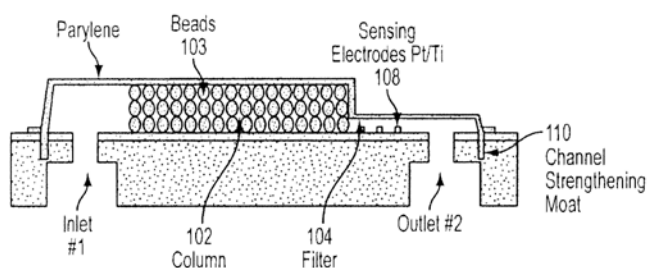


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NATIONAL MEDICAL CENTER AND
BECKMAN RESEARCH INSTITUTE

IC-processed polymer nano-liquid chromatography system on-a-chip



DESCRIPTION

Liquid Chromatography is a separation technique that uses a stationary solid phase(s) to isolate a desired molecule from other solutes. In biotech, LC is widely used for anything from purifying chemical or biologic products to a diagnostic application looking for a specific biomarker in a tissue sample. This joint Caltech and City of Hope technology provides a method for creating a small, cost-effective LC system-on-a-chip that includes a column,

filter(s), an injector, and a detector and is manufactured using the same photolithography techniques established to create monolithic integrated circuit chips. Substitution of different stationary phases allows the technology to be used for reversed-phase, normal-phase, adsorption, size-exclusion, affinity, or ion liquid chromatography and a channel-strengthening technique allows the system to withstand the high pressures required to perform HPLC. Nano/picoliter volumes are injected into the inlet while an electrochemical/conductivity sensor built into the outlet measures separation signals.

The small size and low cost of materials for lab-on-a-chip liquid chromatography allows this technology to have valuable point-of-use application across a variety of fields. Clinically, liquid chromatography is already used in clinical laboratories as a diagnostic tool; Point-of-care nano-LC could be employed to improve the availability and turnaround time of medical care for a number of diseases. Protein digestion of small sample volumes followed by LC could be developed to detect biomarkers for circulating tumor cells, evaluate plasma levels of vitamins or carotenoids in patients of undernourished populations, or to monitor hemoglobin A1c levels in diabetics. Potential applications extend beyond healthcare into fields such as food safety and environmental uses as well; for example, it could be used for trace analysis to ensure safety of food and water sources or to detect suspected pollutants in waterways.

KEY ASPECTS

- Performs reversed-phase, normal-phase, adsorption, size-exclusion, affinity, and ion liquid chromatography and HPLC
- Sample Volume: Nanoliter/picoliter

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Title	US Application Number	Filed
IC-processed polymer nano-liquid chromatography system on-a-chip and method of making it	10/917,257	8/11/2004

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