

# HIGH/HYPERVELOCITY PARTICLE CAPTURE AND ANALYSIS METHOD AND APPARATUS

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## PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	<a href="#">20220018741</a>	01/20/2022	2019-065

## BRIEF DESCRIPTION

This is a capture and analysis system that efficiently captures plume particles, does not degrade the entrained organic molecules, that can be effectively and efficiently analyzed, that can be readily cleaned to provide low background and forward contamination, and that has high sensitivity for analyzing the trace organics.

## SUGGESTED USES

This CELF (Capillary Electrophoresis Life Finder) is a novel and rapidly maturing miniaturized microfluidic organic chemical and biochemical analyzer that, at high altitude, in outer atmosphere, or in outer space, can sensitively analyze cloud, dust and plume samples for organic molecules that may be indicative of past or present life. CELF addresses NASA Science Goals to “explore and find locations where life could have existed or could exist today” and provides science measurement capabilities for biosignatures that address the requirements for life detection suggested in the Europa Lander Study 2016 Report (SDT Report) (1). CELF can probe for life signs by determining, *inter alia*, the abundances and patterns of organic biomarker compounds including, but not limited to, amines, amino acids and carboxylic acids with a sensitivity approaching 1 picomole per gram ice/particle sample. CELF can also determine the types, abundances and enantiomeric ratios of any amino acids in the sample. In one illustrative, but non-limiting embodiment, the miniaturized CELF instrument has size, mass (3.6 kg) and power requirements that can be accommodated in a variety of aircraft, high altitude balloon, and space probe applications.

## ADVANTAGES

Using the unique capabilities of microchip capillary electrophoresis to look for molecular biomarkers indicative of extinct or extant life or that inform about the environment and habitability (2) will produce information of lasting value about the chemistry and biochemistry of Europa (smallest of the four Galilean moons orbiting Jupiter) and many other locations in our solar system including Enceladus (the sixth largest moon of Saturn), comets , *etc.*

## RELATED MATERIALS

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

► [Lifting Gate Microvalves And Pumps For Microfluidic Control](#)

## CONTACT

Craig K. Kennedy  
[craig.kennedy@berkeley.edu](mailto:craig.kennedy@berkeley.edu)  
tel: .



## INVENTORS

» Mathies, Richard A.

## OTHER INFORMATION

### KEYWORDS

microchip electrophoresis,  
extraterrestrial

### CATEGORIZED AS

» [Sensors & Instrumentation](#)

» [Scientific/Research](#)

### RELATED CASES

2019-065-0



University of California, Berkeley Office of Technology Licensing

2150 Shattuck Avenue, Suite 510, Berkeley, CA 94704

Tel: 510.643.7201 | Fax: 510.642.4566

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