

Kit for Identification of Traces of High Explosives Using Thin Layer Chromatography

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BACKGROUND

Explosives detection is critically important in many field settings (e.g., military facilities, minefields, crime scenes, and remediation sites) and has become a necessity for the safety of the general public (e.g., at airports and mass transit areas). As such, there remains a demand for inexpensive and reliable explosive sensors for identifying specific explosives. High explosives are considered to be organic and oxidizing, a relatively rare combination that makes them tractable for molecular recognition. Fluorescent polymers have thus had favorable success in their use as high explosive sensors.

TECHNOLOGY DESCRIPTION

UC San Diego researchers have developed sensors, sensor fabrication processes, and sensing methods that enable detecting traces of high explosives by fluorescence quenching in combination with chromatographic separation. The invention includes use of fluorescent, silicon based copolymers, covalently linked to silica thin-layer chromatographic plates or nanoparticle supports. A thin layer of the polymer allows for a more efficient interaction with an analyte, thus yielding enhanced detection sensitivity. The attachment of the sensing polymers onto a chromatographic support allows for the separation of a mixture, as well as the identification of multiple explosives through the use of multiple sensing polymers. Coating silica nanoparticles with the sensing polymer provides a simple means of detecting high explosives in aqueous media with a low detection limit. The invention can be implemented as inexpensive field-ready kits for the identification of trace explosives.

STATE OF DEVELOPMENT

This technology has a working prototype.

INTELLECTUAL PROPERTY INFO

The invention has a patent pending and is available for licensing.

RELATED MATERIALS

- ▶ [Hollow Silica Nanospheres Containing a Silafluorene-Fluorene Conjugated Polymer for Aqueous TNT and RDX Detection](#), Chem. Commun., 2010, 46, 6804-6806.
- ▶ [Luminescent Organosilicon Polymers and Sol-Gel Synthesis of Nano-Structured Silica](#), Martinez, H. Paul, Ph.D., Dissertation, University of California, San Diego, 2011.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,134,239	09/15/2015	2011-061

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OTHER INFORMATION

KEYWORDS

explosives detection, trace explosives, organosilicon polymers, silicon based copolymers, fluorescence quenching

CATEGORIZED AS

- ▶ **Nanotechnology**
 - ▶ Tools and Devices
- ▶ **Security and Defense**
 - ▶ Other
 - ▶ Screening/Imaging
- ▶ **Sensors & Instrumentation**
 - ▶ Biosensors
 - ▶ Environmental Sensors

RELATED CASES

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