

Optical Fiber Chromatography



Article Overview

Optical fiber chromatography is a technique that uses light transmitted through optical fibers to manipulate, detect, and separate particles or molecules in a fluid medium.

Concept Overview

Optical fiber chromatography combines the principles of chromatography—the separation of particles based on size, refractive index, or other properties—with optical manipulation using light transmitted through fibers or waveguides. In this method, particles suspended in a fluid are propelled and sorted by optical forces generated by laser light within a hollow-core or solid-core optical fiber, effectively creating a non-contact, light-driven separation system .

How It Works

- **Optical Forces:** Light traveling through the fiber exerts forces on particles. The axial force moves particles along the fiber, while the radial force keeps them centered, preventing collisions with the fiber walls .
- **Particle Sorting:** Differences in particle size, refractive index, or optical properties cause variations in how particles respond to the light forces. This allows selective separation, similar to traditional chromatography but using light instead of chemical interactions .
- **Waveguide Integration:** Hollow-core fibers or photonic crystal fibers act as waveguides, confining light and fluid flow simultaneously. This enables precise control over particle trajectories and separation efficiency

Article Content

Optical chromatography using a photonic crystal fiber with on ...

Mentioning: 23 - We describe the realization of integrated optical chromatography, in conjunction with on-chip fluorescence

Optical chromatography for concentration of biological samples

An optical chromatography beam which completely fills a fluid channel can operate as an optically tunable filter for the

Selection of Optical Fiber for Chromatographic Detectors and Remote ...

It is the fiber of choice for most deep UV applications, especially when smaller Introduction diameter fiber is required. Optical fiber

Design and Fabrication of 3D-Printed Lab-On-A-Chip Devices for Fiber ...

Crucial to the sorting performance of these systems is a stable fluid control maintained by the implemented micro fluidic device.

Integrated optical chromatography chip. PCF is inserted into the chip ...

Integrated optical chromatography chip. PCF is inserted into the chip through a fiber channel and used to simultaneously launch

Microsoft Word

We present a new advance in optical chromatography potentially enabling the unique beam delivery properties of photonic crystal

On-line dynamic detection in the column chromatography separation

In this design, we introduced a surface plasmon resonance (SPR) fiber-sensing probe into a column chromatography (CC) system to

The use of predictive models to develop chromatography-based ...

Chromatography is the workhorse of biopharmaceutical downstream processing because it can selectively enrich a target product

Towards integrated optical chromatography using photonic crystal fiber

Optical chromatography is a powerful technique, capable of separating micron-sized particles within a fluid flow, based on their

3D printed microfluidic lab-on-a-chip device for fiber-based ...

In this work, we designed and fabricated a 3D printed lab-on-a-chip device for fiber-based dual beam optical manipulation.

Selection of Optical Fiber for Chromatographic Detectors and Remote ...

Selection of the appropriate fiber is an important factor in achieving optimal system performance. Optical fiber has been

Advantages of optical fibers for facile and enhanced detection in ...

Optical fibers embedded in a microfluidic platform provide a simpler, more flexible, lower-cost, and sensitive setup for

Fiber optics | Definition, Inventors, & Facts | Britannica

Fiber optics, the science of transmitting data, voice, and images by the passage of light through thin, transparent fibers.

Contact Us

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