Contribution ID: **301** Type: **Poster Presentation**

Structural and optical properties of NiO nanopowders prepared by co-precipitation method for gas sensing applications

Tuesday, 26 June 2018 15:00 (2 hours)

Prompt technological and industrial advances uninterruptedly cause the release of hazardous and toxic gases that are harmful to human life; as a result sensing devices that are sensitive and selective to such gases are desirable. Presently, gas sensors based on semiconductor metal oxide (SMO) materials are pleasing more consideration, because of their evident change in electrical resistance when exposed to the target gases such as reducing and oxidizing gases [1]. Amongst the semiconductor metal oxide, p-type nickel oxide (NiO) was found to be promising candidate for gas sensing applications due to its wide bandgap (˜ 3.6 - 4 eV) [2], high specific surface area, excellent structural stability. Therefore, we report on the gas sensing characteristics of NiO nanostructures prepared by co-precipitation method at various reaction times ranging from 2 to 24 hours. X-ray diffraction patterns revealed that nanostructures are polycrystalline, displaying average crystallite sizes of ˜ 10 - 12 nm. The physical variation of colour from green to black after heat treatment was assigned with the non-stoichiometric property of NiO which was confirmed from photoluminescence and electron paramagnetic resonance studies. The effects of non-stoichiometry and energy bandgap on the gas sensing properties of NiO based sensor have been investigated towards various oxidizing and reducing gases at various operating temperatures.

Keywords: surface area, adsorption, desorption, gas sensing.

References

[1]. T.-H. Kim, J.-W. Yoona, Y.C. Kang, F. Abdel-Hady, A.A. Wazzan, J.-H. Lee, Sensors and Actuators B 240 (2017) 1049–1057.

[2]. A. Yazdani, H. Zafarkish, K. Rahimi, Materials Science in Semiconductor Processing, 74 (2018) 225 – 231.

Please confirm that you
have carefully read the
abstract submission instructions
under the menu item
”Call for Abstracts”
(Yes / No)

Yes

Consideration for
student awards
Choose one option
from those below.
N/A
Hons
MSc
PhD

PhD

Supervisor details
If not a student, type N/A.
Student abstract submision
requires supervisor permission:
please give their name,
institution and email address.

D.E Motaung, DST/CSIR National Centre for Nanostructured Materials, DMotaung@csir.co.za
H.C Swart, Department of Physics, University of the Free State, swartHC@ufs.ac.za

Primary authors: Prof. MOTAUNG, David (University of the Free State); Prof. SWART, Hendrik (University of the Free State); Mr MOKOENA, Teboho (University of the Free State)

Presenter: Mr MOKOENA, Teboho (University of the Free State)

Session Classification: Poster Session 1

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