



Effect of synthesis conditions on the growth of ZnO nanorods via hydrothermal method

D. Polsongkram, P. Chamninok, S. Pukird, L. Chow, O. Lupan,
G. Chai, H. Khallaf, S. Park, A. Schulte

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Abstract

ZnO nanorods with hexagonal structures were synthesized by a hydrothermal method under different conditions. The effect of synthesis conditions on ZnO nanorod growth was systematically studied by scanning electron microscopy. All samples were characterized by X-ray diffraction, energy-dispersive X-ray spectroscopy and micro-Raman spectroscopy. The results demonstrate that the morphology and ordering of ZnO nanorods are determined by the growth temperature, the overall concentration of the precursors and deposition time.

ZnO nanorod morphology and surface-to-volume ratio are most sensitive to temperature. The width of ZnO nanorods can be controlled by the overall concentration of the reactants and by temperature. The influence of the chemical reactions, the nucleation and growth process on the morphology of ZnO nanorods is discussed.