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The size controlled structural and optical properties of ZnO nanorods YANWEI CHEN, GUOLIANG YANG, Drexel University, QIAN QIAO, YICHUN LIU, Northeast Normal University — In comparison with zero dimensional (0D) nanostructures, one-dimensional (1D) semiconducting nanostructures can facilitate more efficient carrier transport due to decreased grain boundaries, surface defects and disorders, and discontinuous interfaces. In order to utilize 1D ZnO nanostructures for optoelectronic nanodevices, it is essential to have detailed information about their size and other properties and to have the ability to tune these properties in the fabrication process. The application of the 1D nanostructures depend on this tenability. At present, it is still a challenge to fabricate well-controlled 1D ZnO nanostructures and to characterize their properties. We used convenient and flexible sol-gel and hydrothermal methods to synthesize 1D ZnO nanorods with diameters in the order of 10 to 20 nm. The crystallite size, morphology, the structural and optical properties could be well controlled by modulating the crystal nucleus quantity, the solution concentration and the reaction time. We obtained a strong ultraviolet exciton emission for the ZnO nanorods with a size about 10 nm, and also observed the size effect on the photoluminescence.

Guoliang Yang
Drexel University

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