

Sb-doped ZnO films for the fabrication of all ZnO rod/film homojunction structure applied as UV detection device

Friday, 12 November 2021 12:10 (15 minutes)

In this work, ZnO rod/film homojunction structure was fabricated on Sb-doped ZnO film. The Sb-doped ZnO films were prepared by sol-gel spin coating technique onto the ITO substrate then annealed in nitrogen, air and argon followed by low-temperature hydrothermal process to obtain ZnO rod structure. The morphology of Sb-doped ZnO film exhibit the ZnO nanoparticle with smaller and increasing density when compared with undoped ZnO. The deterioration in the crystal structure of Sb-doped ZnO film suggest that the substitution of Sb atom in ZnO lattice without other impurity phases. While ZnO rod sample shows (002) plane dominance of wurtzite hexagonal with pyramid-like structure. The photoluminescence spectra exhibit the near-band-edge of all samples while the red emission appears in ZnO rod structure due to the imperfection in the ZnO crystal structure. The reflectance of ZnO rod structure in the visible region with the absorption edge of 375 nm. The electrical measurement of Sb-doped on undoped ZnO film suggests the diode characteristic then becomes photocurrent under UV irradiation.

Topics

Session B. Laser physics and modern optoelectronics

Primary author: Mr SINORNATE, Wuttichai (College of Materials Innovation and Technology, King Mongkut's Institute of Technology Ladkrabang)

Co-authors: Prof. MIMURA, Hidenori (Research Institute of Electronics, Shizuoka University); Prof. PECHARAPA, Wisanu (College of Materials Innovation and Technology, King Mongkut's Institute of Technology Ladkrabang)

Presenter: Mr SINORNATE, Wuttichai (College of Materials Innovation and Technology, King Mongkut's Institute of Technology Ladkrabang)

Session Classification: Morning Session