

# Magnesium and Cadmium-alloyed Zinc Oxide Nanowires for Device Applications

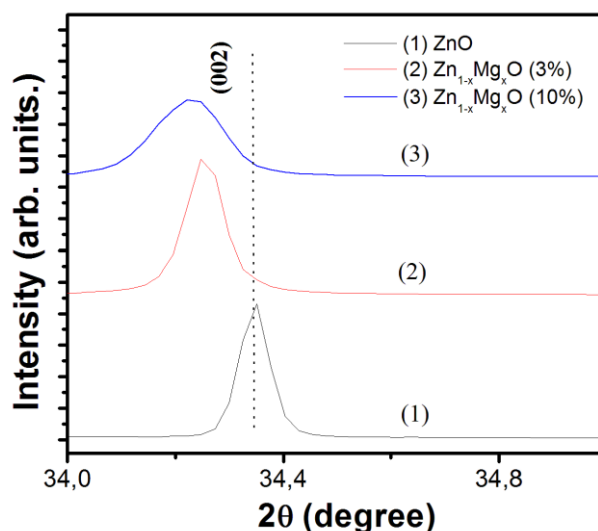
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Magnesium and cadmium-alloyed zinc oxide ( $\text{Zn}_{1-x}\text{Mg}_x\text{O}$  and  $\text{Zn}_{1-x}\text{Cd}_x\text{O}$ ) nanowires/nanorods are important for wavelength-tunable light-emitting diodes (LEDs) [1]. We present an experimental approach to study  $\text{Zn}_{1-x}\text{Mg}_x\text{O}$  and  $\text{Zn}_{1-x}\text{Cd}_x\text{O}$  nanowires (NWs) and their integration in LED structures.  $\text{Zn}_{1-x}\text{Mg}_x\text{O}$  and  $\text{Zn}_{1-x}\text{Cd}_x\text{O}$  NWs were deposited on p-GaN substrates. Low-dimensional ternary structures have been obtained for Magnesium sulfate ( $\text{MgSO}_4$ ), cadmium chloride ( $\text{CdCl}_2$ ) concentration in the deposition bath lower than 5  $\mu\text{M}$  whereas at higher concentration crystallized CdO appears and the aspect ratio of the rods decreased. Accordingly to SEM observations the  $\text{Zn}_{1-x}\text{Cd}_x\text{O}$  have a nanorod morphology. Structural analyses demonstrate that the ZnO nanomaterial is doped with the Mg or Cd incorporated within ZnO NWs. X-ray diffraction analysis demonstrates an increase in the lattice parameters of Cd-alloyed ZnO. Reported results are of great importance for next research on band-gap engineering of low-dimensional zinc oxide by doping/alloying NWs.



**Figure 1** XRD patterns of the ZnO and  $\text{Zn}_{1-x}\text{Mg}_x\text{O}$  nanomaterials: The slow scans are presented for better view of the (002) peaks taken of the pure and Mg-alloyed ZnO nanowires.

## BIBLIOGRAPHY

1. Lupan, O.; Pauporté Th.; Viana, B. Low-voltage UV-Electroluminescence from ZnO-Nanowire Array/p-GaN Light Emitting Diodes. *In: Advanced Materials*, 2010, 22(30), 3298-3302.