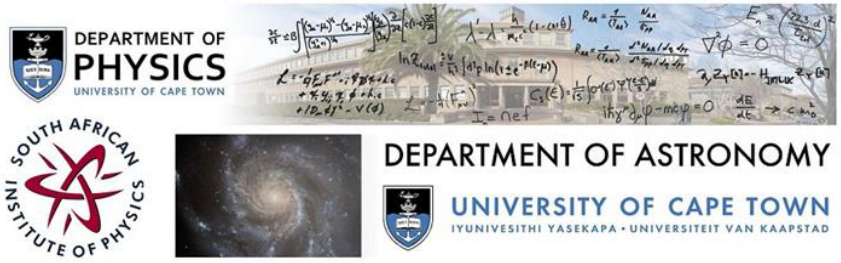

Contribution ID: **405** Type: **Oral Presentation**

Effect of Hydrochloric Acid on the Structure, Defect States and Gas Sensing Properties of TiO₂ Nanotubes by Hydrothermal Method

Thursday, 7 July 2016 10:00 (20 minutes)

Abstract content
   (Max 300 words)
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We report on the enhanced gas sensing properties of TiO₂ nanotubes synthesized following a microwave assisted hydrothermal method followed by washing with various concentrations of Hydrochloric acid (HCl) and distilled water (DW). The Scanning electron microscope displayed a change in morphology from nanoparticles to nanotubes after hydrothermal treatment. The nanotubes washed with DW only displayed narrow nanotubes with diameter approximately 13.92 nm. Samples washed with 0.25 and 0.5 M of HCl have diameters approximately 15.08 and 17.09 nm respectively. Introducing 1.0 M HCl more nanotubes were formed with average diameter approximately 22.27 nm. The structural analyses displayed a mixture of anatase and rutile phase with anatase dominating. Moreover, an increase in crystallinity and growth in diameter of the nanotubes is observed at higher HCl concentration. The Photoluminescence (PL) and the Electron paramagnetic resonance (EPR) analysis showed high concentration of oxygen vacancies (V_o) which have a high contribution on the gas sensing. The gas sensing properties such response, sensitivity and selectivity were carried out towards CH₄, H₂, NH₃, CO and NO₂ gas at different temperatures. The enhanced sensitivity of the TiO₂ nanotubes was attributed to the high surface area provided by the one dimensional nanotubes since they behave as nanochannels for gas diffusion.

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