Continuous, enhanced detection of droplet contents in electrical impedance spectroscopy

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BRIEF DESCRIPTION

The inventors at UCI have developed a method and system to make enhanced electrical impedance spectroscopy measurements in a continuously flowing train of microfluidic droplets. The technique increases the sensitivity of the electrical impedance spectroscopy measurements, lowering detection limits and increasing the frequency of continuous measurements.

FULL DESCRIPTION

Amplified detection of DNA in droplets has been demonstrated using a fluorescent probe. The use of fluorescent markers is expensive and requires extra processing steps. In addition, fluorescence intensity results must be compared to a calibration curve. Electrical impedance spectroscopy (EIS) has been used for the detection of flowing whole cells or static subcellular components.

The inventors at UCI have developed a method and system that allows the detection of a gene in genomic DNA and provides a platform that can detect DNA in flowing droplets. The technique incorporates molecular affinity forces to align molecules within droplets at the interface, resulting in increased EIS sensitivity. The method also allows for continuous measurements in traveling microfluidic droplets. The process is ideal for entities using polymerase chain reaction (PCR), as the technique is label-free and provides the capability to detect PCR amplification in many samples in real time.

SUGGESTED USES

Label-free detection of DNA

Nanoparticle-enhanced detection of droplet contents

ADVANTAGES

Continuous amplified detection in separate droplets

Does not require fluorescent dye

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,203,294	02/12/2019	2014-743

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OTHER INFORMATION

CATEGORIZED AS

- » **Biotechnology**
  - » Genomics
- » **Medical**
  - » Research Tools
  - » Screening
- » **Sensors & Instrumentation**
  - » Analytical
  - » Biosensors
  - » Medical
  - » Scientific/Research

RELATED CASES

2014-743-0

STATE OF DEVELOPMENT

The system for both continuous microfluidic droplet generation and electrical impedance spectroscopy measurements has been developed and tested.

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