Tunable Red-Green-Blue Fluorescent Organogels on the Basis of Intermolecular Energy-Transfer

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Electronic Supplementary Information

Efficiency of energy transfer (E) can be obtained from following equations:

$$E = 1 - \frac{\tau_{DA}}{\tau_D} \qquad (1)$$

$$E = \frac{R_0^6}{R_0^6 + R^6} \qquad (2)$$

$$k = \frac{1}{\tau_D}\left(\frac{R_0}{R}\right)^6 \qquad (3)$$

$$R_0^6 = \frac{9000(\ln 10)\kappa^2\phi_D}{128\pi^5 N_A n^4} I \qquad (4)$$

$$I = \int_0^\infty F_D(\lambda)\varepsilon_A(\lambda)\lambda^4 d\lambda \qquad (5)$$

In these equations, τ_{DA} is the fluorescence lifetime of the donor in the presence of the acceptor and τ_D is the fluorescence lifetime of the donor in the absence of the acceptor, R_0 is the Förster distance between the donor and the acceptor, R is the real distance between the donor and the acceptor, κ^2 is an orientation factor between the donor and acceptor, Φ_D is the quantum yield of the donor in the absence of the acceptor, I the spectral overlap of the emission spectrum of the donor with the absorption spectrum of the acceptor (normalized on a wavenumber scale), n the index of refraction of the medium, N_A Avogadro's number and, $F_D(\lambda)$ is the corrected fluorescence intensity of the donor in the wavelength range from λ to $\lambda+\Delta\lambda$, with the total intensity normalized to unity, $\varepsilon_A(\lambda)$ is the extinction coefficient of the acceptor at λ.

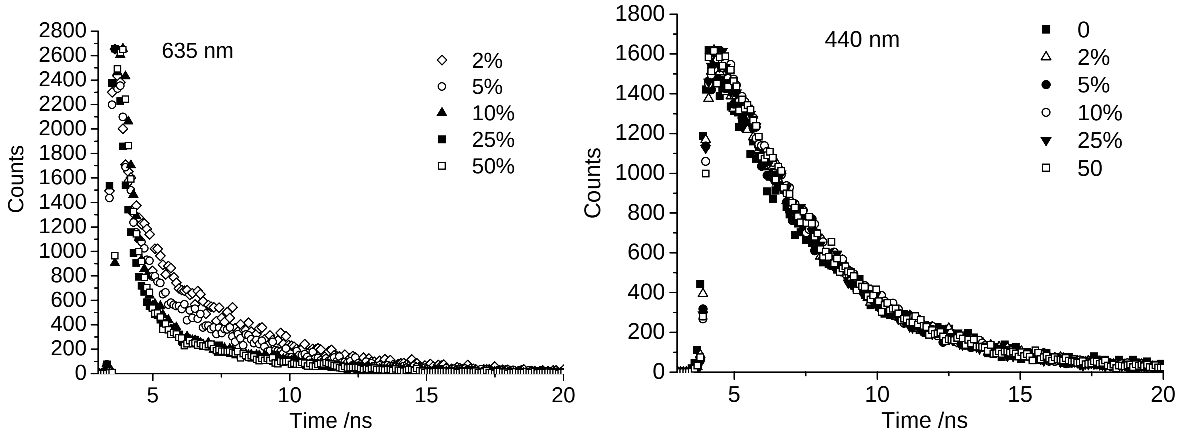

Fig. S1 Lifetime decay profiles (λex = 371 nm, monitored at 635 and 440 nm) of **3** on addition of different amounts of **1** (0-50 mol %) in *n*-octanol ($c = 5.0 \times 10^{-6}$ M).

