Supporting Information for:

Magneto-photoluminescence Properties of Colloidal CdSe Nanocrystal Aggregates

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Room-temperature Photoluminescence of Colloidal and Drop-cast CdSe Quantum Dots

Aggregation of the colloidal CdSe nanocrystals occurred upon sample deposition. Specifically, the samples were drop-cast from a stock solution onto thin (0.17 mm) quartz slides followed by evaporation of the organic solvent (hexane) to deposit both isolated and aggregated nanocrystals. The resulting room-temperature PL from the deposited nanocrystals had a significantly different distribution than the room-temperature colloidal stock solution (Fig. S1). As shown, deposition and subsequent aggregation resulted in a broadening of the PL due to contributions from a second red-shifted emission channel developing in addition to an overall red shift of the PL. This is the result of inter-dot energy transfer within the aggregated system,[1] as discussed in the main text. The packing density of the nanocrystals within the aggregates was varied by concentration and is reflected in the different

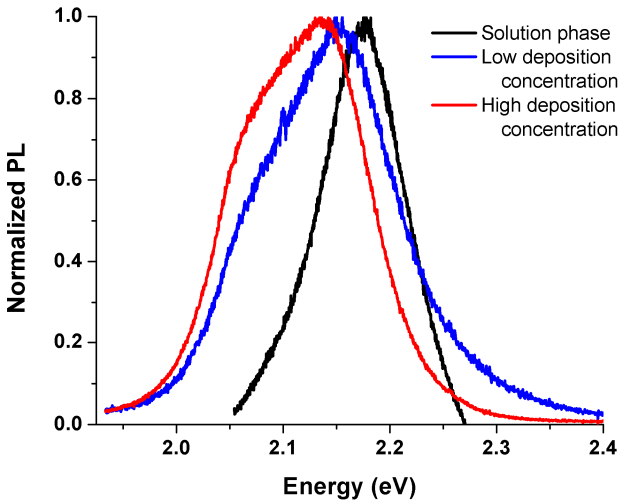

Figure S1. Room-temperature photoluminescence from solution phase CdSe quantum dots (black line), a low concentration region of deposited quantum dots (blue line), and a high concentration region of deposited quantum dots (red line).

PL profiles presented in Fig. S1. For the experiments described in the main text, we selected an area of high concentration to highlight the contributions from the aggregated species.

Verification of Single-exciton Formation for CdSe PL at 1.6 K

Multi-exciton generation was avoided by attenuation of the laser pulse energies (less than 25 nJ of 400 nm photons). Exciton formation probabilities were less than 0.01, which indicated an extremely low probability of PL from multi-excitons. The excitation laser power was doubled to test for multi-exciton formation at higher power to further confirm the validity of using these photon fluxes (Fig. S2). A variable neutral density filter wheel was used to vary the excitation fluence which was measured directly using a thermopile power meter (Coherent LabMax). The remaining experimental details regarding fluorescence collection and measurement were identical to those described in the main text. The main features of the resulting PL from both high and low power remain unchanged, with no evidence of photoluminescence at higher energies within the spectrum.

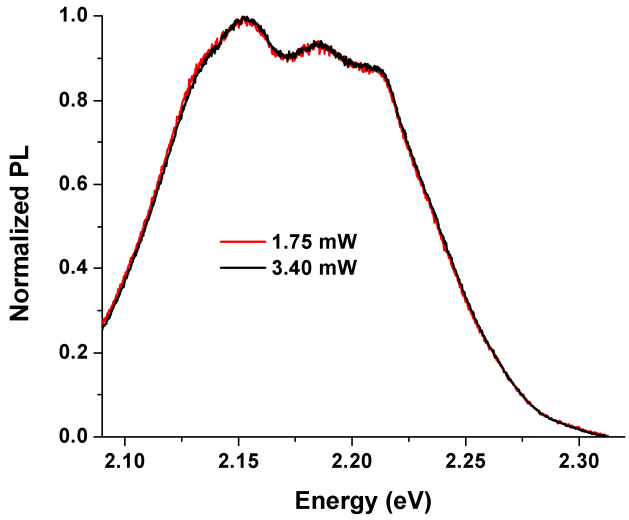

Figure S2. Field-free CdSe PL using 1.75 mW and 3.40 mW excitation laser powers. Data obtained at 1.6 K.

(S.1) Zaitseva, N.; Dai, Z. R.; Leon, F. R.; Krol, D. *J. Am. Chem. Soc.* **2005**, *127*, 10221.