Electronic Supplementary Material (ESI) for Photochemical & Photobiological Science

Photophysics of 1,8-naphthalimide / Ln(III) dyads (Ln = Eu, Gd): napthalimide → Eu(III) energy-transfer from both singlet and triplet states.

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Electronic supporting information

Figures S1 – S7: Additional figures (absorption spectra, luminescence spectra, kinetic traces, triplet-triplet absorption spectra) for the three compounds.

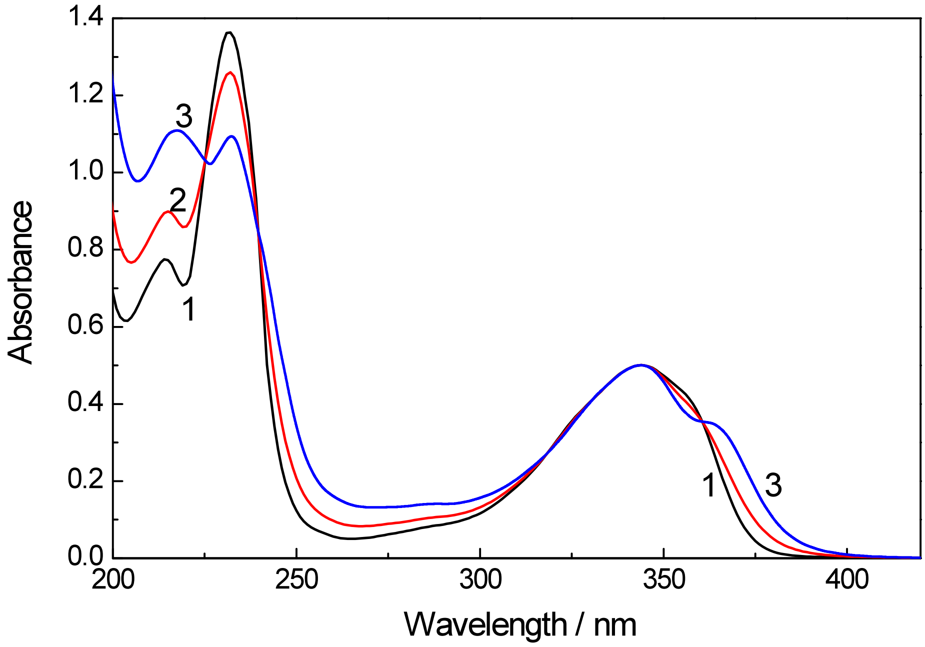

Fig. S1. UV/Vis absorption spectra of Gd•**L** in water: (1) concentration 4.27 × 10^{-5} M (path length 1 cm); and (2) concentration 0.79 × 10^{-2} M (path length 54 μm). The calculated spectrum of a dimer is presented as curve (3).

