

Puttipol Nakarungsee 2014: Hydrothermal Synthesis and Optical Properties of Metal-doped ZnO Nanostructure. Master of Science (Physics), Major Field: Physics, Department of Physics. Thesis Advisor: Mrs. Sirikanjana Thongmee, Ph.D. 101 pages.

A process for the synthesis of zinc oxide and antimony-doped zinc oxide by hydrothermal method are investigated. The effect of antimony doping on the structural and optical properties of zinc oxide are analyzed.

Zinc oxide and antimony-doped zinc oxide with chemical formula: $\text{Sb}_x\text{Zn}_{1-x}\text{O}$; $x = 0 - 0.5$ were synthesized by hydrothermal method at 150 °C for 20 hours. Structural and optical properties of all samples were analyzed by SEM, XRD, Raman, PL and UV-Vis to study the influence of antimony doping on structural and optical properties.

SEM results show that all of samples are of nanoscales size with hexagonal shape nanorod. The shapes of the samples changed from nanorods to nano-flake when antimony higher than $x = 0.30$ is added. XRD patterns revealed that all samples showed hexagonal wurtzite structure and Sb peaks were founded. The PL peaks are indicated that the amounts of Sb dopants are lead to the defect. Raman results show the effect of Sb doping on structural and size of zinc oxide. The crystallinity of zinc oxide is decreased with increasing amount of Sb. UV-Vis results are indicated that the energy band gaps are dropped as the little Sb added.

Student's signature

Thesis Advisor's signature