

# **Electrodeposited ZnO nanowire-based light-emitting diodes with tunable emission from near-UV to blue**

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## **Abstract**

The bandgap control of doped-ZnO nanowires is important for tunable light emitting diodes (LEDs). Ultraviolet (UV), blue and violet LED structures based on Ag-doped ZnO /p-GaN and Cd-alloyed ZnO ( $Zn_{1-x}Cd_xO$ ) nanorods/p-GaN heterojunction have been fabricated by epitaxial electrodeposition at low temperatures and thermal annealing. UV electroluminescence (EL) peak around 397 nm observed from pure nanowires-ZnO/p-GaN at room temperature was shifted to 406 nm or 423 nm by using heterojunction between Ag-doped ZnO (ZnO:Ag) and  $Zn_{1-x}Cd_xO$ -nanorods grown on p-GaN substrate, respectively. The electroluminescence emission threshold voltage was low at about 5.0 V and EL intensity increased with rise in the applied voltage bias. Presented experimental results demonstrate the tunable emission from silver and cadmium-doping in ZnO-based nanoLEDs.