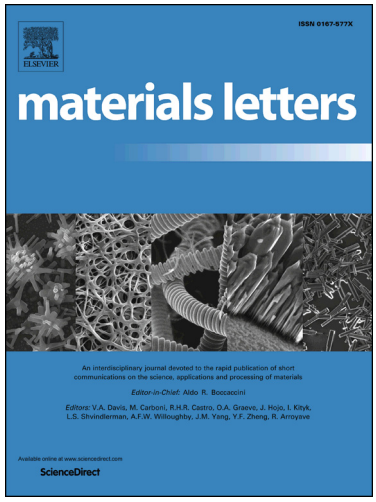

Template-free synthesis of nanoarrays SnO_2 hollow microcubes with high gas-sensing performance to ether

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Template-free synthesis of nanoarrays SnO_2 hollow microcubes with high gas-sensing performance to ether

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Abstract: Hierarchical nanoarrays SnO_2 hollow microcubes were successfully synthesized by a simple one-pot template-free hydrothermal route without any substrates. The as-prepared products demonstrated novel hollow SnO_2 microcubes with side length of 2-3 μm. Noticeably, the SnO_2 cubic surfaces exhibited a hierarchical architecture of well-aligned nanorod arrays. The gas-sensing properties indicated that the nanoarrays SnO_2 hollow microcubes possessed superior sensitivity towards ether at the heating voltage of 4.5 V. The formation and sensing mechanism of the nanoarrays SnO_2 hollow microcubes were proposed in this paper.

Keywords: Tin oxide; Semiconductors; Nanoarrays microcubes; Hydrothermal route; Sensors; Ether

1. Introduction

SnO_2, a n-type wide band gap semiconductor, has grabbed prominent attention due to its extensive applications in many fields [1-4]. It is the most frequently application as sensitive material for detection of various VOCs owing to higher sensitivity, chemical stability and the lower cost [5]. However, it should be mentioned that SnO_2-based sensors with an extremely low response to certain gases, especially ether, has not yet been reported until now. As is well known, nanostructures and morphologies of the materials may dramatically affect their sensing properties. Due to the large active surface area, efficient gas diffusion and mass transport induced by unique channels,