Supporting Information

Photon Upconverted Emission Based on Dye-Sensitized Triplet–Triplet Annihilation in Silica Sol–Gel System

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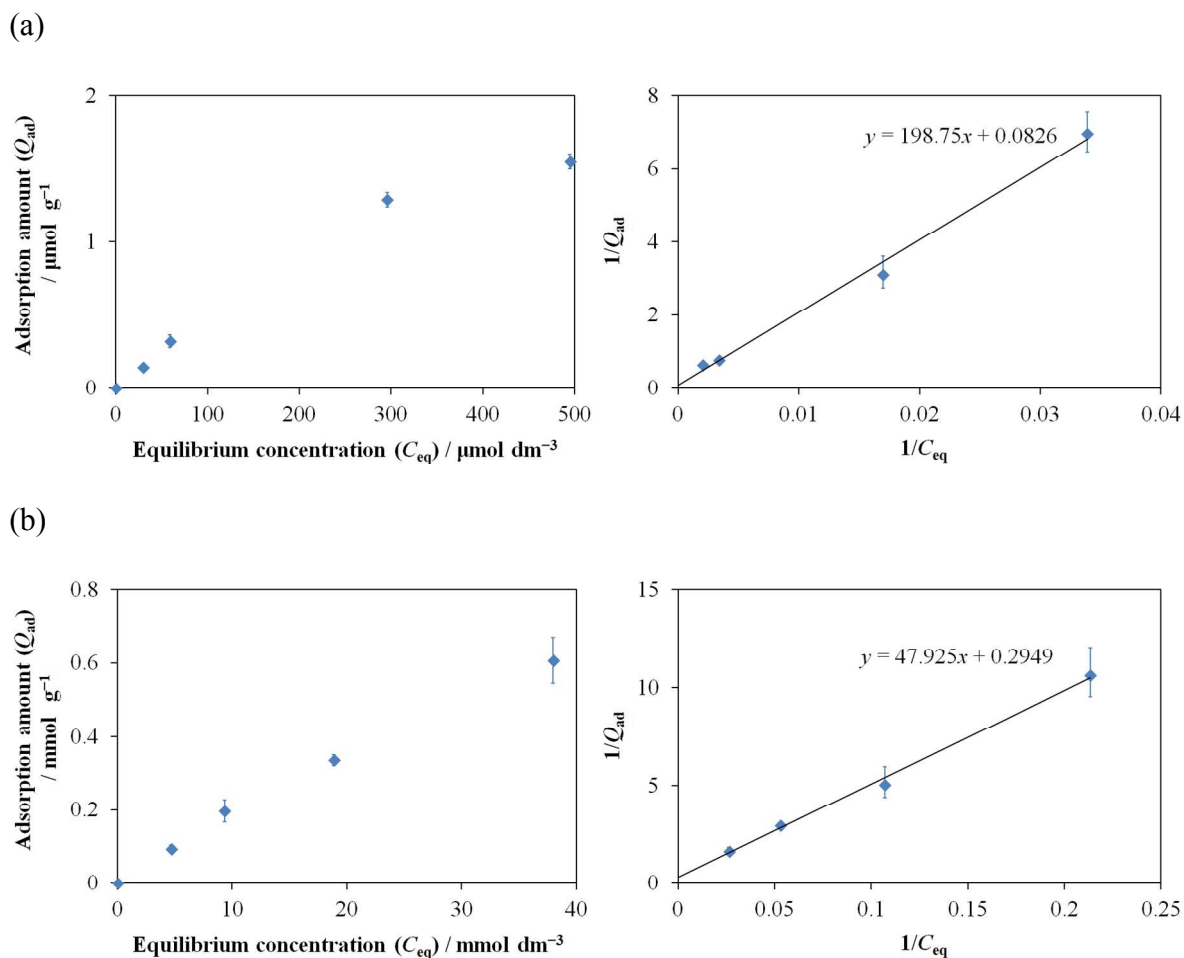
(a)

(b)

Figure S1 Langmuir isotherms of the (a) PtOEP and (b) DPA adsorption on the silica gel particles. The abscissa and ordinate indicate the equilibrium concentration of PtOEP or DPA and the amount of that adsorbed per gram of the silica gel, respectively.

