

## Hydrogen safety sensors using palladium nanowire array

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Very sensitive hydrogen sensor is fabricated using palladium(Pd) nanowires electroplated using anodized alumina template. Mechanism for detecting hydrogen concentration is different from conventional hydrogen sensors using Pd. The Pd nanowires have a diameter of about 80nm and the spacing between the wires is about 10nm. Upon diluted hydrogen environment, the wires become swollen as a result of hydrogen dissolution and as the result the resistance decreases due to the closer gap between the wires. In case of Pd thin film sensor, the resistance through the film increases as the hydrogen concentration increases. Even though a Pd nanowire sensor has been reported by Penner group (Science, 2001), the sensor has a different sensing mechanism of joining nanocrystallites being composed of Pd nanowires and the lower limit of hydrogen concentration is about 1%. The sensor fabricated in this study shows faster response time and can detect as low as 0.1% hydrogen concentration.