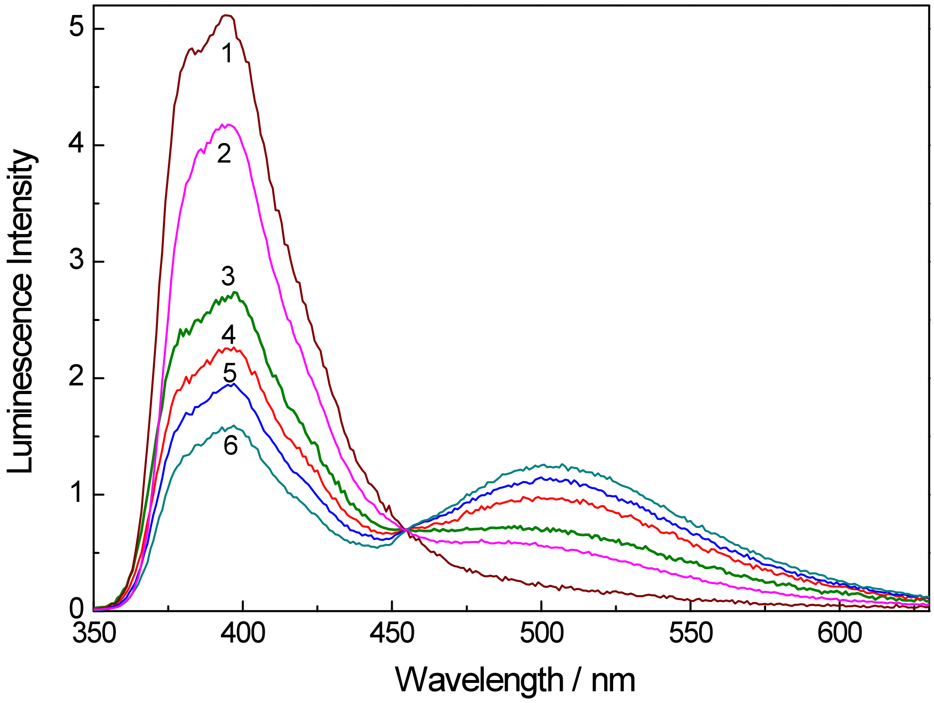

Fig. S2. Luminescence spectra of Gd•**L** in water with excitation a 320 nm. Spectra (1) – (6) were recorded at concentrations 1.14 × 10^{-4}, 1.37 × 10^{-3}, 2.04 × 10^{-3}, 4.52 × 10^{-3}, 7.43 × 10^{-3} and 1.02 × 10^{-2} M, respectively. Spectra (1) and (2) were recorded using 1 and 0.1 cm cuvettes; spectra (3) – (6) were recorded using a 54 μm cuvette. Normalization of spectra recorded with different path lengths was made with the help of the isosbestic point.

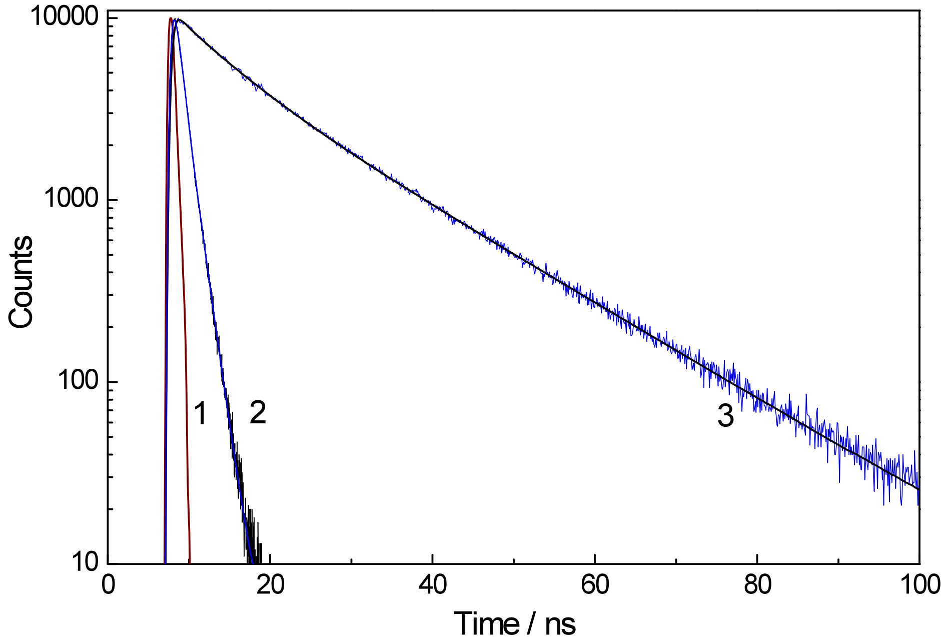

Fig. S3. Luminescence decay kinetics of Eu•**L** in water with excitation at 320 nm. Curve (1): instrument response function. Curves (2) and (3): decay kinetics at 395 and 505 nm, respectively (Eu•**L** concentration, 1.75×10^{-2} M; 54 µm cuvette). Solid lines on the kinetic traces are the calculated fits using a three exponential approximation (parameters in Table 1).

