

Zinc Oxide Tetrapod Impregnated with Platinum for Ethanol Sensor

Chawalit Bhoomanee, Pamika Phunsod, Atcharawan Gardchareon,
Pongsri Mongkorntong, Nikorn Mongkorntong and Supab Choopun*

*Department of Physics, Faculty of Science, Chiang Mai University, Chiang Mai
50200, Thailand.*

**Corresponding author. E-mail: supab@science.cmu.ac.th*

ABSTRACT

Ethanol sensors were fabricated from tetrapod and tetrapod impregnated with platinum. The tetrapod was prepared from zinc powder by using thermal oxidation technique. Tetrapod were pressed into the cylindrical tube and sintering at temperature of 800oC for 12 hours. After that these tubes were dipped in chloroplatinic acid ($H_2PtCl_6 \cdot (H_2O)_6$) for 30 sec and sintered again at 400°C for 3 hours. Surface morphology was studied by FE-SEM. The sensors were tested toward ethanol vapor at concentration of 100 ppm and at the operating temperature of 200-280°C. It was found that there was no improvement of sensitivity for Pt impregnated sensor. However, the improvement of response and recovery for ethanol sensor based on zinc oxide tetrapod impregnated with platinum were observed.

Key words: Zinc oxide, Tetrapod, Ethanol sensor, Gas sensor

INTRODUCTION

Nowadays, gas sensors based on metal-oxides such as ZnO, TiO₂, SnO₂, and Fe₂O₃ are widely studied. Zinc Oxide (ZnO) is one of the promising metal oxide wide-band gap semiconductors for ethanol sensor. Recently, ZnO nanostructures have attracted much attention for gas sensors because of their increasing surface-to-volume ratio. ZnO nanostructures can be synthesized by several methods such as sputtering technique (Choopun et al., 2005(b)), vapor deposition (Chen et al., 2005), pulsed laser deposition (PLD) (Choopun et al., 2005(a)), metal organics chemical vapor deposition (MOCVD) (Xu et al., 2005) and oxidation method (Chen et al., 2004; Sekar et al., 2005; Zhang et al., 2005; Yawong et al., 2005), etc. The oxidation method is the most commonly used for preparation ZnO nanostructures due to low cost and ease of preparation compared to other methods.

In this work, ZnO tetrapods were synthesized by thermal oxidation technique. Ethanol sensors were fabricated from tetrapod and tetrapod impregnated with platinum and the ethanol sensing properties of sensors were reported.