume, and energy consumption.
- Optimized Fluidic Circulation.
- Integrated Thermal Management: precise temperature control for better pre-concentration and elution.
- Easier Maintenance.

Invention synthesis

The invention presents a miniaturized chromatography system designed for chemical analysis, well suited for demanding environments. This system integrates MEMS components for injection, separation via a chromatographic column, and detection of chemical compounds. A unibody metallic fluidic interface plate, serves as a robust structural support and ensures fluidic connections between the different elements. A mixture (typically gaseous) is injected into a cavity where a solid support retains compounds of interest, often by adsorption. After pre-concentration and heating, these compounds are transferred to a separation column, which separates them before a detector identifies them. This addresses the critical need for chemical analysis instruments that are compact, energy-efficient, and extremely resistant to severe mechanical and thermal conditions, all while ensuring reliable analyses.

Potential applications

- Space Exploration: Analysis of planetary atmospheres, detection of biomarkers on other celestial bodies.
- Environmental Monitoring: Detection of gaseous pollutants or contaminants.
- Security and Defense: Rapid identification of hazardous substances (toxic gases, explosives).
- Medical Applications: Portable diagnostics requiring the analysis of gases or complex mixtures.
- Industrial Process Control.



Schematic view of the chromatography system
(1) chromatography device
(10) injection device
(30) separation column using chromatography
(50) sensor
(70) unibody fluidic interface plate
(71) cavity for the injector
(72) main metallic interface plate
(73) cavity for the column for receiving (30)
(75) cavity for the sensor for receiving (50)

Commercial benefits

- Access to New Markets: Opens opportunities in aerospace, defense, and environmental sectors where robustness and miniaturization requirements are high.
- Reduced Mission Costs: reduced mass and volume.
- Improved Reliability: robust design reduces maintenance and replacement needs.
- Rapid and versatile system : increased market potential.

Patented invention - under license.

For more information :

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