

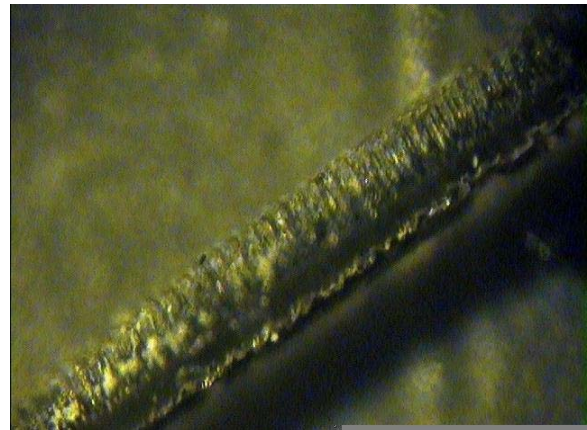
The CUNY Center for Advanced Technology In Photonics Applications (CUNY CAT)  
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## Fiber Optic Biohazard Sensor

The number of containerized cargo units and truck trailers entering this country daily presents a major security problem. A fiber optic sensor that can be used as a chemical biohazard, conventional explosive and nuclear radiation detection system has been developed. Built into cargo containers and truck trailers, or retrofitted into existing units these sensors provide rapid, noninvasive analytical triage of the contents. The present design includes an optical fiber whose cladding is modified in different regions to include materials that act as integrating sensors for the vapors released by explosives and chemical weapons, or are sensitive to emissions from radioactive materials, and biological materials.

### Advantages

- Rugged – Maintenance free – Infinite Lifetime
- No radioactive sources used (No shielding No exposure to radiation)
- Uses standard available fiber optic and laser technology.
- Selectable (properties of cladding impregnates can be varied to optimize detection of specific reagent).
- Minimizes “False Positives”
- Passive until interrogated



Fiber Optic Biohazard Sensor

### How it Works

Polymeric complexes are embedded in the fibers, which absorb light in the 400 to 500-nm region and fluoresce in the 600 to 700-nm region. These polymers are integrating detectors adsorbing vapors from biologicals or conventional explosives, while nuclear radiation chemically changes or damages the fiber's cladding. The fluorescence emission lifetimes are proportional the amount of vapor from an explosive or chemical weapon that is adsorbed, or the damage done to the polymer/cladding by radiation. The emission lifetime detects exposure to one or all of the hazards.

The excitation-detection system consists of a pulsed diode laser that provides a light pulse and a photodiode detector optimized to the decay of the 600-700 nm emission. In one application the sensor can be built into the walls of new containers or trailers or retrofitted to existing containers or trailers. The fiber is externally interrogated with a “reader” to see if has been exposed to CBNR agents.

This technology opportunity sheet describes continuing efforts in this area. Several patents may have been issued or are pending and which may be available for licensing.

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