

UCLA

Posters

Title

SEN2: HPLC Chip Based Chemical Sensing

Permalink

<https://escholarship.org/uc/item/7q75s501>

Authors

Qing He
Yunan Miao
Terry Lee
et al.

Publication Date

2005

HPLC Chip Based Chemical Sensing

Qing He, Yunan Miao*, Terry Lee*, and Yu-Chong Tai
 Caltech Micromachining Lab – <http://mems.caltech.edu>
 * Beckman Research Institute, City-of-Hope

Introduction

High Performance Liquid Chromatography (HPLC) is one of the most powerful, versatile, and widely used separation techniques. It allows separation, identification, purification, and/or quantification of the chemical compounds in complex mixtures. By miniaturizing HPLC system onto a chip, significantly lower sample and solvent requirements, higher mass sensitivity, and lower cost can be achieved. Moreover, portable HPLC chips can be used for field tests and/or networked sensing, which is impossible or impractical for conventional desktop HPLC systems.

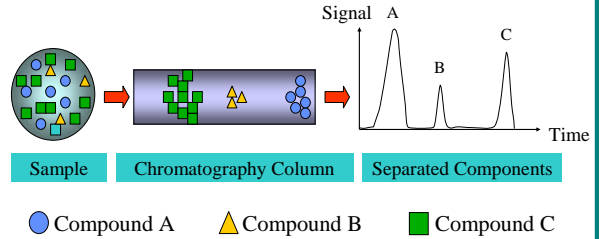


Figure 1. Chromatography Principle

Accomplishments

Ion Chromatography Chip

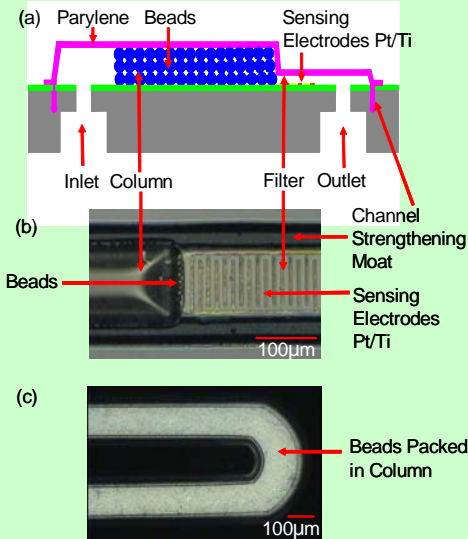


Figure 2. Illustration and pictures of the 1st-generation integrated LC system on-a-chip. (a) Cross-sectional view of the device after fabrication. (b) Beads packed at the filter and sensor. (c) Fluorescent picture of the heavily packed beads in separation column.

Ion Chromatography Separation of Multi-Anion Mixture
 On-Chip Packed Column. L 8mm/W 100µm/H 25µm.
 Hamilton PRP-X110 Anion Exchange 7µm Resin

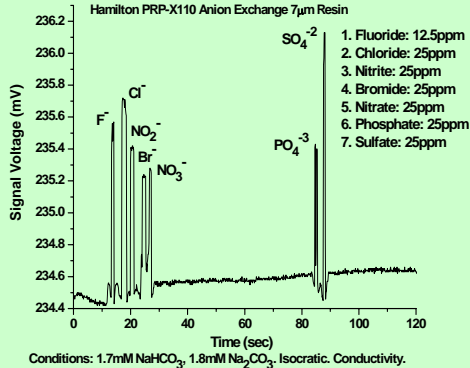


Figure 3. On-chip multi-anion separation result.

HPLC-ESI Chip

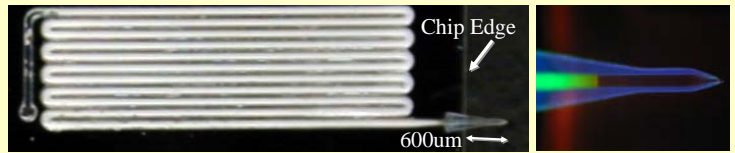


Figure 3. Overview of the chip and close-up picture of the nozzle.

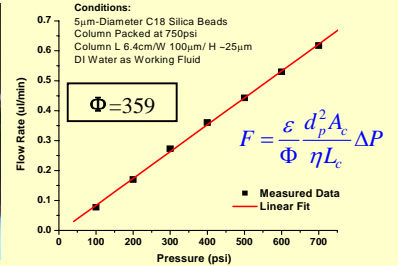
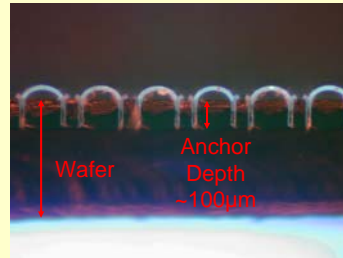


Figure 4. High-pressure anchoring. Figure 5. Column pressure vs. flow-rate.

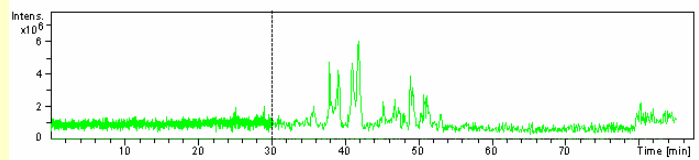


Figure 6. HPLC separation of digested Cytochrome C.

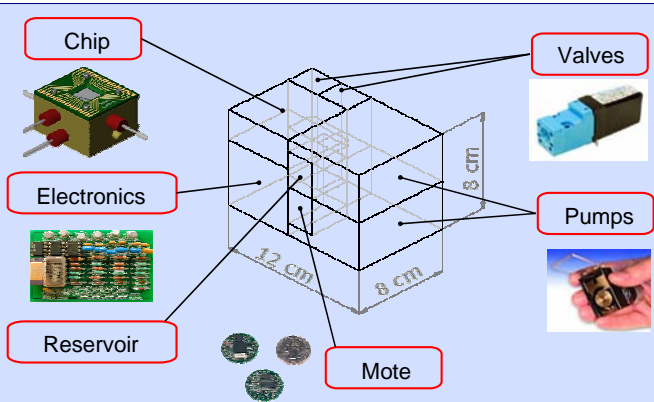


Figure 7. Wireless LC System On-a-Palm