

## **Enhanced LPG response characteristics of SnO<sub>2</sub> thin film based sensors loaded with Pt clusters**

Divya Haridas<sup>1</sup>, Arijit Chowdhuri<sup>2</sup>, K. Sreenivas<sup>1</sup> and Vinay Gupta<sup>1</sup>

<sup>1</sup>Department of Physics and Astrophysics, University of Delhi, Delhi 110 007, INDIA

<sup>2</sup>Acharya Narendra Dev College, (University of Delhi), Kalkaji, New Delhi 110 019, INDIA

Email: [divya\\_h14@rediffmail.com](mailto:divya_h14@rediffmail.com), [vinaygupta@ieee.org](mailto:vinaygupta@ieee.org)

### **ABSTRACT**

RF sputtered SnO<sub>2</sub> thin films (90 nm thick) loaded with clusters of nanoscale (8 nm) metal catalysts (Pt, Ag, Ni, Pb, Al, Pd) are investigated for LPG detection. SnO<sub>2</sub> film loaded with Pt catalyst clusters exhibits enhanced response ( $\sim 7.5 \times 10^2$ ) to 200 ppm of LPG at a relatively low operating temperature (185°C) with a fast response time of 100s. Variation of thickness of Pt clusters in the nanoscale range (2 to 20 nm) is seen to significantly influence the sensor response characteristics. Enhanced performance is observed for SnO<sub>2</sub> thin films loaded with 10 nm thick platinum clusters that exhibited a high response ( $\sim 5 \times 10^3$ ) at an operating temperature, of 220°C. Preliminary results indicate the potential application of prepared sensor structure of Pt clusters (10nm)/SnO<sub>2</sub> (90 nm)/IDE/glass substrate for efficient detection of LPG at relatively low temperature.

*Keywords:* Gas Sensor, Pt clusters-SnO<sub>2</sub>, Thin films, Sputtering, LPG