Table S1 Fitting parameters of the Langmuir isotherms ($Q_{ad}/Q_{max} = K_{ad}C_{eq}/(1+K_{ad}C_{eq})$) of PtOEP and DPA adsorption on the silica gel particles.

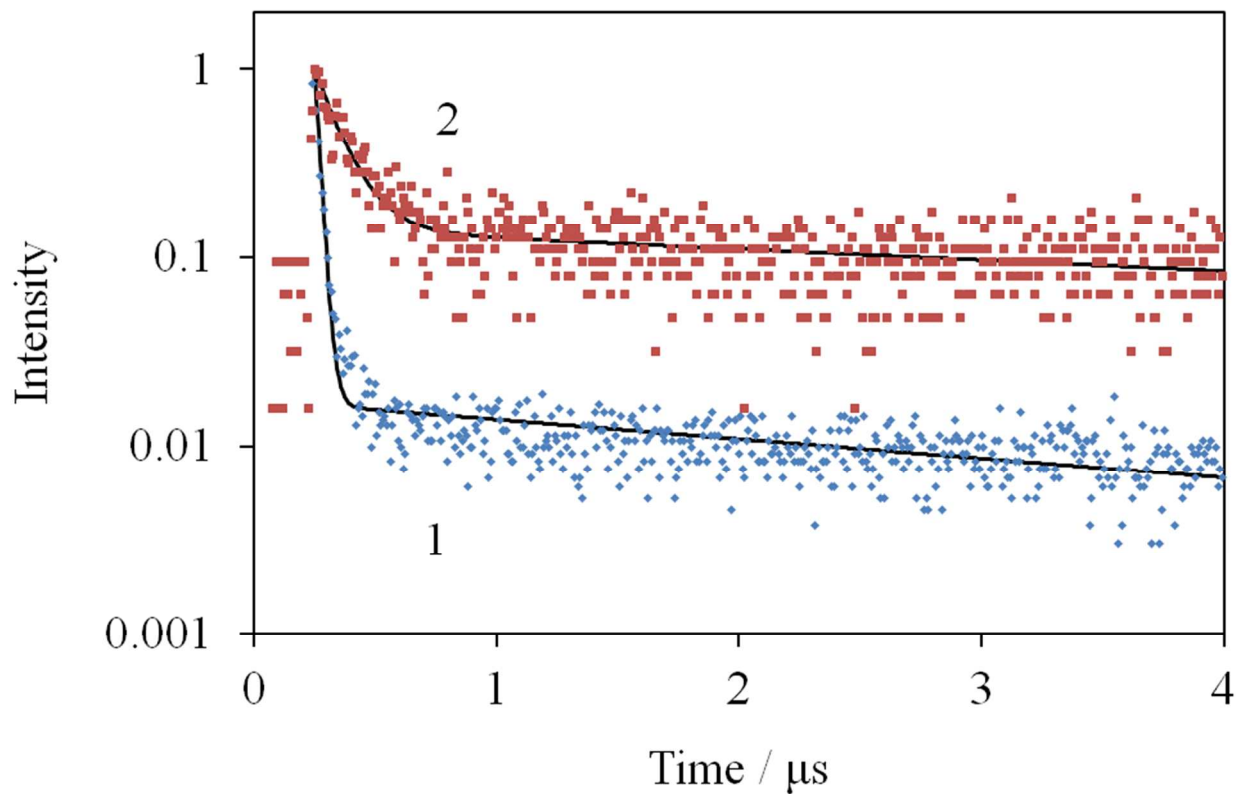| Adsorbate	$K_{ad}/dm^3\ mol^{-1}$	$Q_{max}/mmol\ g^{-1}$
PtOEP	416	0.0121
DPA	6.15	3.39

Figure S2 Emission decay and the fitted double exponential function ($A_1\exp(-t/\tau_1)$ + $A_2\exp(-t/\tau_2)$) curves of the PtOEP (1) adsorbed on the surface of the silica gel particles, and (2) encapsulated in the silica gel networks. The emission was monitored at 645 nm.

