

PHOTORESISTORS & PV CELLS BASED ON ZINC OXIDE NANORODS GROWN BY AN ULTRA FAST HYDROTHERMAL PROCESS

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Abstract

Zinc oxide is a II-VI semiconductor material that focused a growing interest in various fields such as biology, medicine or electronics. This semiconductor reveals very special physical and chemical properties, which imply many applications including a transparent electrode in solar cells or LED diodes. In this work we present a new, extremely fast, cheap and safe method for the growth of ZnO nanostructures. The density and sizes of the nanostructures can be controlled over a wide range. Such a fast growth rate is reported for the first time. Growth of nanostructures was performed in microwave assisted hydrothermal reactor, but similar results were obtained in the heated magnetic stirrer. Moreover received nanorods are characterized by a very high quality. We use hydrothermal method and fairly low growth temperature of 50°C. As a substrate can be used almost every commercial substrate. We used deionized water and zinc acetate as an oxygen and zinc precursors, respectively. The method is fully reproducible and extremely fast, the growth of nanostructures generally lasts 2-3 minutes. In addition, the method is extremely resistant to impurities so the purity of the precursors and the solvent used does not affect the quality of nanostructures. The technology is characterized by extremely low costs. The obtained ZnO nanorods are applied in simple-architecture photovoltaic cells (efficiency over 12%) and high-sensitive photoresistors. Details informations about technology and applications will be presented.

Keywords: zinc oxide, nanorods, photovoltaic cells, photoresistor

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