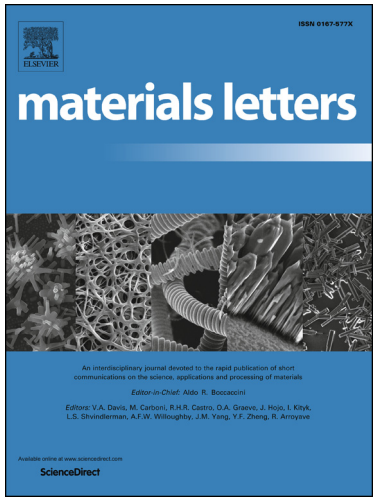

Enhancement of hydrogen sensing response of ZnO nanowires for the decoration of WO_3 nanoparticles

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Enhancement of hydrogen sensing response of ZnO nanowires for the decoration of WO_3 nanoparticles

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WO_3 nanoparticle-decorated ZnO nanowires are synthesized by the hydrothermal and vapor-liquid solid (VLS) methods, respectively. WO_3 nanoparticles are decorated on the surface of ZnO nanowires to fabricate the highly sensitive hydrogen gas sensor. This structured sensor presents a sensing response that is 4.3 times higher than its counterpart for 2000 ppm hydrogen gas. The variation in depletion layer width of the ZnO nanowires increases as the WO_3 nanoparticles are decorated. This improves the sensing response of the WO_3 nanoparticle-decorated ZnO nanowire sensor compared with its counterpart. In this research, a synthetic method of WO_3 nanoparticle-decorated ZnO nanowires is described, and its physical and chemical properties are analyzed. Moreover, the sensing responses are measured, and the sensing mechanism is discussed in this literature.

Keywords: nanowires, nanoparticles, sensor, hydrogen, ZnO, WO_3.

Introduction

Hydrogen gas is applied in various industrial fields, and the demand for it is currently increasing since being developed as a fuel for next-generation eco-friendly vehicles. However, since this gas has no color, smell, or taste, its detection is very important for its safe use [1]. Many sensors to detect this gas have been developed in previous decades [2-4], however, their sensitivities are not sufficient for the application of commercial hydrogen sensors.

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