Supporting information for: Deuteration of Perylene Enhances Photochemical Upconversion Efficiency

Andrew Danos,[†] Rowan W. MacQueen,[†] Yuen Yap Cheng,[†] Miroslav Dvořák,[‡,‖] Tamim A. Darwish,[¶] Dane R. McCamey,[§] and Timothy W. Schmidt[*,†]

School of Chemistry, UNSW Sydney, NSW 2052, Australia, Department of Physical Electronics, Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, V Holesovickach 2, 180 00 Prague, Czech Republic, National Deuteration Facility, Bragg Institute, Australian Nuclear Science and Technology Organisation, Locked Bag 2001, Kirrawee DC, NSW 2232, Australia, and School of Physics, UNSW Sydney, NSW 2052, Australia

E-mail: timothy.schmidt@unsw.edu.au

[*]To whom correspondence should be addressed

[†]School of Chemistry, UNSW Sydney, NSW 2052, Australia

[‡]Department of Physical Electronics, Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, V Holesovickach 2, 180 00 Prague, Czech Republic

[¶]National Deuteration Facility, Bragg Institute, Australian Nuclear Science and Technology Organisation, Locked Bag 2001, Kirrawee DC, NSW 2232, Australia

[§]School of Physics, UNSW Sydney, NSW 2052, Australia

[‖]School of Chemistry, The University of Sydney, NSW 2006, Australia

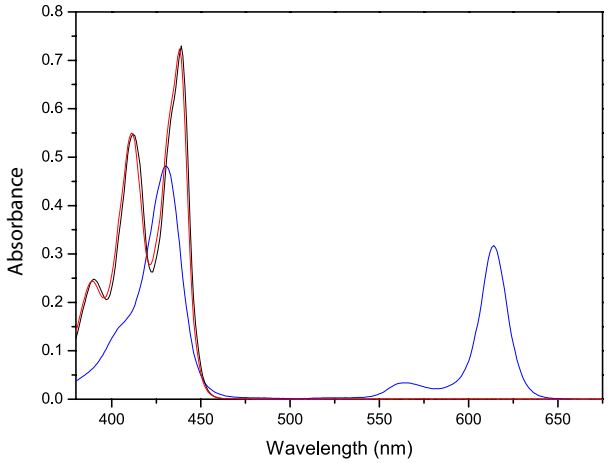

Figure S1: Absorption spectra of 0.01 mM TPTBPt (blue), 0.1 mM perylene (black), and 0.1 mM deuterated perylene (red) in a 1 mm cuvette.

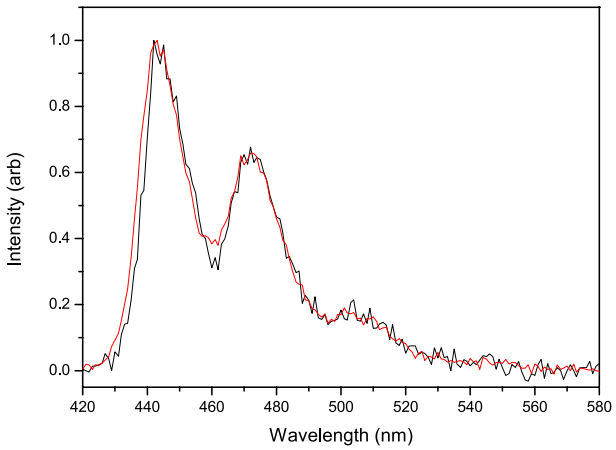

Figure S2: Fluorescence emission spectra of perylene (black) and deuterated perylene (red) with 410 nm excitation.

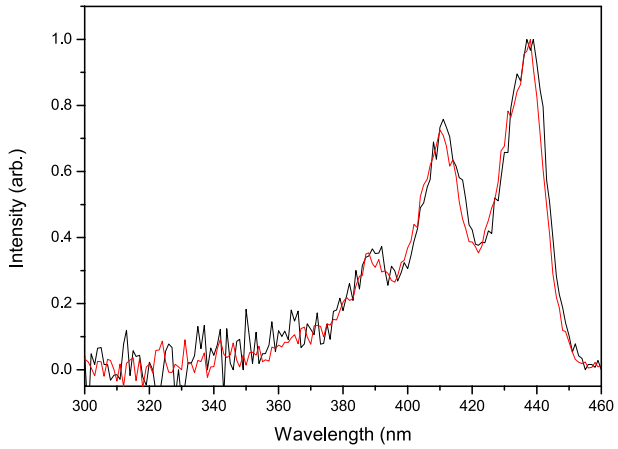

Figure S3: Fluorescence excitation spectra of perylene (black) and deuterated perylene (red) observed at 470 nm.

