



Smart Leaf Technology - Floating Semiconductor Membranes for Wireless Sensing

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in wireless sensors for detecting the presence or absence of target analytes.

Overview

Sensors currently used for detecting the presence of a given analyte, such as a toxin, in solution or in air require direct contact with a power supply. Distributed sensing systems or “sensor networks” are an emerging technology that promise the ability to wirelessly monitor and manipulate an environment via a spatially distributed network of small and inexpensive sensor nodes.

The Invention

UW-Madison researchers have developed wireless sensors made from nanoscale membranes for use in detecting the presence or absence of analytes, systems incorporating the sensors and methods for using the sensors. The “smart leaf” sensors are made of two thin films with opposing front and back surfaces. The surfaces are coated with molecules that react with the target analyte. Upon exposure to the analyte, the molecules alter the geometry of the leaf and change its dielectric response in a manner that depends on the concentration of the target chemical. An electromagnetic source continually exposes an array of sensors to an electromagnetic signal, while a detector regularly scans the sensor array to observe any change in the reflected and/or transmitted radiation. In this way, the presence or even the concentration of a particular analyte may be easily detected without requiring the sensors to be directly wired to a power supply.

Applications

- Disaster relief
- Precision agriculture
- Environmental monitoring
- Machine monitoring
- Medical patient monitoring
- Drug delivery

Key Benefits

- Electromagnetic sensing eliminates need for electricity at sensor.
- Electromagnetic monitoring saves time by providing a plurality of membranes from which an average output may be detected, without probing all sensors individually.
- Nanoscale allows many sensors to be scattered across a small surface area.

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Additional Information

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For More Information About the Inventors

- [Robert Nowak](#)

Tech Fields

- [Analytical Instrumentation, Methods & Materials : Sensors](#)
- [Engineering : Micro & nanotechnologies](#)
- [Research Tools : Detection](#)

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854

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