

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Optical Properties of CdSe/Zns Quantum Dots Coupled to Gold Nanoparticles SHIN GRACE CHOU, HYEONG GON KANG, Optical Technology Division, NIST, MATTHEW CLARKE, Optical Technology Division, NIST, JEESEONG HWANG, Optical Technology Division, NIST, RAJASEKHAR ANUMOLU, LEONARD PEASE, Department of Chemical Engineering, University of Utah, SILVIA LACERDA, CBER, Food and Drug Administration — We look into the detailed photophysical interactions between isolated CdSe/ZnS quantum dot (QD) and neighboring gold nanoparticles (AuNP) in samples with both particles randomly distributed onto a glass coverslip and with QD-AuNP dimer pairs sorted using differential mobility analyzer. The coupled nanoparticles pairs were analyzed using a time-correlated confocal spectral-microscopy station, where the spectral diffusion, the blinking pattern, and the lifetime of the QD were monitored simultaneously. The AuNP has been found to enhance the fluorescence intensity of the QD while significantly altering the blinking statistics of the individual QD. As the sample was excited at the same spot by multiple laser sources that are on or off the peak plasmon resonance of the AuNP, detailed changes in the QD optical signal were analyzed in the context of exciton-plasmon coupling and photo-thermal effects. Overall, our results yield new insights that lead to a better understanding of the fundamental interaction mechanism of QD-metal nanostructures.

Shin Grace Chou
Optical Technology Division, NIST

Date submitted: 28 Nov 2009

Electronic form version 1.4