



Contribution ID: 64

Type: **Poster Presentation**

Gas-Sensing Properties of TiO_2 Nanoparticles Double Doped with Ag and Cu

Tuesday, 4 July 2017 17:10 (1h 50m)

Nanometric powders of titanium dioxide (TiO_2) were prepared by the sol-gel synthesis of titanium isopropoxide. With Ag and Cu as dopants, single and double doped samples, at doping levels of 5% molar weight, were achieved. In addition, undoped samples were also prepared. The samples were dried in air at 100°C and post annealing was done at 300°C and 900°C , in order to obtain the anatase and rutile polymorphs respectively. The changes in the electrical conductivities of representative anatase and rutile TiO_2 nanopowders upon exposure to water-vapour, ammonia (NH_3) and hydrogen (H_2) were then investigated. Sensing measurements for water-vapour was done at room temperature for various humidity levels ranging from 5.4% RH to 88.4% RH. The detection of NH_3 and H_2 gases were carried out at temperatures extending from room temperature to 350°C and over concentration ranges of 25 sccm to 500 sccm and 15 sccm to 200 sccm respectively. The gas-sensing results show that the sol-gel fabricated TiO_2 nanoparticles (particularly in anatase form), has excellent fast and stable dynamic responses to humidity, NH_3 and H_2 . They feature good sensitivities, even at a low operating temperatures. However, acceptor behaviour, for which there was a conductivity switch from n-type to p-type, was recorded for the Ag-doped rutile powders at operating temperatures of 300°C and 350°C . Overall, the double-doped sample annealed at 300°C was deemed the most promising candidate for gas-sensing.

Apply to be considered for a student award (Yes / No)?

No

Level for award (Hons, MSc, PhD, N/A)?

N/A

Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

Yes

Primary author: Mr NUBI, Olatunbosun Nubi (University of Limpopo)

Co-author: Dr MOSUANG, Thuto (University of Limpopo)

Presenter: Mr NUBI, Olatunbosun Nubi (University of Limpopo)

Session Classification: Poster Session 1

Track Classification: Track A - Division for Physics of Condensed Matter and Materials