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Patent(s) Issued

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Available Technologies

Lossless Droplet Transfer for Microfluidic-Based Analysis

SUMMARY

An emerging subfield of microfluidics, referred to as “droplet-based” or “plug-based” microfluidics, involves the encapsulation of aqueous droplets within another immiscible fluid such as an oil. The droplets can be formed uniformly in terms of both size and frequency, and offer the potential to serve as ideal reaction vessels for extremely small samples, including individual biological cells.

Presently, detection of the contents of droplets typically occurs by passing a droplet through an optical detector, which measures, for example, the fluorescence emitted by a molecule of interest. This detection strategy, and those like it, is limited in that chemical separations are essentially precluded and only natively fluorescent species or those that have been fluorescently labeled can be detected. As such, only a small number of species can be measured within each droplet. Furthermore, current approaches to transfer droplets from the immiscible fluid to an aqueous one for subsequent analysis typically results in large sample losses and/or require painstaking manipulation of individual droplets.

This patented invention utilizes a micro-fabricated grid to transfer individual droplets (typically encapsulating a sample of interest such as an individual biological cell) into an aqueous stream. As shown in image (right), once in this stream, the contents of the droplets can be separated and/or analyzed by known means, including electrophoresis and mass spectrometry. The technology covered by the patent opens up the exciting possibility of detailed analysis of individual biological cells using mass spectrometry. Partners are sought for manufacturing and selling the device within the electrophoresis and/or mass spectrometry research community.

ADVANTAGES

- * Allows for analysis of single cells and other small samples using electrophoresis or mass spectrometry
- * Provides for lossless transfer of sample contents from a droplet to an aqueous stream to facilitate analysis



Patents & Intellectual Property

- » Patent #: 8,061,187

Technology Portfolio(s)

- » Mass Spectrometry Instrumentation

Potential Industry Applications

- » Chemicals
- » Healthcare, Pharma, Biotech & Medical
- » Professional Services
- » Security

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