

COSMIC – CBRNE Detection in Containers

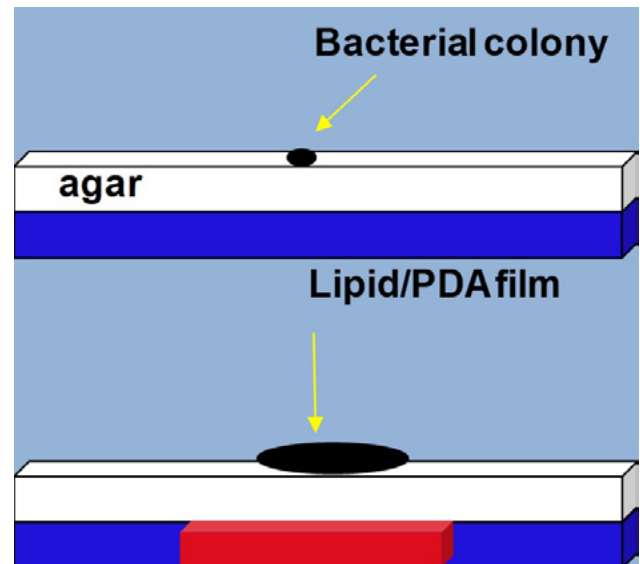
BGU: PDA (Bacteria in liquids and solids)

The threat of CBRNE (Chemical, Biological, Radiological, Nuclear and Explosives) materials used by terrorists is a major concern for EU and worldwide security.

The COSMIC project includes the research, design and implementation of a three stage (primary, secondary, focused manual inspection) detection architecture using combination of innovative sensors. COSMIC plans the introduction of new CBRNE Sensors for all three stages.

Biological:

The sensors developed at BGU, as part of the COSMIC-CBRNE project, are aimed at the Biological threats through detection of bacteria in liquids or in solids employing PDA based sensors.



Concept of operation:

BGU's sensors are based on Polydiacetylene (PDA). PDA is an interesting sensor as it exhibits a strong blue color due to electron delocalization in the conjugated polymer. Changes in the environment (e.g. bacteria and their secretion products) cause external defects and with this a color change from blue to red, which is also accompanied by fluorescence emission. PDA retains those properties in different configurations (e.g. thin films, vesicles, host-guest systems) and is therefore very versatile.

Thus, basic sensors for detection of bacteria in liquids or in solids through either color change or measurement of fluorescence by simple apparatus (e.g. hand-held fluorimeters) can be developed.

Type of sensors:

- a) Detection in liquid
Thin PDA films on glass or Perspex.
- b) Detection in solids
Preparation of Agar based sensors, with either incorporation of vesicles or thin films of PDA.

The main benefits of the PDA based bacterial sensor are the following:

- ❖ Fast, reliable and straightforward detection of B threats in shipping containers
- ❖ Detection is either visual or by simple apparatus
- ❖ Brief training
- ❖ Introduction of new and innovative B sensor
- ❖ Cost-benefit approach

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