Table S2 Fitting parameters of the emission decay curves of the PtOEP (1) adsorbed on the surface of the silica gel particles, and (2) encapsulated in the silica gel networks.

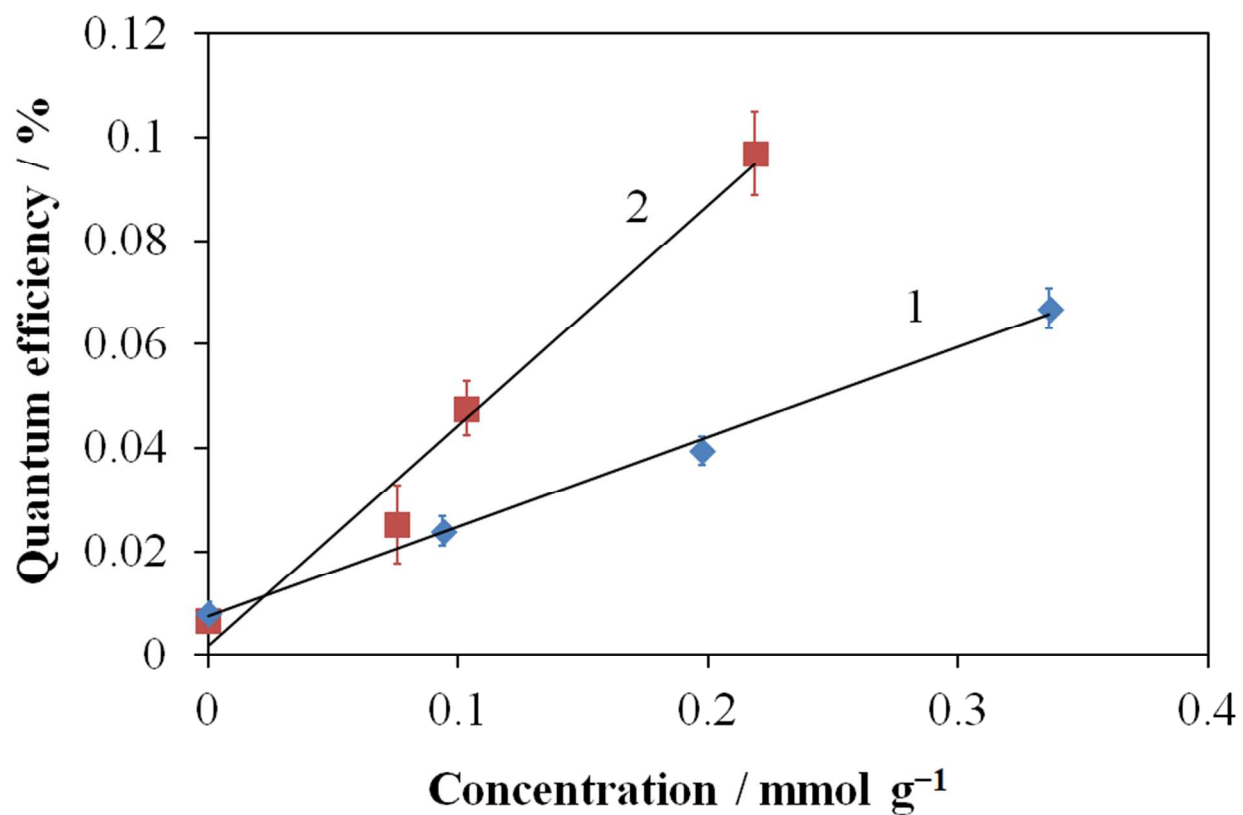| Sample	A_1	$\tau_1/\mu s$	A_2	$\tau_2/\mu s$
1	0.984	0.0203	0.016	4.22
2	0.860	0.110	0.140	7.49

