

## **Thin film in sensing Application**

The ability to detect gaseous hydrogen is of critical importance to acceptance and utilization of hydrogen as an energy carrier. Micro-machined gas sensors are a new generation of sensor technology combining existing integrated circuit fabrication technology with novel deposition and etching processing. This results in a new device structure, known as a “micro-hotplate”, which consists of an integrated hotplate on a suspended thermal isolation structure. This structure allows the sensor to operate at elevated temperatures, and provides a platform where the operating temperature can be rapidly changed to achieve desired response characteristics. The combination of micro-hotplate and novel active thin film materials has led to hydrogen sensors that demonstrate an array of highly desirable features, such as fast response speeds, low-level sensitivity, and amenability to mass production. These sensors are adaptable to a wide variety of sensing applications for a hydrogen-based energy economy, spanning from hydrogen based process monitoring to life safety protection.

This progress includes designing the sensor geometry to reduce power consumption and investigating the cross sensitivity to several contaminant gases – carbon monoxide, hydrogen sulfide, and isopropyl alcohol. Portable signal conditioning hardware was developed to help study long-term operation stabilityal