

# Supporting Information

## Poisson Distributed Electron Transfer Dynamics from Single Quantum Dots to C60 Molecules

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### S1. Transient absorption spectrometer

**Femtosecond Transient Visible Absorption Measurements.** The femtosecond (0.1 ps to 1 ns) transient absorption (TA) spectrometer used in this study is based on a regeneratively amplified Ti:sapphire laser system (coherent Legend, 800 nm, 150 fs, 3 mJ/pulse and 1 KHz repetition rate) and Helios spectrometer (Ultrafast Systems LLC). Pump pulse at 400 nm were generated by frequency doubling of the 800 nm pulse at a  $\beta$ -barium borate (BBO) crystal. The energy of the 400 nm pump pulse was controlled to be ~20 nJ by a variable neutral-density filter wheel to avoid multiexciton generation

in the QD samples. The pump beam at the sample had a diameter of 300  $\mu\text{m}$ . A white light continuum probe (from 410-700nm) was generated by attenuating and focusing  $\sim 10$   $\mu\text{J}$  of the 800 nm pulse into a Sapphire window. The probe beam was collimated and focused with Al parabolic reflectors onto samples with a beam size of 150  $\mu\text{m}$ . After the sample, the probe beam was collimated and focused into a fiber optics coupled multichannel spectrometer with CMOS sensor and detected at a frequency of 1 KHz. The pump pulses were chopped by a synchronized chopper to 500 Hz. For all spectroscopy measurements, the samples were put in a 1 mm cuvette and were constantly stirred by a magnetic stirrer to avoid photodegradation.

**Nanosecond Transient Absorption Measurement.** Nanosecond (0.5 ns to 1  $\mu\text{s}$ ) transient absorption was performed with the EOS spectrometer (Ultrafast Systems LLC). The pump pulses at 400 nm were generated in the regeneratively amplified Ti:sapphire laser system as described above. The white light continuum probe pulse (380 -1700 nm, 0.5 ns pulse width, 20 KHz repetition rate) was generated by focusing a Nd:YAG laser into a photonic crystal fiber. The probe pulse was synchronized with the femtosecond amplifier and the delay time was controlled by a digital delay generator (CNT-90, Pendulum Instruments). The probe light was detected by the same multichannel spectrometers used in the femtosecond setup. To connect the femtosecond and nanosecond results, the nanosecond spectra have been scaled (to account for slight differences in excitation power densities) such that the spectra at delay time 0.6 – 1 ns agree with those measured by the femtosecond setup.