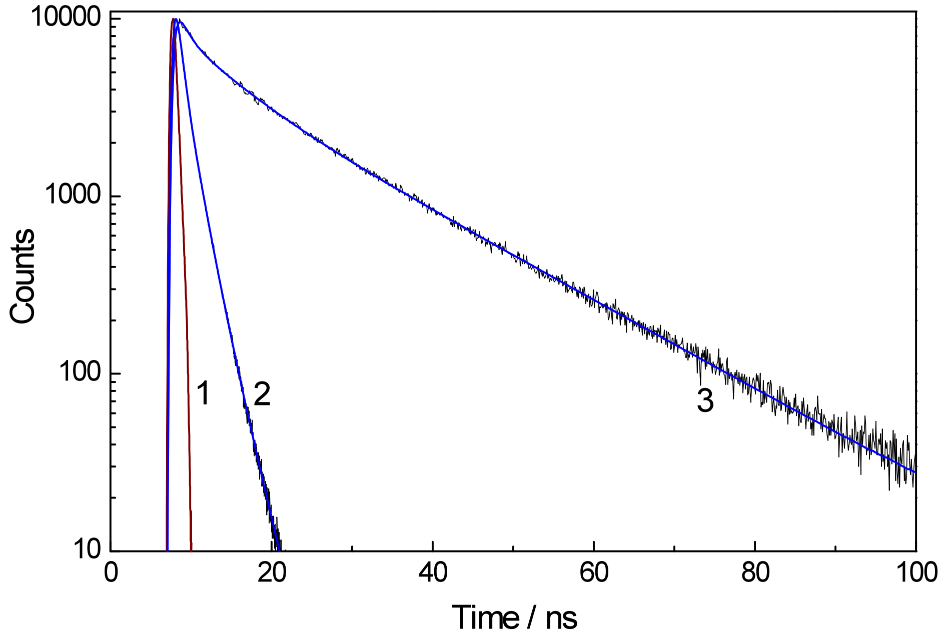

Fig. S4. Luminescence decay kinetics of Gd•**L** in water with excitation at 320 nm. Curve (1): instrument response function. Curve (2): decay kinetics at 393 nm at low Gd•**L** concentration (1.13×10^{-4} M, 1 cm cuvette). Curve (3): decay kinetics at 500 nm at high Gd•**L** concentration (7.9×10^{-3} M, 54 µm cuvette). Solid lines on the kinetic traces are the calculated fits using a three exponential approximation (parameters in Table 1).

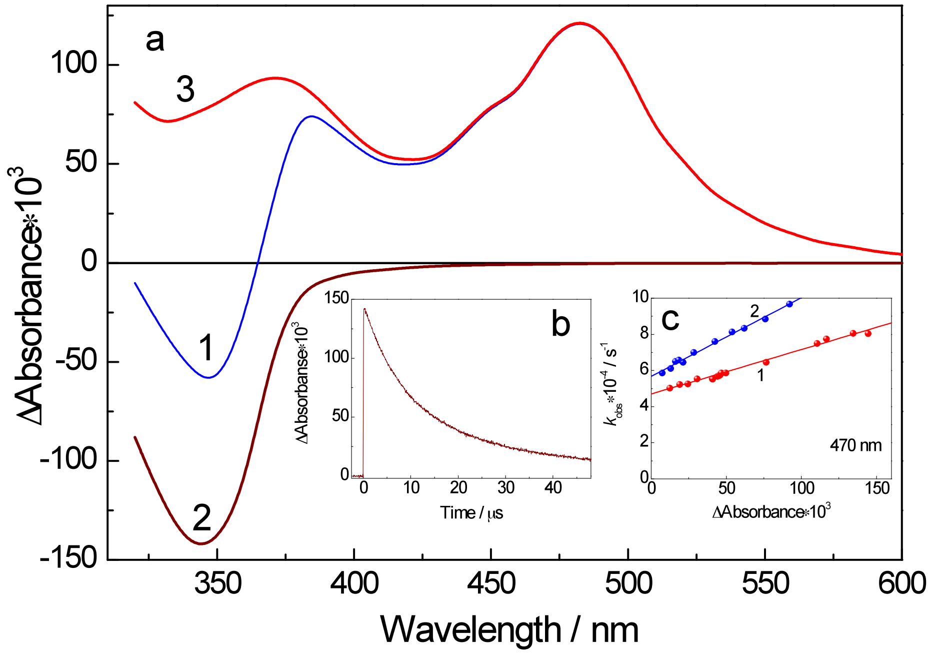

Fig. S5. The triplet-triplet absorption spectrum (**a**) and its decay (**b**) of Gd•**L** in deoxygenated water after laser excitation at 355 nm. Panel **(c)** shows the dependence of k_{obs} for the T-T absorption decay at 470 nm on the value of the initial absorption (ΔA), for both Gd•**L** (line 1) and Eu•**L** (line 2). In frame (**a**): (1), the measured differential T-T absorption; (2), the UV/Vis spectrum of the complex showing the naphthalimide absorption; (3), the difference between (1) and (2), *i.e.* the T-T absorption spectrum.

