

عنوان مقاله:

Structural and Optical Properties of Bismuth-doped ZnO Nanoparticles Synthesized by Co-precipitation

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خلاصه مقاله:

Bismuth-doped zinc oxide (ZnO) nanoparticles can serve as efficient photocatalysts for various reactions. Herein, we synthesized and discussed the growth mechanisms of Bi-doped ZnO nanoflakes using co-precipitation with Bi concentrations ranging from 0 to 3%. The resulting ZnO were hexagonal nanosheets with diameters ranging from 80 nm (ZnO) to 200 nm (ZnO: Bi 3%). The dominant crystal structure matches hexagonal wurtzite with a small presence of Bi₂O₃ diffraction peaks. The estimated crystallite sizes range from ~ 33 nm to ~ 45 nm, indicating multiple crystalline regions in each nanoflake. Nevertheless, as sheet resistance monotonically decreases with the Bi concentration, the higher number of grain boundaries likely has a lower effect on the conductivity compared to an increase in free carriers and larger grain size in the samples with higher Bi concentration. The bandgap decreases from ~ 3.13 eV to ~ 2.96 eV, likely due to the shrinkage effect from electron-electron or electron-impurity interaction .that lowers the conduction band of ZnO

کلمات کلیدی:

Zinc oxide nanoparticles, bismuth-doped ZnO, Co-precipitation, Photo-catalyst

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