

Abstract Submitted
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Doped ZnO nanowires and their optical properties¹ ATHAVAN NADARAJAH, ROLF KONENKAMP, Portland State University — We report on the optical properties of doped ZnO nanowires grown at 80C. The incorporation of impurities, the annealing behavior as well as electro- and photoluminescence results are presented. The comparison of spectra obtained from temperature-dependent photoluminescence (PL) measurements before and after thermal annealing indicates that the optical activity of impurities changes noticeably upon annealing. The internal quantum efficiency for PL was measured to be as high as 16 percent for Al-doped samples annealed at 380C. The PL measurements also show that the excitonic luminescence is preferentially guided while the defect emission is more isotropically emitted. Visible electroluminescence (EL) from a hybrid p-n junction arrangement consisting of a hole-conducting polymer and n-type ZnO nanowires was achieved. The observed EL spectra show an ultra-violet excitonic emission peak and a broad defect-related emission band in the visible range. After annealing at 380C the defect related EL peak exhibits a characteristic shift to higher wavelengths. The magnitude of the shift is dependent on the dopant type.

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