

Synthesis of ZnO nanoparticles by Spray-pyrolysis method for photo-catalytic application

Sang-Hun Nam, Myoung-Hwa Kim, Sang Duck Lee, Young Dok Kim, Jin-Hyo Boo

Department of Chemistry and Institute of Basic Science, Sungkyunkwan University,
Suwon 440-746, Republic of Korea

Recently ZnO nanoparticles have been investigated as the photocatalyst widely. ZnO nanoparticles were prepared from $\text{Zn}(\text{CH}_3\text{COO})_2 \cdot 2\text{H}_2\text{O}$ source by spray-pyrolysis method with changing synthesis temperature. We studied on photocatalytic activity of the ZnO nanoparticles as compared with commercial Degussa $\text{TiO}_2(\text{p-25})$ powder. When the ZnO nanoparticles irradiated by UV light, ZnO nanoparticles have catalyzed redox reactions in presence of $\text{O}_2/\text{air}/\text{water}$ and degraded methylene blue (MB) in water solution. We carried out O_2 plasma treatment to focus on the ratio of zinc to oxygen of hand made ZnO nanoparticles. After O_2 plasma treatment of ZnO nanoparticles its photo-catalytic activity was increased rapidly. The characterization of ZnO nanoparticles were analyzed by Transmission Electron Microscopy (TEM), Energy Dispersive Spectrometer (EDS) and BET test. Also we defined the photocatalytic activity of ZnO nanoparticles using UV-VIS Spectroscopy.

Position-controlled ZnO nanoflower arrays grown on glass substrates for electron emitter application

Yong-Jin Kim, Jinkyung Yoo, Young Joon Hong, Chul-Ho Lee, and Gyu-Chul Yi^{1,2}

¹National CRI Center for Semiconductor Nanorods, ²Department of Materials Science and Engineering, OSTECH

We report on the position-controlled growth of ZnO nanoflowers composed of several nanoneedles with a sharp tip on a conducting glass substrate by chemical solution deposition method. The position of ZnO nanoflowers was controlled by preparing the polymethylmethacrylate (PMMA) submicron patterns on substrates using e-beam lithography. ZnO nanoflower arrays exhibited excellent electron emission characteristics showing a low turn-on voltage of 0.13 V/mm at the criterion of 0.1 mA/cm² and a high emission current of 0.8 mA/cm² in the applied electric field of 9.0 V/mm. Furthermore, the light emitting devices using ZnO nanoflower arrays clearly demonstrated strong light emission.