proceedings

Abstract

Electrical and Gas Sensing Properties of *p-Type* Co_3O_4 Loaded *n-Type* TiO_2 Nanotubes Heterostructures †

Alp Kılıç, Onur Alev and Zafer Ziya Öztürk *

Department of Physics, Gebze Technical University, 41400 Kocaeli, Turkey
* Correspondence: zozturk@gtu.edu.tr
† Presented at the 5th International Symposium on Sensor Science (I3S 2017), Barcelona, Spain, 27–29 September 2017.

Published: 4 December 2017

p-type Co_3O_4 particles loaded onto *n-type* TiO_2 nanotubes (NTs) with controlled Co_3O_4 density were synthesized using a two-step electrochemical deposition procedure. Morphology and structure of the fabricated samples were characterized by Scanning Electron Microscopy equipped with Energy Dispersive X-ray Spectroscopy and the X-ray Diffraction method. The effect of loading density on the electrical and gas sensing properties of the loaded *n-type* TiO_2 NTs was investigated. *C-V* and *I-V* characteristics were obtained and the heterojunction barrier height was determined. Sensor properties of hydrogen (H_2), NO_2 and VOCs with varying operation temperatures were measured. The results show that Co_3O_4 particle density on the surface of TiO_2 NTs directly affects the sensor performance such as selectivity and sensor response, even at low operation temperatures.

Acknowledgement: This study was supported by The Scientific and Technological Research Council of Turkey (TUBITAK) Grant No: 116M201.

© 2017 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).