

Chemical Warfare Agent Detection

Defiant Technologies presents the next generation of chemical warfare (CW) agent detection. Canary-Two™ is the first commercially available chemical analysis microsystem. Canary-Two™ isn't merely a sensor, it is a system. Selective preconcentration ensures that interfering chemicals like fuel vapors are ignored. Micro gas chromatography separates target chemicals for selectivity. These two features minimize the number of chemicals introduced to the SAW detector at any given time thus improving system performance. Canary-Two™ can detect chemical warfare agents, chemical weapon degradation products, and chemical weapon precursors. Figure 1 shows the system collecting separating and detecting 5 different chemicals simultaneously. Sarin, DMMP, soman, tabun, and cyclosarin are all

distinguished from one another in the same analysis. This cycle can be repeated every two minutes. Figure 2 shows the detection of methyl salicylate. This chemical is frequently used as a stimulant for mustard gas.

The data in figure 1 uses ambient air as the carrier gas. The column is one meter LIGA column coated with polydimethylsiloxane (PDMS). The flow rate through the GC is approximately 8mL/min and the GC temperature ramps from 60 °C to 90 °C at 30 °C/min. The data in figure two is collected on a different GC column it was ramped from 50 °C to 80 °C at 30 °C/min.

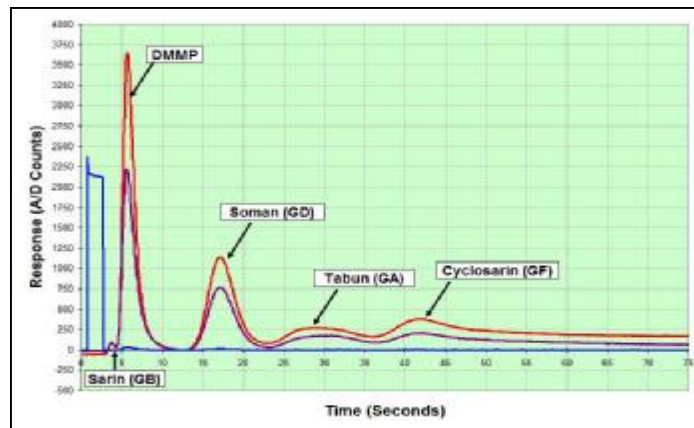


Figure 1: The graph above shows results of collecting separating and detecting GB, GD, GA, and GF all in the same analysis. In addition, our system is separating DMMP from the agents as well.

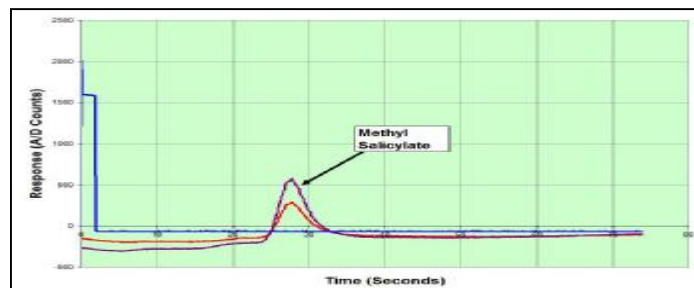


Figure 2: The above graph shows detection of methyl salicylate, often used as a stimulant for mustard gas.

A New Solution for Chemical Weapon Detection

Canary-Two™ offers a great deal to people of differing levels of experience. Non chemists can use the device as a point and analyze sensor system. The display will show the user which of the target chemicals the system was trained for are present. Experienced users or chromatographers will enjoy the fact that chromatographic data can be displayed on the screen or saved as a comma delimited data file on a laptop.

Canary-Two™ can detect nerve agents even in the presence of high concentra-

tions of interfering chemical s like fuel vapors. This means that drums of diesel fuel will not be identified as a chemical weapon. Inspectors can move on to inspect other potential sources.

This product can also be packaged in smaller configuration where batteries and displays may not be needed like facility monitors, unmanned aerial vehicles (UAV) or unmanned ground vehicles (UGV).

Defiant can provide this gas module for OEM applications.



Figure 3: Above is the gas module used to collect the data shown in figures 1 and 2. This module uses 2 SAW detectors; one in the bypass collection sample train and one in the GC analysis train.

Special points of interest:

- Simultaneous analysis of all nerve agents and blister
- Separate simulants like DMMP from actual nerve agents.
- PPB level detection in a 2 minute analysis cycle.
- Ambient air carrier gas.

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