

Sonochemical Synthesis of ZnO Nanospheroid

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Spheroidal ZnO nanostructures were synthesized by ultrarapid sonochemistry using 0.1 M zinc nitrate ($\text{Zn}(\text{NO}_3)_2$) and 0.2 M sodium hydroxide (NaOH) aqueous solution. These chemical solutions were sonicated under ambient conditions without any template, surfactant, and chelating agents. Only 30 min was needed to complete the formation of highly crystallized nanospheroids. As-prepared ZnO products were characterized by powder X-ray diffraction (XRD) and scanning electron microscope (SEM). The results reveal that spheroidal structures possess a hexagonal wurtzite structure with diameters between 60 and 230 nm. Both concentration of the precursors and ultrasonic irradiation time played a critical roles for formation and optical properties of ZnO nanospheroids. The room temperature photoluminescence (PL) spectra showed a UV emission peak at around 390 nm and a broad visible emission band at around 650 nm. These spheroidal nanostructures may promising applications in anti-aging, anti-microbial, and photocatalytic activities.

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