

Applications:

- Explosives such as TNB, TNT, and 2,4-DNT
- Chemical warfare agents like nerve gas
- Pesticides and insecticides
- Chlorinated hydrocarbons and other environmental pollutants

Benefits:

- Microsensors do not require sophisticated equipment, field sampling, gas chromatography or mass spectroscopy analysis to accurately predict explosives or warfare agents.
- More sensitive SAW chemical sensors can be manufactured with faster response times than those currently available.
- Adaptable to optical transduction, including waveguide evanescent field methods, because the films have low light loss.

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Summary:

Conventional explosives are traditionally the weapon of choice for terrorists, hence, their use remains a serious threat to national security. In addition, small amounts of chemical, biological, or radiological agents can exact a much greater human toll than an equivalent amount of explosives, prompting the need for additional precautions and mitigation methods. Los Alamos National Laboratory has developed new technologies that reliably and rapidly detect trace amounts of chemical, biological, radiological, or explosive materials, hence are of utmost importance in the effort to thwart terrorist. In one development, the microsensor is provided by means of a photopolymerization method that patterns and attaches chemical microsensor films to any oxide surface. This invention is ideal for patterning different elements of a sensor array with chemical sensing films, each with distinct chemical specificities. In another development, the microsensor device consists of a cyclodextrin monolayer on which sensing occurs that is coated onto the piezoelectric substrate of an SAW (Surface Acoustic Wave) device. These technologies can be used for process monitoring of industrial chemicals, monitoring of gas phases for safety, environmental monitoring, or in monitoring of sensitive areas such as airports for restriction of terrorist activities.

Development Stage:

Work is ongoing for most applications. Specific new work has been completed for actuators and hollow fibers. With more application-specific work each of these technologies could provide a substantial base from which to form either a go-to-market product or a complete product line.

Patent Status:

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| US Patent 5,418,058 | Chemical microsensors |
| US Patent 6,316,268 | Chemical microsensors for detection of explosives and chemical warfare agents |
| US Patent 6,670,286 | Photopolymerization-based fabrication of chemical sensing film |

Licensing Status:

Available for exclusive or non-exclusive licensing