

# Organic molecule capable of detecting explosives

## Summary

Profile type	Company's country	POD reference
<b>Technology offer</b>	<b>Spain</b>	<b>TOES20230512004</b>
Profile status	Type of partnership	Targeted countries
<b>PUBLISHED</b>	<b>Commercial agreement with technical assistance</b> <b>Research and development cooperation agreement</b>	<b>• World</b>
Contact Person	Term of validity	Last update
<a href="#">Rita Elste - Tomsons</a>	<b>12 May 2023</b> <b>11 May 2024</b>	<b>12 May 2023</b>

## General Information

### Short summary

Spanish researchers have designed a method to synthesize a compound extremely useful in the detection of explosives, such as triacetone triperoxide. This explosive is very simple to prepare and extremely difficult to detect. They are looking for commercial and research cooperation agreements with companies and institutions related with the detection of explosives. The partners' role would be to test the technology and/or give economical support to improve/adapt the technology to their needs.

### Full description

During the last years, this research group has developed a wide variety of sensors capable of detecting heavy metal and hazardous organic molecules, among others. Its expertise has made it possible for this group to collaborate with international organizations, such as NATO.

Improvised Explosive Devices (IEDs) pose a great threat to society, which is why, in recent years methods have been developed to detect them. However, explosives such as triacetone triperoxide (TATP) are extremely difficult to detect and, given the ease with which it can be obtained, it is imperative to have simple, robust methods with sufficient sensitivity to detect these compounds. The technology developed by the Spanish Institution was born to respond to these demands and position itself as an effective, affordable and easy-to-use method.

The naphthalimides described in the present invention, when interacting with an oxidizing molecule, undergo a modification of their fluorescence that is directly related to the concentration of oxidizing analyte. Moreover, the

synthesized molecule can be absorbed in different materials (anatase, silica, etc.) and, once absorbed, the interaction with the molecules of interest takes place on its surface. Giving the potential of the molecule, the project has been subsidized by NATO.

The university is interested in contact with different partners. Commercial agreements are sought and partners for research cooperation agreements are welcome as well.

#### Advantages and innovations

Ultrasensitive detection of triacetone triperoxide, TATP, (very difficult to detect and frequently used in improvised explosive devices) in the air in real time, being the detection limit of TATP as low as 13 ng.

The patented molecule, following the procedure designed by the research group, can be easily obtained.

- The proprietary molecule has proven to be perfect for use as an active element in the preparation of fluorogenic sensors.
- The main advantage of this technology is that it allows detecting traces of TATP in the air without the use of large and expensive equipment in a selective and ultrasensitive manner.
- The detection limit is significantly low, reaching concentrations lower than 60 pM.
- To add value to this technology, this method is useful for detecting a wide variety of oxidant molecules.

#### Technical specification or expertise sought

#### Stage of development

**Available for demonstration**

#### IPR Status

**IPR applied but not yet granted**

#### Sustainable Development goals

**• Goal 12: Responsible Consumption and Production**

## Partner Sought

#### Expected role of the partner

The partner sought, both for license and manufacturing agreement (commercial agreement), will be chemical companies, which are willing to implement this technology. It is important to note that interest in the detection of TATP has gained traction during the last years, giving even more importance to the method to detect it effectively. Their role will be, for instance, to use and test this technology.

In addition, they are looking for research groups and research institutions to collaborate to transfer and bring the technology to the next level and, additionally, apply for European funds.

#### Type of partnership

#### Type and size of the partner

**Commercial agreement with technical assistance**

**Research and development cooperation agreement**

- Other
- SME <=10
- SME 11-49
- Big company
- SME 50 - 249

## Dissemination

Technology keywords

- **05001004 - Organic Chemistry**
- **08002001 - Detection and Analysis methods**

Targeted countries

- **World**

Market keywords

- **08001019 - Speciality/performance chemicals**

Sector groups involved