

Contact

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 Reference: MSP Sensors

Lead Inventors

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Status

- A U.S. non-provisional application (20050074904) has been filed
- Particles have detected down to 5000 cells/mL ([reference](#)); lower detection limits anticipated

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research or joint venture

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Novel Particulate Biosensors

Overview

Auburn University is seeking a licensee or development partner for magnetostrictive particulate sensors (MSPs) capable of wireless/remote, continuous, highly sensitive detection of multiple target biological/chemical agents in a variety of environments. This technology has potential applications in the following economic sectors:

- Homeland Security: testing people and monitoring sites for chem/biothreats
- Defense: on-site or drone-enabled continuous monitoring for chem/biothreats
- Food Safety: analyze food for pathogens (naturally or artificially introduced)
- Agriculture: monitoring plant health, fruit ripeness and insect infestation
- Environmental: monitor water samples for pathogens
- Medicine: rapid disease diagnostics, blood typing

Advantages

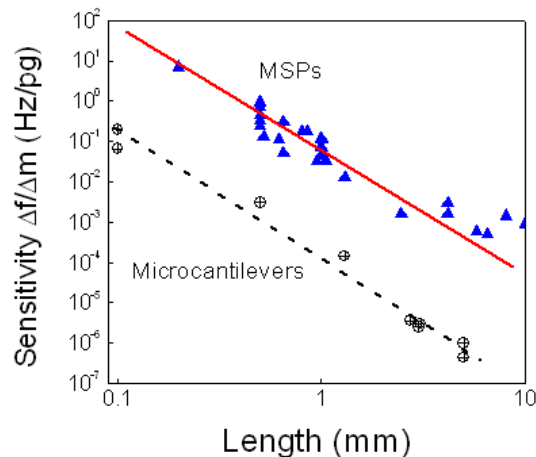
- Remotely powered, with no onboard electronics or wiring necessary
- Sensors are placed in the sample: water, food, blood, etc.
- Highly sensitive: 100-fold sensitivity enhancement over standard microcantilevers
- Rapid detection: within minutes
- Capable of detecting multiple targets simultaneously
- Particles are inexpensive and easily fabricated from commercially available materials
- Works with liquid or gas samples

Description

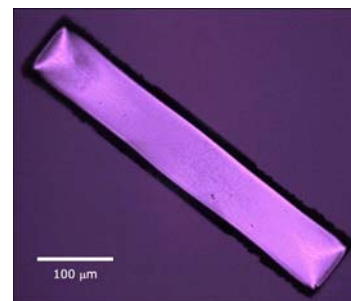
The ability to identify the presence of a very small number of target proteins, bacteria, or spores in a small volume of liquid would greatly advance scientific research into the human genome, provide a more sensitive tool for medical diagnostics and protect against bioterrorism. Current methods have the principal drawback in that the target species must be brought to the sensor surface for detection.

A biosensor may be formed by coating MSPs with a biorecognition element such as antibody or phage. MSPs exhibit a change in their magnetic resonance state when target pathogens react and bind with the biorecognition element. Detection is rapid and measured remotely.

The particles, which can range from a few nanometers to microns in size, are mixed, fluidized or distributed through the sample, effectively bringing the sensors to the target agent. The small size and large number of MSPs greatly increase the probability of binding with target pathogens, thereby increasing sensitivity and reducing detection time. After reaction, MSPs are concentrated, separated and/or collected using a magnetic field and their resonance characteristics are measured.



Experimental data show MSPs have sensitivities more than 100 times greater than microcantilevers



Micrograph of a 5 micron x 100 micron x 500 micron MSP