SAIP2016



Contribution ID: 414

Type: Poster Presentation

The Effect of Annealing Temperature on the Sensitivity and Selectivity of TiO₂ base Gas Sensors

Tuesday, 5 July 2016 16:10 (1h 50m)

Abstract content
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In this study we report on the effect of annealing temperature on the TiO₂ nanostructure based chemoresistive gas sensors synthesized using microwave assisted hydrothermal treatment. The sensing response, structural, optical and magnetic properties were carried out using various analytical techniques. The X-ray diffraction, Raman and transmission electron microscope displayed an increase in rutile (110) and (101) peaks at 700 °C annealing temperature. The scanning electron microscope revealed that the web of nanotubes transforms to short nanorod like structures at 700 °C. Photoluminescence analysis showed an increase in band edge and a decrease in oxygen vacancies concentration as the annealing temperature increases. The electron paramagnetic resonance displayed room temperature ferromagnetism due to the presence of Ti⁴⁺- O²⁻ and Ti³⁺ radicals on the surface and lattice respectively. We observed a decrease in a sensing response as the annealing temperature increases.

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Main supervisor (name and email)
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Session Classification: Poster Session (1)

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