

Synthesis and Characterization of Flower-shaped ZnO Nanostructures by the Solution Process

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Synthesis of flower-shaped ZnO nanostructures ZnO nanorods was achieved by the simple solution process using 0.2M zinc acetate dihydrate and 1M sodium hydroxide in 100ml diionized water at very low temperature about $\sim 90^{\circ}\text{C}$ in 30 minutes refluxing time. Detailed morphological and optical characterizations demonstrate that the synthesized products are single crystalline with the wurtzite hexagonal phase and grown along the [0001] direction. The composition of as synthesized white powder was analyzed by the IR spectroscopy. Where a standard peak of zinc oxide was observed at 523 cm^{-1} . Raman scattering exhibits a sharp and strong E2 mode at 437 cm^{-1} which further confirms the crystallinity and wurtzite hexagonal phase for the grown nanostructures. Room-temperature photoluminescence (PL) demonstrate a strong and dominated peak at 381 nm with a suppressed and broad green peak at 515 nm, suggests that the flower-shaped ZnO nanostructures have good optical properties with very less structural defects.