Table S1: Scaling factors used to normalise action spectra at 470 nm direct response peak

Pump Power (mW)	0	2.4	3.3	4.5	4.5	6.4	9.8	16.2	16.2	29.9	159.7
Scaling factor (%)	1.59	1.29	1.59	2.54	3.86	2.37	3.23	3.43	3.97	3.51	1.34

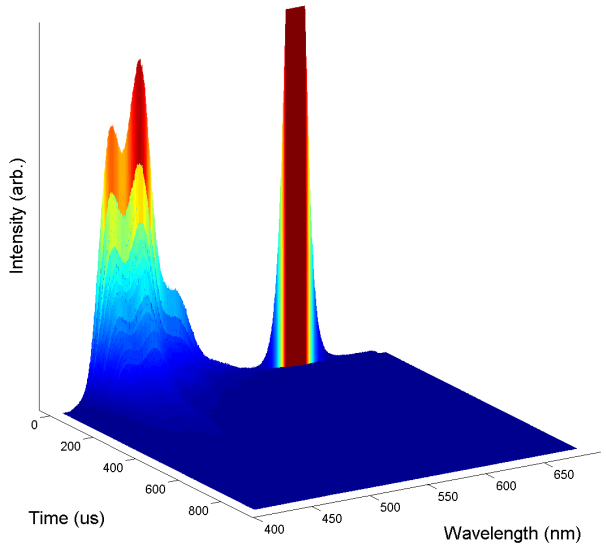

Figure S4: Typical time-resolved photoluminescence spectrum of P0 solution. Laser excitation at 615 nm is observed in the first time slice only.

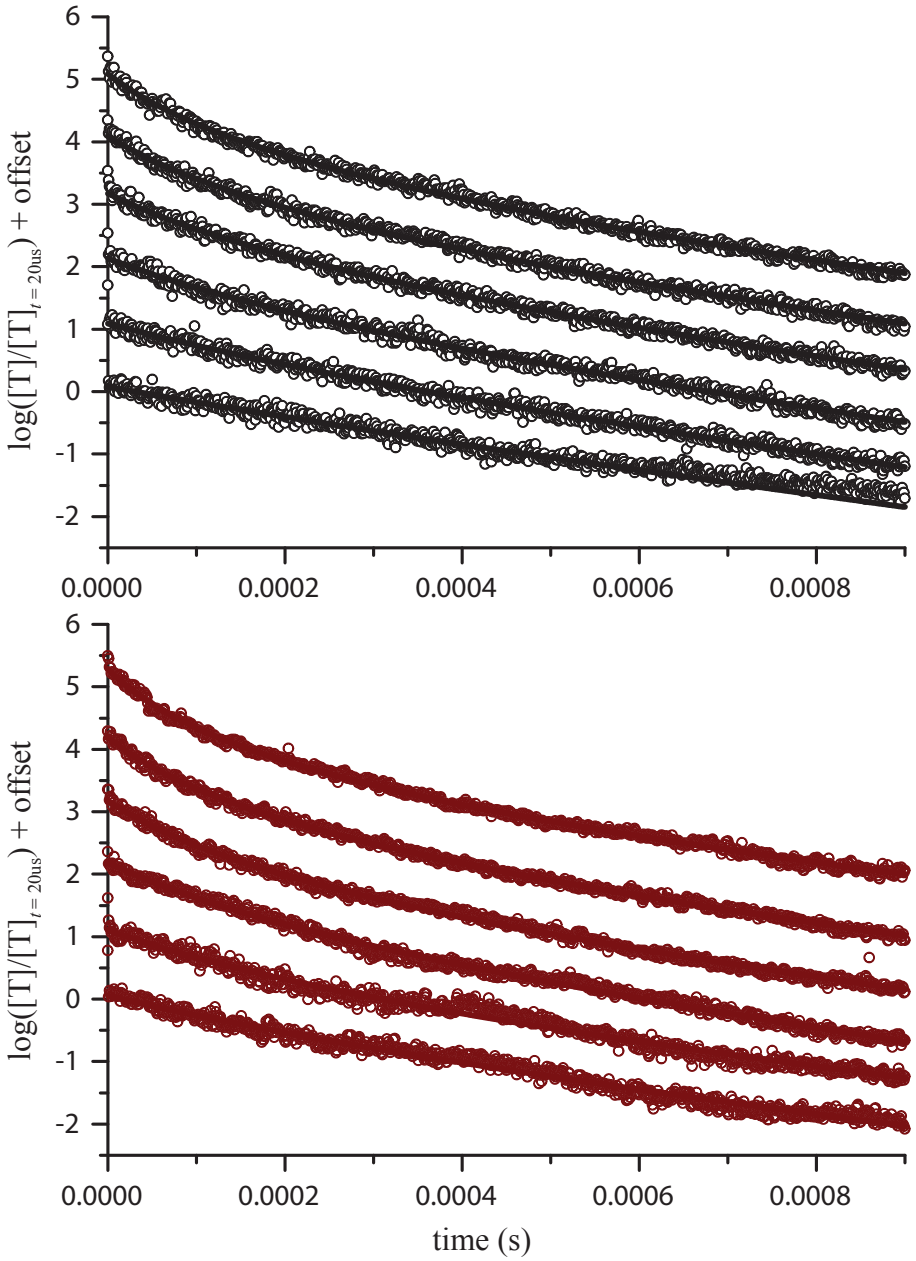

Figure S5: Transient log-normalized triplet concentrations (from square-root of luminescence) for P0 (top) and P98 (bottom). Sequentially higher pulse energies are offset for clarity, revealing kinetics which deviate more significantly from exponential decay. Solid lines are fits to a mixed first and second order kinetics model.