

Nanostructured composites of titanium oxide and single wall carbon nanotube for gas sensor

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Nanostructured gas sensor like nanorod, nanotube has been studied due to its large surface area for improved gas sensing property. The composites of titanium oxide and single walled carbon nanotube were prepared for application to gas sensing material. For porous nanostructure, single walled carbon nanotubes were synthesized by the in-situ arc-discharge method followed by thermal purification to remove amorphous carbon in the deposit. Titanium metal layer was then deposited on the single walled carbon nanotubes by the magnetron DC sputtering method. Thermal oxidation process was held to oxidize titanium metal particles on the single walled carbon nanotubes. The morphology and structure of the composites were characterized by FESEM and XRD. The morphology of the as-deposited single wall carbon nanotubes was like a thicket and it did not change after oxidation. The resulting structure was a thicket of titanium oxide nanotubes with single wall carbon nanotube wicks. The sensing properties of the nanostructured composites to several gas species will be discussed.