Low Temperature Synthesis and Characterization of Zinc Oxide Nanorods by Simple Solution Process

Mohammad Vaseem, 홍동민, Ahmad Umar, 박용규, 김진환,
한윤봉*
전북대학교 반도체 화학공학부
(ybhahn@chonbuk.ac.kr*)

Zinc oxide (ZnO) as an n-type semiconductor with direct wide band gap energy of 3.37 eV demonstrates great potentials for use in blue-ultraviolet (UV) semiconductor lasers, light emitting diodes, and other optoelectronic devices. Due to its wide application, we report synthesis of uniform zinc oxide nanorods by a simple solution method using zinc chloride as a precursor material, and ammonium hydroxide (NH_4OH) as a hydroxyl ion (OH^-) source without using any additive molecules at 60 ^{0}C reaction temperature via refluxing. The generation of as synthesized zinc oxide nanorods from wulfingite zinc hydroxide microcrystal have also been discussed via time-dependent reaction process. The crystallinity and structural properties of as synthesized zinc oxide nanorods were further characterized by X-ray powder diffraction (XRD), transmission electron microscope (TEM), high-resolution TEM (HR-TEM), field emission scanning electron microscope (FESEM), Fourier transform infrared spectroscopy (FT-IR). Optical activity of as synthesized products was characterized by UV-Vis spectrophotometer.