Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Exciton Energy Transfer from Halide Terminated Nanocrystals to Graphene in Solar Photovoltaics OBAFUNSO AJAYI, JUSTIN ABRAMSON, NICHOLAS ANDERSON, JONATHAN OWEN, YUE ZHAO, PHILLIP KIM, FELICE GESUELE, CHEE WEI WONG, Columbia University — Graphene, a zero-gap semiconductor, has been identified as an ideal electrode for nanocrystal solar cell photovoltaic applications due to its high carrier mobility. Further advances in efficient current extraction are required towards this end. We investigate the resonant energy transfer dynamics between photoexcited nanocrystals and graphene, where the energy transfer rate is characterized by the fluorescent quenching of the quantum dots in the presence of graphene. Energy transfer has been shown to have a d^{-4} dependence on the nanocrystal distance from the graphene surface, with a correction due to blinking statistics. We investigate this relationship with single and few layer graphene. We study halide-terminated CdSe quantum dots; where the absence of the insulating outershell improves the electronic coupling of the donor-acceptor system leads to improved electron transfer. We observe quenching of the halide terminated nanocrystals on graphene, with the quenching factor ρ defined asI^Q/I^G (the relative intensities on quartz and graphene).

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Date submitted: 28 Nov 2010 Electronic form version 1.4