

Synthesis of Copper-doped Zinc Oxide Nanoparticles by Simple Solution Process

홍동민, Mohammad Vaseem, 한윤봉*

School of Semiconductor and Chemical Engineering, and BK 21 Centre for Future Energy Materials and Devices, Nanomaterials Processing Research Centre, Chonbuk National University
(ybhahn@chonbuk.ac.kr*)

Recently, doped ZnO nanoparticles have been extensively studied due to its wide applications in optical, electrical, and sensing devices. In this regard, first we synthesized ZnO nanoparticles with diameter ranges from 30–40 nm by using zinc acetate, NaOH, and hexamethylenetetramine (HMTA) at 90 °C for 3 h by simple solution process. Copper-doping in ZnO nanoparticles were performed through impregnation method using various weight percentage of copper, i.e. $Zn_{1-x}Cu_xO$ where $X=0.01$ (sample a), 0.02 (sample b), 0.03 (sample c), and 0.06 (sample d) at 600 °C. Copper-doped ZnO nanoparticles prepared with this techniques were characterized by FESEM, TEM, and EDS spectra. X-ray diffraction (XRD) results indicated that introduction of copper with atomic ration of $x= 0.02$ (samples a and b) showed no influence on the crystal structure of ZnO, but substantial effect with $x=0.03$ (samples c and d) was observed. Moreover, UV-Vis spectroscopy showed significant enhancement in the optical absorption compared with the un-doped ZnO nanoparticles.