



Properties of a single SnO₂:Zn₂SnO₄ – Functionalized nanowire based nanosensor

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<https://doi.org/10.1016/j.ceramint.2017.12.075>

Abstract

Tin oxide nanowires (SnO₂ NWs) exhibit large potential for applications in sensor and detector technology. Using a flame transport synthesis method, high-quality single crystalline SnO₂ nanowires (NWs) with Zn₂SnO₄ dots functionalized surface were synthesized on a large scale. The individual SnO₂:Zn₂SnO₄ nanowire based ultraviolet photodetector and ethanol vapors nanosensors were fabricated by contacting an individual nanowire to pre-patterned Au electrodes via a FIB/SEM system. The photodetector structure exhibited excellent photoconductive performance in terms of high response to the 375 nm ultraviolet light irradiation, ultra-fast response and recovery time at different temperatures (25–300 K). It also showed a long term stability and reliability. The n-type semiconducting behavior of the SnO₂:Zn₂SnO₄, forms an excellent material for fabricating highly sensitive and rapid responding sensors, which will enable the development of high-performance multi-functional devices.