

COSMIC – CBRNE Detection in Containers

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

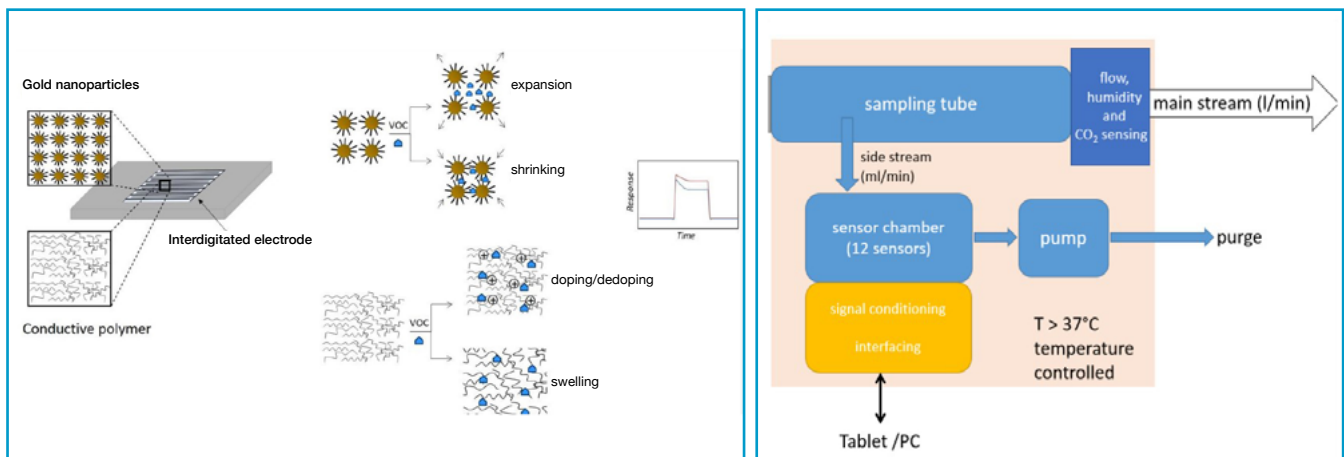
Technion: NaNose, sensor array technology

Goals

As part of the COSMIC project, the LNBD group at the Technion is responsible for developing a nanomaterial based sensor device that will be integrated in the system. The LNBD detection system will be aimed for two-phase detection as part of the primary and secondary stages of two of the target threats, chemical and biological agents, by identifying their volatile print in the containers.

Concept of operation

The NaNose system is based on modification of a series of artificially intelligent hybrid sensors that is based on chemiresistive layers, for the detection of by-products (so called, volatile organic compounds, VOCs) emitted from the target sample. Chemiresistive sensors are based on different nanomaterials such as metal nanoparticles, carbon nanotubes or modified polymers. Once exposed to the sample the different sensors respond, in a cross-reactive manner, to the samples causing an electrical resistance change. These changes are reordered and analyzed using machine learning algorithms. As a result, the NaNose can be “trained” to identify specific VOCs using pattern recognition methods. In the case of the chemical threat detection, system is trained to identify the specific chemical. Whereas in the case of the biological threats system will be trained to identify (suspected) species evaporating from the sample.



The main benefits of the NaNose sensor technology are the following:

- ❖ Fast detection of chemical and biological threats in shipping containers.
- ❖ Training potential for different threats
- ❖ On-site systems
- ❖ Cost-benefit approach compared to other solutions

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