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Fabrication and characterization of p-Si/n-MgZnO heterojunction diode

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Semiconductor nanorods represent a novel class of materials structure with a number of interesting properties that give them potential applications in optoelectronic devices, including light-emitting diodes (LEDs), photoelectrochemical systems, and ϕ solar cells. A chemical bath deposition (CBD) is attracting attention as low-cost film formation processes. In these processes, nucleation and crystal growth on substrate in solution result in the formation of metal-oxide films. We present a fundamental experimental study of a microwave assisted chemical bath deposition (MW-CBD) method for Mg doped ZnO films. The MW-CBD method was used to prepare nanorod Mg doped ZnO (1% and 10%) films onto p-Si substrates. Zinc nitrate hexahydrate and magnesium nitrate were the precursor materials and doping source materials. Scanning electron microscopy (SEM) and X-ray diffraction (XRD) spectroscopy had been used to analyze the morphological properties and structures of this films products, respectively. The current density-voltage characteristics (I - V) of the diodes were measured at room temperature. The important junction parameters such as series resistance (R_s), the ideality factor (n) and the barrier height (ϕ_b) were determined by performing different plots from the forward bias I - V characteristics. Norde function was compared with the Cheung functions and it is seen that there is a good agreement with both method for the series resistance values.

Biography

Mujdat Caglar is a member of the Physics Department of the University of Anadolu. He studied Condensed Matter Physics at University of Anadolu, starting in 1997. His academic and research interests are in the areas of nanomaterials, nanoelectronics, organic electronics, metal oxide materials. He has published more than 79 papers in international scientific journals and has been serving as the Editorial Board Member of repute.

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