## **S2. Ensemble-averaged transient absorption spectra of QD-C60 complexes**

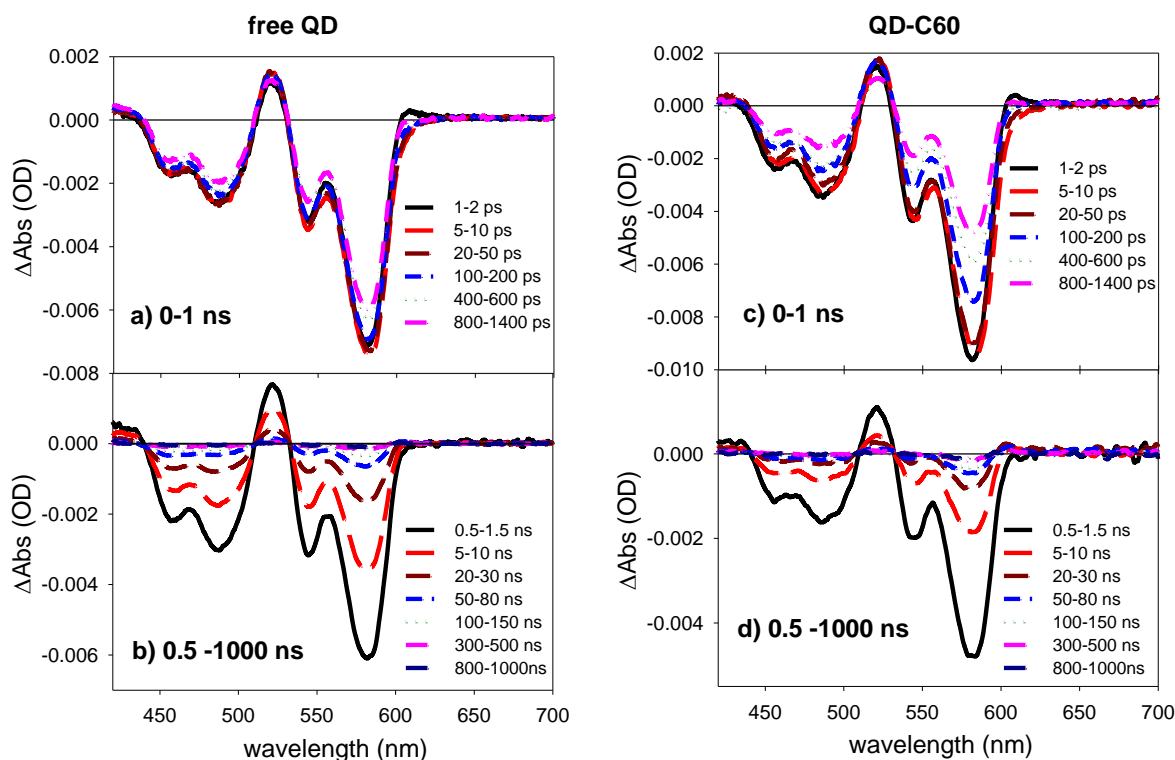


Figure S1. Transient absorption spectra of QDs (a,b) and QD-C60 complexes (c,d) at indicated delay times after 400 nm excitation. The femtosecond (a, c, 0-1.5 ns) and nanosecond (b, d, 0.5 -1000 ns) TA spectra have been scaled such they overlap at 0.5-1.5 ns.

### S3. Ensemble-averaged transient absorption kinetics of QD-C60 complexes

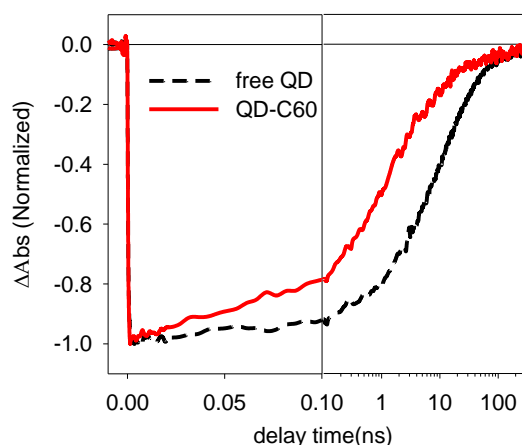
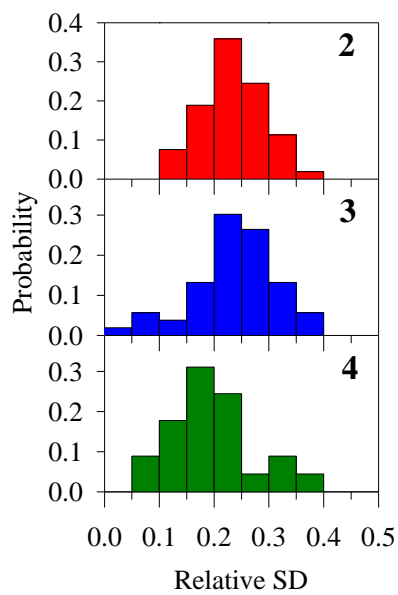


Figure S2. 1S exciton band bleach recovery kinetics of QD and QD-C60 complexes. In the presence of C60 the QD exciton bleach recovers faster, indicating electron transfer from the QD to adsorbed C60 molecules.

### S4. Relative standard deviation of ET rates in single QD-C60 complexes



**Figure S3.** Histograms of relative standard deviations of ET rates for QD-C60 complexes from samples 2(red), 3(blue), and 4(green).