

Enhanced LPG response characteristics of SnO₂ thin film based sensors loaded with Pt clusters

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ABSTRACT

RF sputtered SnO₂ 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. SnO₂ 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 SnO₂ 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)/SnO₂ (90 nm)/IDE/glass substrate for efficient detection of LPG at relatively low temperature.

Keywords: Gas Sensor, Pt clusters-SnO₂, Thin films, Sputtering, LPG