6TH INTERNATIONAL CONFERENCE on MATERIALS ENGINEERING and METALLURGY
Iran.Tehran 28, 29 Oct. 2017
iMAT CONFERENCE 2017
تهران – ایران ۶ و ۷ آبان ماه ۱۳۹۶
ششمین کنفرانس بین المللی مهندسی مواد و متالورژی و یازدهمین کنفرانس مشترک انجمن مهندسی متالورژی و مواد ایران و انجمن علمی ریخته گری ایران

Synthesis of noble-metal doped tin dioxide nanohybrid and its application in the chemiresistive sensors

Shiva Navazani[1], Mostafa Hassanisadi[2], Ali Shokufar[3], Mojtaba Askarieh[4]

Abstract

SnO_2 quantum dots and doped SnO_2 nanohybrid were synthesized and evaluated as chemiresistive gas sensors for methane detection at moderate temperatures. SnO_2-QDs were synthesized through one pot hydrothermal method and doped with noble metal catalyst. The sensors response to 1000ppm CH_4 were measured at the temperature range of 100-300^oC. Our experiments demonstrated that presence of the dopants increased the response of SnO_2-QD sensor toward methane gas from 12.5% to 52% at 200^oC. On the other hand, sensing optimum operating temperature for methane, reduced from 300^oC for SnO_2-QD to 200^oC for the hybrid SnO_2; addition of the catalysts improved the sensing characteristics of gas sensor and the device could operate at lower temperatures. The nanostructured hybrid materials were characterized by X-ray diffractometer (XRD) and Field Emission Scanning Electron Microscope (FESEM).

Keywords: SnO_2, sensor, chemiresistive, noble-metal doped tin dioxide

[1] PhD student of materials science and engineering

[2] Assistant professor of analytical chemistry, Nanotechnology research center, Research institute of petroleum industry, Tehran, Iran, mhsaadi@ripi.ir

[3] Professor of materials science and engineering, Advanced materials and nanotechnology lab, KNTU, Tehran, Iran, shokuhfar@knt.ac.ir

4 Msc of chemical engineering, Nanotechnology research center, Research institute of petroleum industry, Tehran, Iran, m.ask@aol.com