

**A sensitive substrate of TiO<sub>2</sub> (thin film)/ Au nanoparticles for detection of explosives based on Surface-enhanced Raman spectroscopy (SERS).**

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**POSTER ABSTRACT:**

Surface-enhanced Raman spectroscopy (SERS) is one of the most popular and powerful technique in analytical chemistry, with single-molecule detection potentially accessible with carefully designed noble-metal substrates. The physisorption of analyte molecules to a roughened noble metal (typically a gold or silver nanoparticle) surface enables strong enhancement of the analyte's Raman resonance signals, through interaction with the surface plasmonic field. This is the so-called electromagnetic enhancement, whereas, the chemisorption of analyte molecules on the substrate leads to chemical charge transfer that called chemical enhancement, these effects lead to increase the detection sensitivity significantly. Therefore, it is a very promising analytical tool that can be exploited for detection of ultra-trace concentrations of materials, such as explosives.

In this work we demonstrate a new SERS substrate that utilises gold nanoparticles (AuNPs) on a rutile-TiO<sub>2</sub> substrate to achieve ultra-trace (sub picomolar) detection of explosives. A range of high-explosives could then be detected in solution and vapour phase at ultra-trace levels, simply and in a repeatable manner. Furthermore, the substrates could be easily cleaned of all organic residues for reuse with no ill effect on enhancement. A SERS substrate was fabricated by depositing gold nanoparticles on a thin film of TiO<sub>2</sub> followed by deposition of analyte species. The performance of this sensor was optimize for good SERS enhancement and rapid time response.

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**Authors:** Sultan Ben Jaber and Ivan Parkin

**Dear: Sultan Ben Jaber**

I am pleased to inform you that your abstract: detailed above, has been accepted as **Poster** in the **6<sup>th</sup> International Chemistry Conference** to be held in Riyadh, Saudi Arabia Nov 8-10 2016.

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Hope to see you in Riyadh,

Sincerely yours,

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