



## Detecting Compounds with Liquid Crystals

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**WARF: P01228US**

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**The Wisconsin Alumni Research Foundation is seeking commercial partners interested in developing a method and device that uses liquid crystals to detect gas phase compounds, including environmental contaminants.**

### Overview

Although highly sensitive techniques already exist for monitoring gas phase chemicals in the environment, these methods involve expensive, complex instruments and processes such as mass spectroscopy, making them unsuitable for real-time use in the field.

### The Invention

UW-Madison researchers have developed a novel method and device for detecting the presence of gas phase chemical compounds such as environmental contaminants with liquid crystals. The device consists of a thin film of liquid crystals overlaying a nanostructured surface that hosts receptors for binding a chemical compound of interest. When the target compound is present in a sample, it diffuses through the film of liquid crystals and binds to the receptors on the surface. Binding of the compound causes the liquid crystals to change their orientation, a shift that is readily observed with the naked eye.

### Applications

- Monitoring gas phase chemicals in the environment

### Key Benefits

- Highly sensitive and specific to target chemical compounds
- Eliminates need for complex instrumentation and highly trained personnel
- Well suited for use under mobile conditions in the field
- Can be designed to detect a wide range of gas phase chemicals in the environment
- By patterning a number of different receptors on the nanostructured surface, device may also be used to detect several chemical compounds simultaneously

### Stage of Development

In a series of experiments with organophosphonates – a group of chemicals found in common garden pesticides and some chemical warfare agents – the researchers determined the device's sensitivity to be in the low parts-per-billion range, with a visual change occurring in a matter of seconds after exposure.

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#### Related Technologies

- [WARF reference number P99313US describes a related liquid crystal technology for detecting microscopic pathogens.](#)



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## Tech Fields

- [Analytical Instrumentation, Methods & Materials : Sensors](#)
- [Clean Technology : Monitoring, remediation & waste reduction](#)

For current licensing status, please contact Jennifer Gottwald at [jennifer@warf.org](mailto:jennifer@warf.org) or 608-960-9854

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