PROPERTIES OF HYDROTHERMALLY GROWN ZNO NANORODS ANNEALED IN DIFFERENT ATMOSPHERES

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Abstract

Zinc oxide (ZnO) is a direct wide bandgap semiconductor with a series of unique properties: a large exciton binding energy, which inhibits thermal activation and enhances light emission at room temperature; good optical transmittance in the visible region; high optical gain; piezoelectricity; room temperature ferromagnetism; mechanical stability given by the high melting point and large cohesive energy; radiation hardness; or biological compatibility. Recently, a great interest has been devoted to ZnO nanostructures. ZnO nanorods can be easily prepared by hydrothermal growth at low temperatures. However, the low temperature growth results in a high density of native defects, which strongly affect physical properties of the ZnO nanorods. We report on the hydrothermal growth of ZnO nanorods and their annealing in different atmospheres (air, vacuum, nitrogen, hydrogen) and show their impact on the morphological, electrical and optical properties of the ZnO nanorods.

Keywords: ZnO, nanorods, hydrothermal growth, annealing, point defects

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