

ZnO nanowires for tunable near-UV/blue LED

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Abstract

Nanowires (NWs)-based light emitting diodes (LEDs) have drawn large interest due to many advantages compared to thin film based devices. Markedly improved performances are expected from nanostructured active layers for light emission. Nanowires can act as direct waveguides and favor light extraction without the use of lenses and reflectors. Moreover, the use of wires avoids the presence of grain boundaries and then the emission efficiency should be boosted by the absence of non-radiative recombinations at the joint defects. Electrochemical deposition technique was used for the preparation of ZnO-NWs based light emitters. Nanowires of high structural and optical quality have been epitaxially grown on p-GaN single crystalline films substrates. We have shown that the emission is directional with a wavelength that was tuned and red-shifted toward the visible region by doping with Cu in ZnO NWs.