Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Effect of Cobalt Doping on ZnO/CuO Heterojunction Solar Cell

AMRIT KAPHLE, RAM TIWARI, PARAMESWAR HARI, University of Tulsa —

In this study, we report optical and electrical characterization of nanostructured ZnO/CuO heterojunctions with cobalt doping. CuO p-layer was deposited by DC sputtering and ZnO nanorods (n-layer) were fabricated on fluorine doped tin oxide (FTO) substrate by a chemical bath deposition technique. We investigated the structural, optical, and electrical properties of the ZnO/CuO heterojunction. Optical properties were investigated using UV-VIS spectroscopy. Absorption measurements show a decrease in electronic band gap with increase in cobalt concentration. Current- Voltage (I-V) measurements show that as the cobalt percentage increased from 0-20%, the power conversion efficiency of the CuO/ZnO solar cell increased from 1.70% to 2.93%. This increase in conversion efficiency also resulted in changes in fill factor (62.09% - 69.93%), current density (3.62 mA/cm^2 – 5.07 mA/cm^2), and open circuit voltage (0.56 V - 0.61 V). Our external quantum efficiency (EQE) measurements show an increase in EQE from 5.11% to 9.34% in the visible range with doping. We will discuss the implications of these results based on cobalt incorporation in ZnO nanostructure.

Amrit Kaphle
University of Tulsa

Date submitted: 13 Nov 2016 Electronic form version 1.4