C54 A Novel Sensor for Post-Blast Explosive Investigations

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After attending this presentation, attendees will understand the design and functionality of a new explosive detection sensor.

This presentation will impact the forensic community and/or humanity by demonstrating the basic research being conducted on a new type of explosive sensor.

A new type of optical chemical sensor has been developed for highly sensitive, in-situ detection of explosives. The sensor is comprised of a dense silica thin film grown on the straight-cut endface of a standard, 125µm telecommunication optical fiber. Silicalite is an all silica MFI type zeolite with an effective pore size of 0.55nm. MFI zeolite is hydrophobic and selectively absorbs organics of appropriate molecular size. The sensor device operates through measuring the optical refractive index or optical thickness of the coated zelote film that changes in response to the adsorption of molecular species in its structure.

This sensor has previously been shown to detect the presence of trinitrotoluene (TNT) in a He carrier gas, but has yet to be tested for use in post-blast situations. Bullseye smokeless powder was burned in a chamber and samples of the products of this reaction were collected. These samples were then introduced into the sensor apparatus using helium as an inert carrier gas. In this work, the response of the sensor to the introduction of smokeless powder byproducts in helium carrier gas is shown.

Explosives, Sensing, Zeolite

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