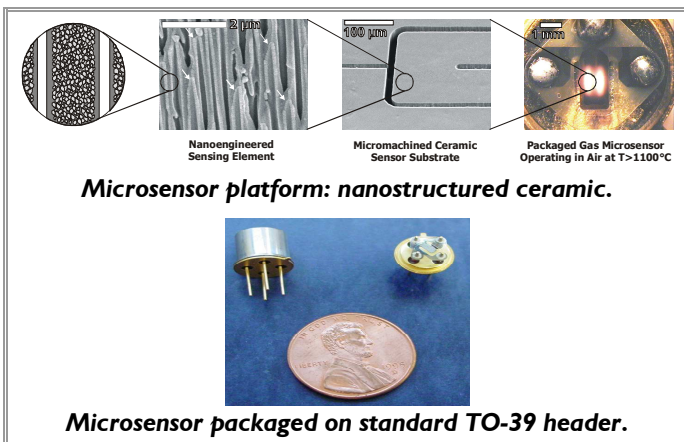


Air cleanliness is an issue of increasing concern in modern buildings. The EPA estimates that poor indoor air quality is responsible for over 125 million lost school days and over 10 million lost work days each year, and affects 33 to 50% of the commercial buildings in the US. Some of the most objectionable pollutants are Volatile Organic Chemicals (VOCs). Among them, formaldehyde (HCHO) is notorious as a common, toxic and hard to detect species. Humans begin to experience adverse effects when HCHO levels exceed 0.1 ppm. The World Health Organization recommends that HCHO exposure does not exceed 0.05 ppm.

The Synkera's approach to HCHO detection utilizes the conductivity change induced, upon exposure to HCHO, in a layer of tin oxide. Cross-sensitivity to other VOCs is eliminated by patterning of the tin oxide surface by an inert protecting layer with sub-nanometer pores, each shaped to selectively host a single HCHO molecule. Incorporating novel molecular recognition sensing material into a high-surface-area patented sensor platform will enable highly sensitive, selective, low-power, and low-cost HCHO microsensors. Synkera has been awarded a Phase I SBIR grant by NIEHS to demonstrate the feasibility of this technology.



General features of the sensors include:

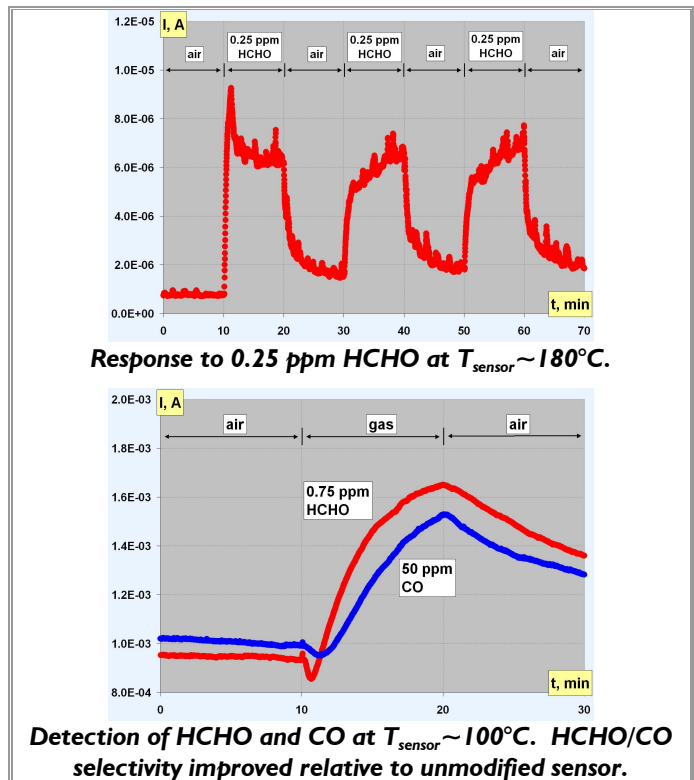
- large dynamic range,
- low power consumption (<250 mW) enabled by micromachined sensor platform,
- good reproducibility and low cost enabled by unique manufacturing methods,
- long lifetime enabled by the sensor design as a ceramic monolith,
- advanced temperature operating modes (e.g., cyclic and pulsed heating) enhance selectivity and sensitivity,

- potential for integration with a monolithic sensor array will allow measurement of other aspects of air quality.

Taken together these features will allow the sensors to be used reliably and affordably in a very diverse set of applications. At the midpoint of the feasibility study, Synkera has made excellent progress toward achieving program goals.

Targeted & achieved performance parameters:

- HCHO detection limit <0.05 targeted, <0.25 ppm achieved,
- Selectivity of HCHO detection versus benzene, CO, H₂O sufficient to prevent false alarm targeted, 50 ppm CO response is smaller than 0.75 ppm HCHO.



Having established that sensor surface modification can be used to enhance selectivity and sensitivity, Synkera will now focus on additional improvements to sensor performance. Partnerships will be sought to further develop the technology, including detection of HCHO and other VOC's. If you have a special application you would like to discuss, or questions you would like answered please contact:

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