

Screen-Printed Gas Sensor Using Nano-Particulate Catalyst NSF Phase I, II, IIB; Award # IIP-1058563

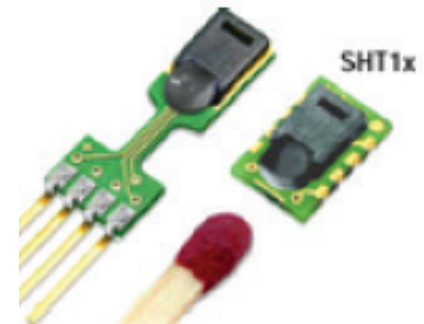
Need: This sensor will provide comparable/improved performance to commercially available industrial CO sensors, but with a much lower cost and smaller size than is currently available. Market feedback has indicated that the new “Printed Gas Sensor” will allow us to revolutionize and expand existing markets as well as open new wearable and wireless markets. The innovative new sensor technology is a platform that is scalable, low cost, high performance, ultra low power, and exceptionally long lifetime, a combination heretofore not possible for gas sensors. Newly enabled applications include:

- Wireless Sensor Networks and wearable sensors;
- Multi-gas arrays in single package; environmental arrays!
- EPA priority pollutant sensors; ppb-level sensing
- Chip size gas sensors with microwatt power needs!
- Low cost manufacture scalable to ultra-high volumes



Approach/Results: During Phases I and II we developed a lower-cost, high performance CO sensor that is able to be manufactured using high volume “printed electronics” processes. This sensor (top right) is currently entering high-volume production and customer evaluation. The next generation, sensor will be less than 5x5x1mm (see illustration lower right), and inexpensive enough to be incorporated into cell phones and other mobile devices. Yet performance will be comparable to expensive sensors.

Results are especially impressive because using the semiconductor paradigm in processing plastic sensors bring order of magnitude reductions in size, cost, and processing/packaging for gas sensors.



Examples of printed gas sensors compared to conventional, amperometric sensor.

Benefits/Innovation: Toxic and hazardous gases like CO lead to millions of preventable deaths worldwide. This new platform technology enables CO and important gas sensors to be measured and monitored with evidential quality in a low cost mass produced package! The health, safety, security, and comfort of populations around the world will be impacted by this new development and the new sensors will provide highly reliable, innovative chip size ultra-low power sensors for ubiquitous monitoring of indoor and outdoor pollutants. Strategic partners for applications are sought and this technology has been licensed to SPEC-Sensors, LLC, Newark CA, USA..