Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Attachment of Quantum Dots on Zinc Oxide Nanorods JARED SEAY, HUAN LIANG, PARAMESWAR HARIKUMAR, University of Tulsa — ZnO nanorods grown by hydrothermal technique are of great interest for potential applications in photovoltaic and optoelectronic devices. In this study we investigate the optimization of the optical absorption properties by a low temperature, chemical bath deposition technique. Our group fabricated nanorods on indium tin oxide (ITO) substrate with precursor solution of zinc nitrate hexahydrate and hexamethylenetramine (1:1 molar ratio) at 95C for 9 hours. In order to optimize the light absorption characteristics of ZnO nanorods, CdSe/ZnS core-shell quantum dots (QDs) of various diameters were attached to the surface of ZnO nanostructures grown on ITO and gold-coated silicon substrates. Density of quantum dots was varied by controlling the number drops on the surface of the ZnO nanorods. For a 0.1 M concentration of QDs of 10 nm diameter, the PL intensity at 385 nm increased as the density of the quantum dots on ZnO nanostructures was increased. For quantum dots at 1 M concentration, the PL intensity at 385 nm increased at the beginning and then decreased at higher density. We will discuss the observed changes in PL intensity with QD concentration with ZnO-QD band structure and recombination-diffusion processes taking place at the interface.

Jared Seay
University of Tulsa

Date submitted: 03 Jan 2011 Electronic form version 1.4