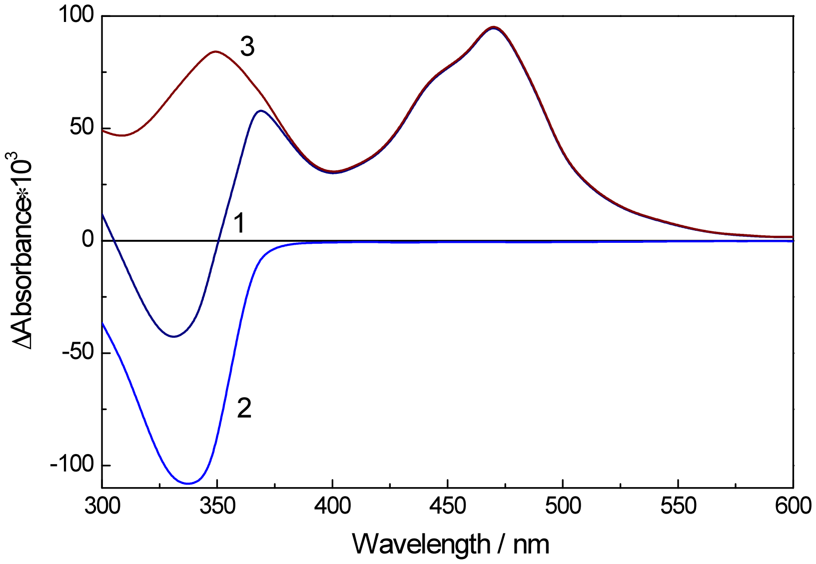

Fig. S6. The triplet-triplet absorption spectrum of Eu•**L** in deoxygenated CH_3CN after laser excitation at 355 nm. Curve (1) is the measured differential T-T absorption; curve (2) is the UV/Vis spectrum of the complex showing the naphthalimide absorption; curve (3) is the difference between (1) and (2), *i.e.* the T-T absorption spectrum.

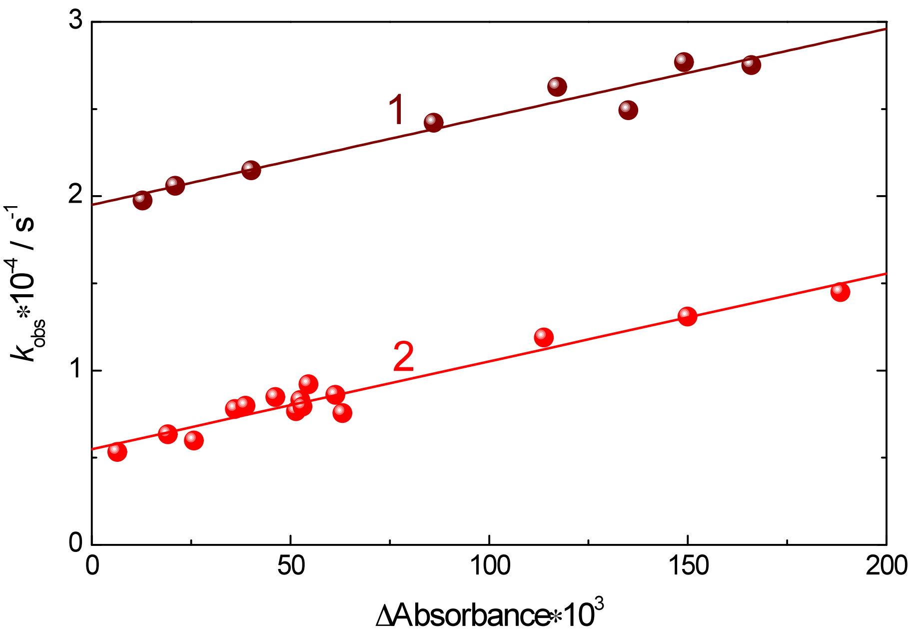

Fig. S7. Dependence of k_{obs} for the T-T absorption decay at 470 nm on the value of initial absorption (ΔA) for Eu•**L** (line 1) and Gd•**L** (line 2) in CH_3CN.