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## V2O5 nanostructures for gas sensing: doping, and low temperature detection of Methanol, Ethanol and NO2 with superior response of H2S

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A facile reflux method was used to synthesize the undoped and Au-doped V2O5 nanoparticle powder samples at concentrations ranging from 1 wt% to 5 wt%. XRD, SEM, BET, FTIR and UV-Vis analysis revealed a change in morphology from spherical to nanorod-like nanostructures upon doping with the gold. The Au-doped V2O5 nanostructures tend to increase in surface area, and also become more crystalline with increase in Au concentration. The V2O5 nanostructures were found to have a larger optical band gap when compared with bulk V2O5. The undoped V2O5 sample was tested against ethanol (C2H5OH), hydrogen sulphide (H2S), methanol (CH3OH) and nitrogen dioxide (NO2), at low temperatures ranging from 25oC to 150oC and concentrations from 5 ppm to 100 ppm. A high response of 130 towards 100 ppm H2S at 75oC, was exhibited by the undoped sensor. The sensitivity of the V2O5 sensor in the low temperature range of 25oC to 150oC was found to follow the sequence of H2S > C2H5OH > CH3OH > NO2.

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

Yes

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

MSc

**Primary author:** MOKWENA, Mick Molukie (University of limpopo)

Co-authors: Dr NUBI, Olatunbosun (University of Limpopo); Dr AKANDE, Amos (University of Sydney)

**Presenter:** MOKWENA, Mick Molukie (University of limpopo)

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