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Microstructural Investigation of ZnO Nanowires for Therapeutic Applications

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ABSTRACT

Zinc oxide (ZnO) is known as an important semiconductor, which has been studied extensively in the past few years due to its fundamental and technological importance [1]. Many attractive properties of ZnO, such as wide bandgap (3.37 eV), large exciton binding energy and excellent chemical stability, [2] suggest a great many possible practical applications such as in gas sensors, ceramics, field-emission devices and luminescent materials [3] and therapeutic. Size and crystalline morphologies play important roles in these applications,which have driven researchers to focus on the synthesis of nanocrystalline ZnO [4].

This work aims to the synthesis and characterization of zinc oxide nanowires for therapeutic applications. ZnO nanowires are synthesized by hydrothermal method using a novel synthesized protocol. The elaboration hydrothermal conditions are optimized in order to have the longest nanowires with the lowest diameter.

The structural properties, morphological and elementary analysis of the growth NWs, are carried out respectively by X-ray Diffraction (DRX), Scanning Electron Microscopy (SEM) and Energy Dispersive spectroscopy (EDS). XRD results reveals a very good crystallinity of ZnO-Nws in a hexagonal würtzite phase. Scanning Electron Microscopy (SEM) shows single-crystals of ZnONPs with nearly wires shapes. The crystalline refinement in the ZnO-Nws are investigated by X-ray peak broadening. Williamsone Hall (W_H) analysis and size strain plot method are used to study the individual contributions of crystallite sizes and lattice strain on thepeak broadening of the ZnO-Nws.

Acknowledgments

Zinc Oxide nanowires**,** hydrothermal method, XRD, SEM,Williamson–Hall analysis

References

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