

## Gasochromic response of Pd/NiO nanostructured film towards hydrogen.

### Abstract

The gasochromic performance of nanostructured nickel oxide (NiO) films coated with 25 Å catalytic palladium (Pd) layer were investigated for low concentration hydrogen (H<sub>2</sub>) sensing. NiO nanostructures of 20-30 nm sizes were produced via RF sputtering deposition of NiO on quartz substrates and subsequently annealed at 500 °C. It was found that the Pd/NiO films show significant gasochromic response when exposed to H<sub>2</sub> at elevated temperatures. Integrating the absorbance change over a range of visible wavelengths (500-800 nm), has enabled very low concentrations of H<sub>2</sub> (0.06%) to be sensed in real time. The 90% response of 25 Å Pd/100 nm NiO film towards 0.06% H<sub>2</sub> in a balance of synthetic air was approximately 120 s at 170 °C. Similar H<sub>2</sub> concentration can be recovered in as little as 240 s at 170 °C.

**Keyword:** Sputtered NiO; Palladium; Hydrogen sensing; Absorbance response; Optical.