Figure S3 DPA concentration dependence of the relative quantum efficiency of the upconverted emission in (1) the silica gel samples adsorbing PtOEP and DPA, and (2) those encapsulating PtOEP and adsorbing DPA.
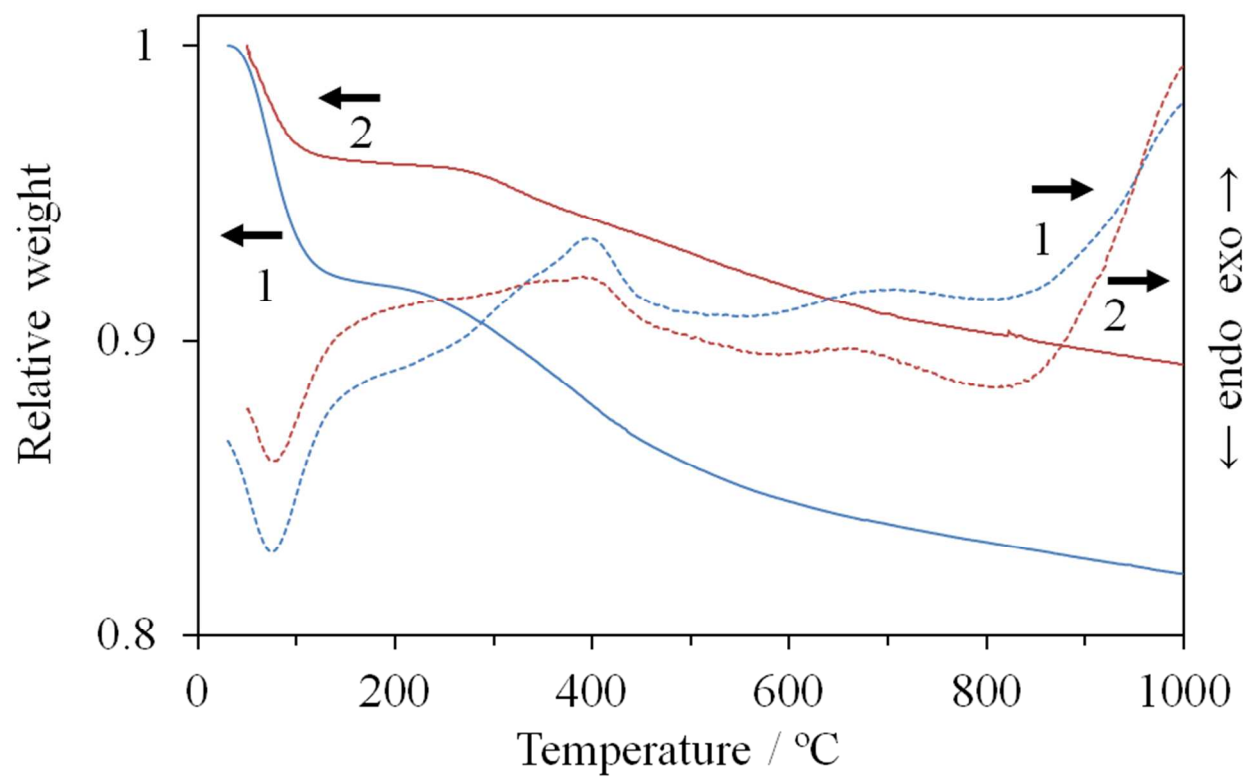
Figure S4 TG-DTA curves of the silica gel samples dried at (1) 25 and (2) 60 °C.
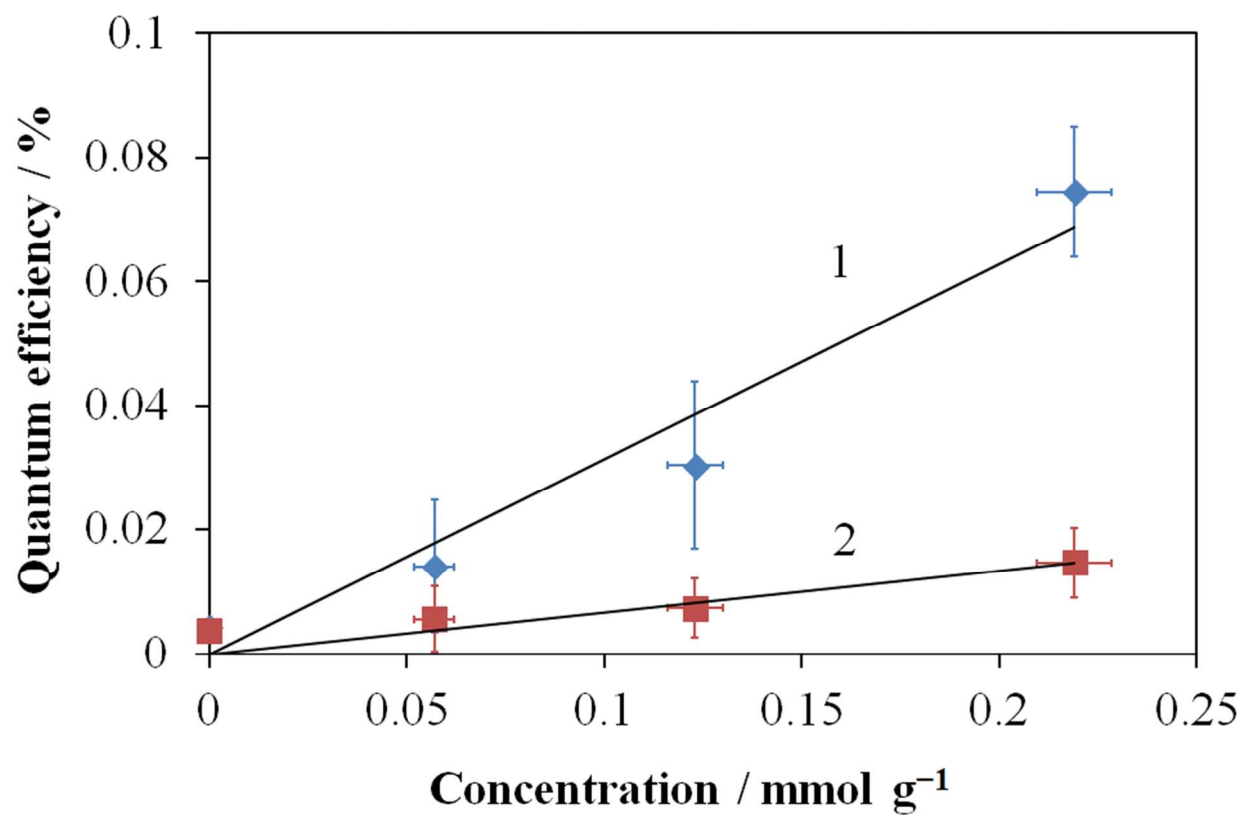
