

NANOSNIFFER™



Explosives Trace Detector

Need for an Explosive Trace Detector (ETD)

Selective and sensitive detection of explosives is very important in countering terrorist threats. Detecting trace explosives has become a very complex and expensive endeavour because of a number of factors, such as the wide variety of materials that can be used as explosives, the lack of easily detectable signatures, the vast number of avenues by which these weapons can be deployed, and the lack of inexpensive sensors with high sensitivity and selectivity.

Most common explosives have extremely low vapour pressures at ambient temperature. The very low vapour pressures indicate that these molecules are extremely sticky and tend to adsorb to surfaces very easily. Therefore, the sensing device must be highly sensitive.

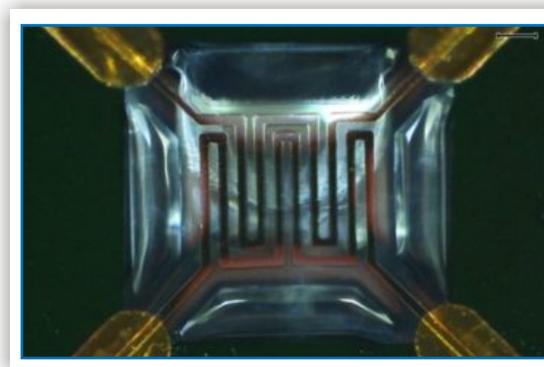
The ETDs in the market lack high selectivity – their sensors show false positives for common analytes such as water vapour, perfumes, smoke, shoe polish etc.

Therefore, high sensitivity & high selectivity & low deployment cost of instruments is desirable in an ETD product.



Nanosniffer: The instrument consists of a MEMS Microheater that acts as a Sensor. Other components are: Data Acquisition & Processing Electronics, Flow-Cell Assembly, User Interface, Power Elements etc.

Technology: Based on Microsensors, High Sensitivity & High Speed Electronic Instrumentation, and Intelligent Mathematical Algorithms.



Nanosniff's MEMS Microheater based ETD instrument satisfies all the requirements of an effective platform for the trace detection of explosives. Its Physics based approach uses Micro-Differential Thermal Analysis to distinguish explosives from non-explosives. The Micro-DTA facilitates recording of a calorimetric profile, for nanograms of materials, when they are rapidly heated to a high temperature (~ 500 deg C). The DTA profile comprises a combination of sublimation, melting, evaporation, and deflagration processes, for the sample material. Using this profile, it is possible to distinguish explosives from non-explosives. The detection decision is backed by High-speed Electronics & Sophisticated Signal Processing algorithms. It can detect even less than 10 nanograms of explosives. The sensitivity capability was validated by HEMRL (the DRDO Lab at Pune). Our approach has been to detect 'classes' of explosives; we have been successful in that. Since the approach is Physics based - it applies to other materials of the same class.

Operation: In the use case scenario, the user will 'swipe' the surface of persons, vehicles, & bags; and therefore, will collect explosives particles on a Swipe. This Swipe will be inserted into the instrument, where, the collected sample will be transferred to the Microheater sensor via evaporation from the swipe. Using the principle of differential calorimetry the Microheater detects whether the sample collected on the Swipe was an explosive or not.



Low Operational Cost : NanoSniffer provides the advanced explosives detection capabilities through its latest Microsensor technology, powered by a non-radioactive source in a very economical operational cost. NanoSniffer use less consumable items as compared to other technology based ETD's available in the market and has an automated internal calibration system which helps to reduce the operational cost by 40-60 % per annum.

Features Highlights:

- India's First Microsensor based Explosive trace detector
- No carrier Gas/Dopant required
- No radioactive source required
- Rapid clear-down time
- Data can be viewed offline
- Detection in less than 10 seconds
- Can detect "Nanogram" quantities of Explosive Traces
- Video and Audio alerts with sunlight-readable color display
- Not respond to the odour of non-explosive like medicines & perfumes.
- Very Low Operational Cost per annum as compared to other foreign OME's
- Resists contamination from weather, humidity, dirt and dust
- Operation not affected by Electro Magnetic Interference (EMI) of other electronic/electrical devices

Applications:

- Aviation Security
- Air Cargo Screening
- Customs & Border Protection
- Rail & Mass Transit
- Police & Law Enforcement
- Military & Defense
- Hotels & Shopping Malls
- Critical Infrastructure
- Ports

