

Accepted Manuscript

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F.I. Shaikh, L.P. Chikhale, I.S. Mulla, S.S. Suryavanshi

PII: S0032-5910(17)30976-2
DOI: doi:[10.1016/j.powtec.2017.12.028](https://doi.org/10.1016/j.powtec.2017.12.028)
Reference: PTEC 13017

To appear in: *Powder Technology*

Received date: 17 May 2017
Accepted date: 3 December 2017



Please cite this article as: F.I. Shaikh, L.P. Chikhale, I.S. Mulla, S.S. Suryavanshi, Facile Co-precipitation synthesis and ethanol sensing performance of Pd loaded Sr doped SnO₂ nanoparticles, *Powder Technology* (2017), doi:[10.1016/j.powtec.2017.12.028](https://doi.org/10.1016/j.powtec.2017.12.028)

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Facile Co-precipitation synthesis and ethanol sensing performance of Pd loaded Sr doped SnO₂ nanoparticles

F.I. Shaikh^a, L.P. Chikhale^a, I.S. Mulla^b, S.S. Suryavanshi^{a*}

^aSchool of Physical Sciences, Solapur University, Solapur 413255, (M.S.) India

^bEmeritus Scientist, Council of Scientific and Industrial Research (M.S.) India

Abstract:

In present communication, we have presented a high performance ethanol sensor based on Pd loaded Sr doped SnO₂ nanomaterial. The (0.5, 1.5, 2.5 and 3) wt% Pd loaded 4 mol% Sr doped SnO₂ nanoparticles were prepared using a co-precipitation method. The samples were characterized by X-ray Diffraction (XRD), High Resolution Transmission Electron Microscope (HR-TEM), Selected Area Electron Diffraction (SAED), Field Emission Gun-Scanning Electron Microscope (FEG-SEM), (SEM-EDAX) Scanning Electron Microscope-Energy Dispersive Analysis by X-ray techniques. The gas response studies such as sensitivity, selectivity and stability towards liquid petroleum gas (LPG), ammonia (NH₃), acetone (CH₃COCH₃) and ethanol (C₂H₅OH) were measured at 100 ppm concentrations. The results show that optimum Pd loading (2.5 wt%) results in smaller crystallite size (~3.7 nm), lower operating temperature (275 °C), higher gas response (93%), better selectivity, faster response (~1 sec) and quicker recovery (~5 sec) towards ethanol.

Keywords: Tin dioxide; Pd loading, Strontium oxide; Screen printing; Thick film; Ethanol sensor

Corresponding Author: S. S. Suryavanshi

Email: sssuryavanshi@rediffmail.com

Telephone & Fax: +91-0217-2744771: 2744770

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