Figure S5 DPA concentration dependence of the relative quantum efficiency of the upconverted emission in the samples dried at (1) 25 and (2) 60 °C.
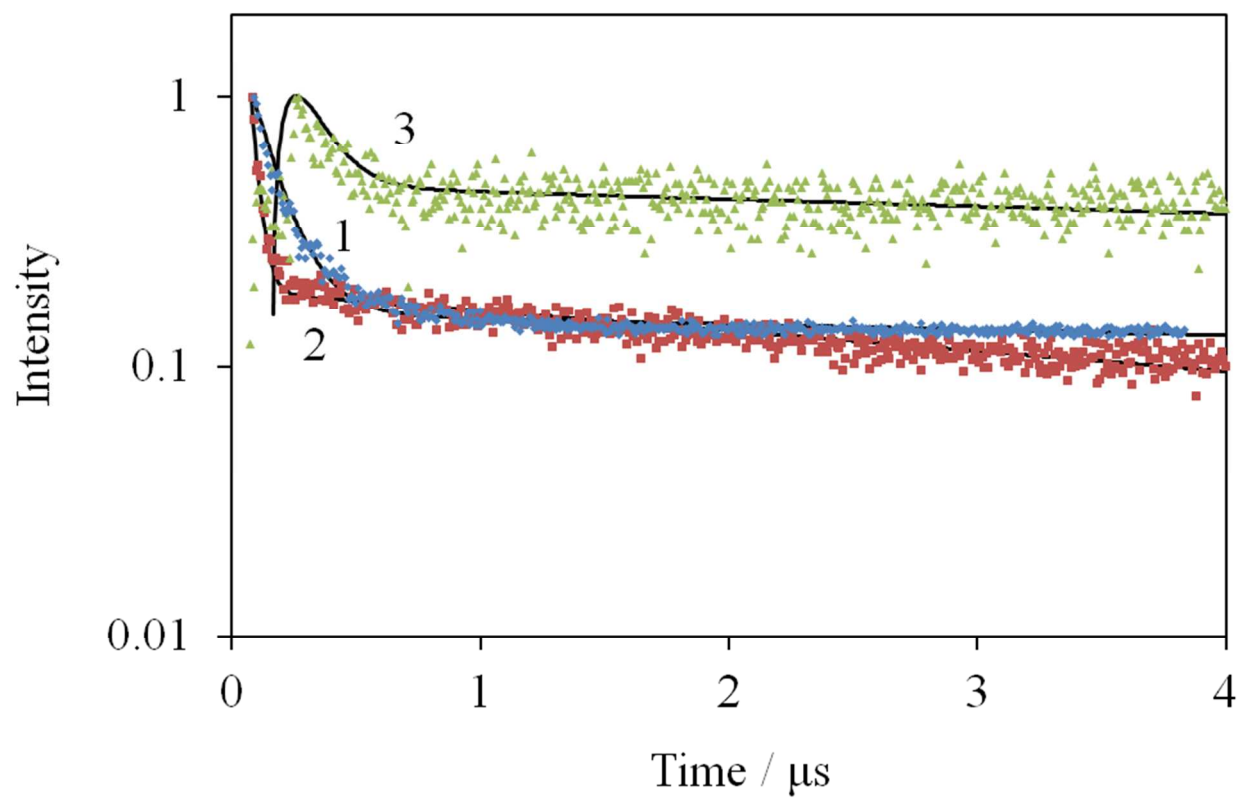
Figure S6 Phosphorescence decay curves of (1) the wetter silica gel sample encapsulating PtOEP and (2) that encapsulating PtOEP and adsorbing DPA, and (3) upconverted emission rise and decay curve of that encapsulating PtOEP and adsorbing DPA. The emission was monitored at (1,2) 645 and (3) 430 nm.

Table S3 Fitting parameters of the emission decay curves of (1) the wetter silica gel sample encapsulating PtOEP and (2) that encapsulating PtOEP and adsorbing DPA, and (3) emission rise and decay curve of that encapsulating PtOEP and adsorbing DPA.

Sample	A_1	$\tau_1/\mu s$	A_2	$\tau_2/\mu s$	A_3	$\tau_3/\mu s$
1	0.844	0.115	0.156	21.5		
2	0.812	0.0298	0.188	5.82		
3	0.999 (rise)	0.0800	0.998 (decay)	0.806	0.002 (decay)	16.5