

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Time-resolved photoluminescence Studies of CdSe Core and CdSe/ZnS Core/Shell colloidal nanoparticles as function of temperature and concentration M. YASAR, A. ANTIPOV, M. BELL, V. MITIN, A. VEREVKIN, Department of Electrical Engineering, SUNY at Buffalo, Buffalo, NY 14260, A. PETROU, Department of Physics, SUNY at Buffalo, Buffalo, NY 14260 — We report the results of time-resolved photoluminescence studies (TRPL) of CdSe Core and CdSe/ZnS Core/Shell colloidal nanoparticles dissolved in toluene in the temperature range of 10-300 K. The integrated PL intensity of nanoparticles in liquid changes little between 10 K and 300 K, whereas the intensity of the “dry” nanoparticles quenches dramatically as temperature is increased. The PL exhibits biexponential decay characteristics; the longer decay component is affected by the presence of the solvent. In particular, the phase transitions (the glass-solid and the solid-liquid) of the solvent are clearly detected by our experiment. In addition, the PL efficiency and decay times are studied as a function of nanoparticle concentration. Our findings suggest that the PL quantum yield as well as the decay times strongly depend on the solvent temperature, as well as nanoparticles concentration. These results are discussed in terms of reabsorption and reemission between nanoparticles. We acknowledge support of NSF IGERT, NYSTAR and ONR.

M. Yasar
Department of Electrical Engineering, SUNY at Buffalo, Buffalo, NY 14260

Date submitted: 03 Dec 2007

Electronic form version 1.4