Abstract Submitted
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Steady-state fluorescence spectroscopy of multiexcitons in single 'giant' nanocrystal quantum dots[1] HAN HTOON, DAVID BUSSIAN, JAVIER VELA-BECERRA, YONGFEN CHEN, JENNIFER HOLLINGSWORTH, VICTOR KLIMOV, Los Alamos National Lab — Due to ultrafast nonradiative Auger recombination, emission of multiexciton states is not pronounced in steady-state spectra of nanocrystal quantum dots (NQDs). Here, we report the first observation of multiexcitonic signatures in steady-state photoluminescence (PL) from single 'giant' core/shell NQDs*, in which a CdSe core is overcoated with a thick (>10 monolayers) CdS shell. At low temperature, we observe the emergence of multiple high-energy PL peaks with increasing pump power. Analysis of intensity scaling of these PL peaks with pump power allows us to assign them to bi-, tri- and higher order multiexcitons. Lifetimes of these multiexciton states obtained by single-dot time- and wavelength-resolved PL further corroborate this assignment. These results suggest that in 'giant' NQDs Auger recombination is greatly suppressed compared to regular NQDs, which likely stems from their large effective volume and decreased spatial overlap between electrons (occupy entire NQD volume) and holes (localized in CdSe core). *Y.F. Chen et al. *J. Am. Chem. Soc.* **130**, 5026 (2008)

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