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Ultrafast energy transfer in organic-inorganic hybrid nanostructures EVGENY DANILOV, HUE NGUYEN, AMANDEEP SRA, ANTON MALKO, The University of Texas at Dallas — The integration of organic and inorganic materials at the nanoscale offers the possibility of developing new photonic devices that could potentially combine the advantages of both classes of materials. Such optoelectronic structures could work both in photovoltaic as well as in light emitting modes depending on the direction of *exciton* energy transfer. In the present work, we studied hybrid film structures consisting of a thin layer of colloidal CdSe nanocrystals (NCs) "anchored" to a monolayer of J-aggregates (JA) of a cyanine dye (TDBC) with polyelectrolyte (PDDA) acting as a molecular "glue". We performed time-resolved and steady-state photoluminescence (PL) measurements to quantify the energy transfer (ET) rates from NCs to JA layer. Systematic study of ET rates as a function of donor-acceptor distance revealed that even at separations approaching 100 A, energy transfer is still an efficient process. Additionally, we present our initial results for ET rates and efficiencies from NCs to patterned GaAs multiquantum well structures.

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