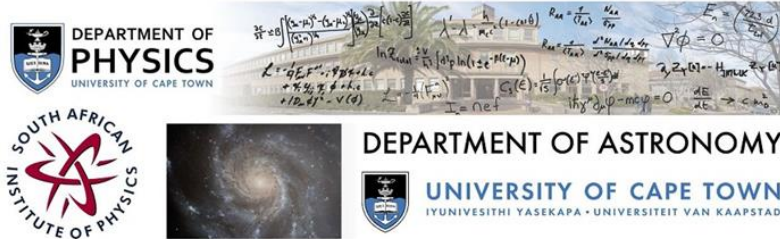


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Metal Oxide N-doped CNTs decorated Gas sensors

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Abstract :

Carbon nanotube (CNTs) continues to exhibit great potential in their applications as chemical sensors due to their unique chemical and physical properties [1-3]. These hexagonal networks of carbon atoms have been used principally due to their large surface area and their ability to fine tune the electrical properties to increase surface reactivity to reagents such as CH_4 , CO , H_2 . In this work N-doped MWCNTs (CN_x) were synthesised using horizontal chemical vapour deposition (CVD) at 850°C and decorated with metal oxides for sensor applications. The dependence of structural disorder and electrical properties on nitrogen concentration on CNTs is established. Furthermore functionalization of CN_x through the side wall decoration with metal oxide (SnO_2 and CuO) nanoparticles has been carried out to enhanced surface reactivity. The physico-chemical properties of the decorated CN_x have been carried using XRD, Raman, TEM and EDX to establish the coverage and disorder of the nanoparticles onto CN_x matrix. As a proof of concept decorated CN_x were tested for gas sensing applications through measurements of the change in electrical resistance as a function of analyte composition (0-250ppm) at varying temperatures (300K-700K). REFERENCES1. Brahim, S., et al., Carbon nanotube-based ethanol sensors. Nanotechnology, 2009: p. 7.2. Klein, K.L., et al., Surface characterization and functionalization of carbon nanofibers. Journal of Applied Physics, 2008. 103: p. 26.3. Wang, Y. and J.T.W. Yeow, A Review of Carbon Nanotubes-Based Gas Sensors. Journal of Sensors, 2009. 2009: p. 24.

Award :

Yes

Level :

PhD

Supervisor :

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Paper :

Yes

Permission :

Yes

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