

# Sensitive Chemical Sensor To Detect A Broad Range Of Nitrogen-Based Explosives

Tech ID: 20583 / UC Case 2007-074-0

## BACKGROUND

Detecting ultra trace explosive analytes is important for forensic or counterterrorism applications as well as for personnel, baggage, or cargo screening. However, metal detectors frequently fail to detect explosives (such as those in the plastic casing of modern land mines); dogs are expensive and difficult to maintain: and other methods, including gas chromatography coupled with mass spectrometry, surface-enhanced Raman, energy dispersive X-ray diffraction, for example, are highly selective, but are expensive and not easily adapted to a small, low-power package. Therefore, chemical sensors are preferable to other detection devices.

## TECHNOLOGY DESCRIPTION

This technology describes the synthesis of a polymer and a method for detecting a broad range of nitrogen-based explosives including nitroaromatic based, nitramine based and nitrate ester-based high explosives. The polymer is excited at an appropriate range using a UV-B, UV-C, black light, LED or other illumination source. If an explosive has bound the polymer, then the polymer fluorescence will be quenched.

## APPLICATIONS

- ▶ Counter terrorism
- ▶ Forensic (e.g. examination of post blast residue)
- ▶ Screening baggage, personnel, or cargo
- ▶ Facility protection

## ADVANTAGES

- ▶ Sensitive
- ▶ Rapid
- ▶ Low cost
- ▶ Versatile synthetic approach
- ▶ Single polymer
- ▶ Detects wide range of trace explosives
- ▶ Detects explosives on a variety of surfaces

## STATE OF DEVELOPMENT

This technology is the subject of a patent application, and is being offered exclusively or nonexclusively for US and/or worldwide territories.

There is an initial working prototype.

## RELATED MATERIALS

- ▶ Dr. William Trogler, Professor of Chemistry & Biochemistry, UCSD.
- ▶ [Trogler Group Web Page](#)
- ▶ S. J. Toal and W.C. Trogler, "Polymer Sensors for Nitroaromatic Explosives," Journal of Materials Chemistry 16, 2871-2883 (2006)

## PATENT STATUS

| Country                  | Type          | Number    | Dated      | Case     |
|--------------------------|---------------|-----------|------------|----------|
| United States Of America | Issued Patent | 8,557,595 | 10/15/2013 | 2007-074 |

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## OTHER INFORMATION

### KEYWORDS

nitrogen, detection, sensor, screening, polymer

### CATEGORIZED AS

- ▶ **Materials & Chemicals**
  - ▶ Chemicals
  - ▶ Other
- ▶ **Sensors & Instrumentation**
  - ▶ Analytical
  - ▶ Other

### RELATED CASES

2007-074-0

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