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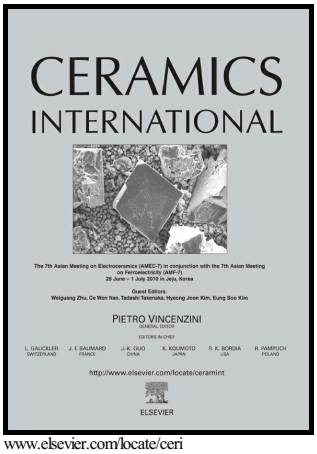

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One-step hydrothermal fabrication of nanosheet-assembled NiO/ZnO microflower and its ethanol sensing property

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Abstract

In this work, we report a simple synthesis of hierarchical flower-like NiO/ZnO heterostructure consisting of numerous nanosheets via a facile one-step hydrothermal method. The gas-sensing results reveal that the NiO/ZnO composite based sensor presents excellent properties towards ethanol such as high gas response and good repeatability. The excellent performances are predominantly ascribed to the p-n heterojunction strengthening at the interface between p-type NiO and n-type ZnO, which causes the change of depletion layer and potential barrier height. Moreover, the unique hierarchical architectures may play an evenly important role in the surface sensing reaction.

Keywords: NiO/ZnO composite; hierarchical heterostructure; p-n heterojunction; ethanol sensing

1. Introduction

Nowadays, with the rapid progress of technology and industry, the atmospheric pollution is becoming a severe and widely concerning problem. In this respect, metal-oxide semiconductor based gas sensors are urgently needed to achieve effective detection of toxic and harmful gases in air [1-3]. Among them, Zinc oxide (ZnO), a typical n-type semiconductor with a wide band gap of