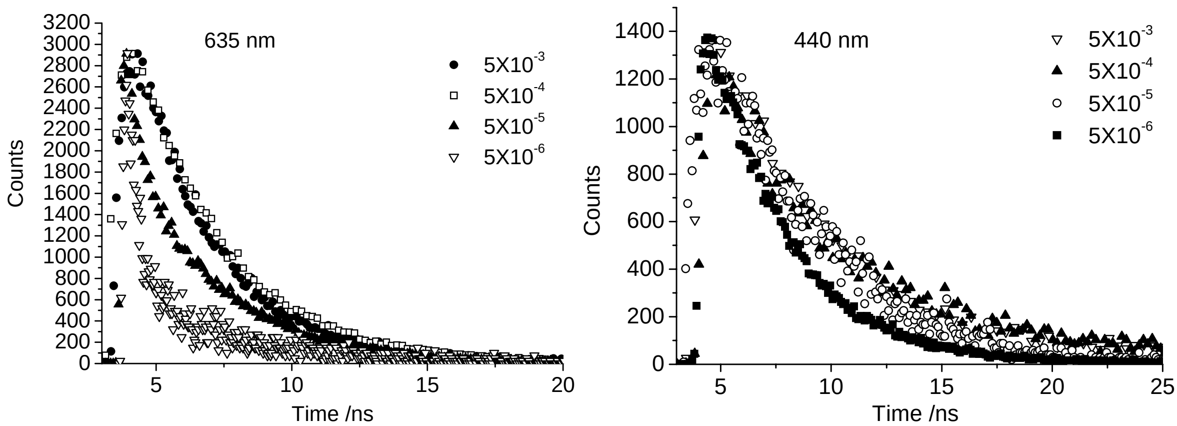

Fig. S2 Lifetime decay profiles (λex = 371 nm, monitored at 635 and 440 nm) of **3**/**1** (4:1, mol/mol) in *n*-octanol solutions with the whole concentration changed from 5.0×10^{-6} to 5.0×10^{-3} M.

Tab S1 Relative coefficient of energy transfer between donor and acceptor in **3** / **1** *n*-octanol (c = 5.0×10^{-6} M)

V_D	V_A	τ_{DA} (ns) ▲	τ_R (ns) ▼	*I* (cm^3/M)	R_0 (nm)	R (nm)	*k* ($10^7 s^{-1}$)	E (%)
100	0	3.80(100%)		5.90×10^{-14}	4.43			
100	2	3.68(100%)	3.50 (100%)			7.81	0.88	3.2
100	5	3.62(100%)	3.36(100%)			7.31	1.30	4.7
100	10	3.60(100%)	3.31(100%)			7.16	1.48	5.3
100	25	3.56(100%)	0.41(25.79%) 3.13(74.21%)			6.94	1.78	6.3
100	50	3.55(100%)	0.52(45.78%) 3.97(54.22%)			6.89	1.86	6.6

▲τ_{DA} is the fluorescence lifetime of the donor in the present of acceptor

▼τ_R is the fluorescence lifetime of acceptor (rise time) and, the fluorescence lifetime of acceptor is 3.65 ns (c=5×10^{-6}M, *n*-octanol) in the absence of donor.

Tab S2 Relative coefficient of energy transfer between donor and acceptor in **3** / **1** *n*-octanol (4: 1, v/v)

c (mol·L^{-1})	logc	E (%)
5.0×10^{-6}	-5.30	6.3
5.0×10^{-5}	-4.30	18.1
5.0×10^{-4}	-3.30	45.2
5.0×10^{-3}	-2.30	69.0

Tab S3 Xerogel state E-T coefficient of **3**+**1** serials

W_D	W_A	τ_{DA}▲	τ_R▼	E(%)
100	0	24.18 (75.27%), 10.60 (24.73%)		
100	2	6.83 (11.85%), 22.00 (88.15%)	0.27 (19.20%), 13.90 (80.80%)	3.0
100	5	5.93 (11.99%), 20.18 (88.01%)	18.24 (100%)	11.3
100	10	21.06 (80.30%), 5.79 (19.70%)	15.63 (100%)	13.3
100	25	18.84 (76.16%), 5.13 (23.84%)	14.36 (100%)	25.2
100	50	16.81 (80.50%), 5.04 (19.50%)	12.59 (100%)	30.3

▲τ_{DA} is the fluorescence lifetime of **3** (donor) in the present of **1** (acceptor).

▼τ_R is the fluorescence lifetime of acceptor (rise time); the fluorescence lifetime of acceptor is 65.83 ns (xerogel from *n*-octanol) in the absence of donor.