

## Synthesis and Characterization of Nickel and Sulphur Sensitized Zinc Oxide Structures

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**Abstract :** The use of nanostructured semiconducting material to catalyze degradation of environmental pollutants still receives much attention to date. One of the desired characteristics for pollutant degradation under ultra-violet visible light is the materials with extended carrier charge separation that allows for electronic transfer between the catalyst and the pollutants. In this work, zinc oxide n-type semiconductor vertically aligned structures were fabricated on silicon (100) substrates using the chemical bath deposition method. The as-synthesized structures were treated with nickel and sulphur. X-ray diffraction, scanning electron microscopy, energy dispersive X-ray spectroscopy were used to characterize the phase purity, structural dimensions and elemental composition of the obtained structures respectively. Photoluminescence emission measurements showed a decrease in both the near band edge emission as well as the defect band emission upon addition of nickel and sulphur with different concentrations. This was attributed to increased charger-carrier-separation due to the presence of Ni-S material on ZnO surface, which is linked to improved charge transfer during photocatalytic reactions.

**Keywords :** Carrier-charge-separation, nickel, photoluminescence, sulphur, zinc oxide

**Conference Title :** ICN 2018 : International Conference on Nanotechnology

**Conference Location :** Rome, Italy

**Conference Dates :** May 03-04, 2018