

Chemical Sensors for EHS

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What is a chemical sensor?

How do they work? Electrical, optical, acoustical

Detection limits, sensitivity, <u>selectivity</u>

Sampling media gases, liquids, solids (evaporation of solids) Active or diffusive sampling



Selectivity

- Sensor arrays (tailored coatings to enhance the response to the target species)
- Data analysis methods PCA Neural networks
- Need to know what looking for so can best design and develop array

Will chemical sensors replace standard analytical laboratory instrumentation (GC-MS, HPLC, etc...)?

NO, but they can provide a cost effective method for monitoring a large area

- Enables monitoring plumes or population exposures to a given target species
- Standard analytical instrumentation can be distributed as needed to acquire more detailed information as necessary.



The Future

- New methods in the MEMS and IC industry enables new sensing structures to be designed and built cost effectively
- Integration of ancillary components on sensor platforms; power, memory, and data analysis enables a "lab on a chip" to be more of a reality
- Sensors can be fabricated using parallel manufacturing methods and 1000s of units are now possible.

Sensors for nanomaterial "targets" will be challenging but likely necessary