

Supporting Information for the following manuscript:

**Multicolor Tunable Emission from Organogels Containing Tetraphenylethene, Perylene-3,4,9,10-tetracarboxylic diimide and Spiropyran Derivatives**

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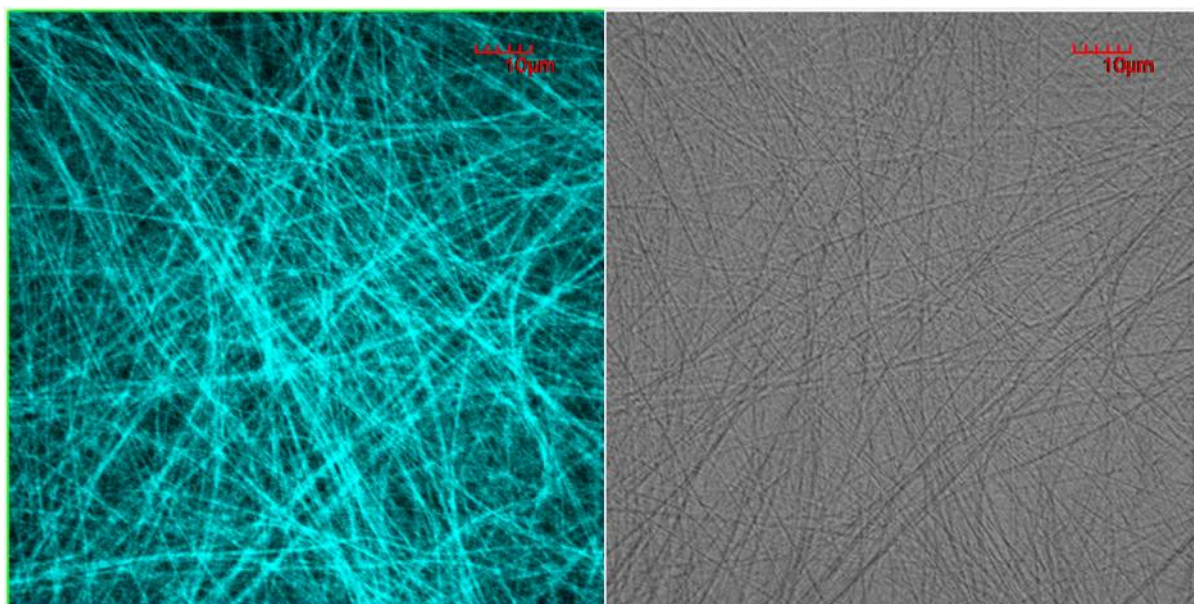
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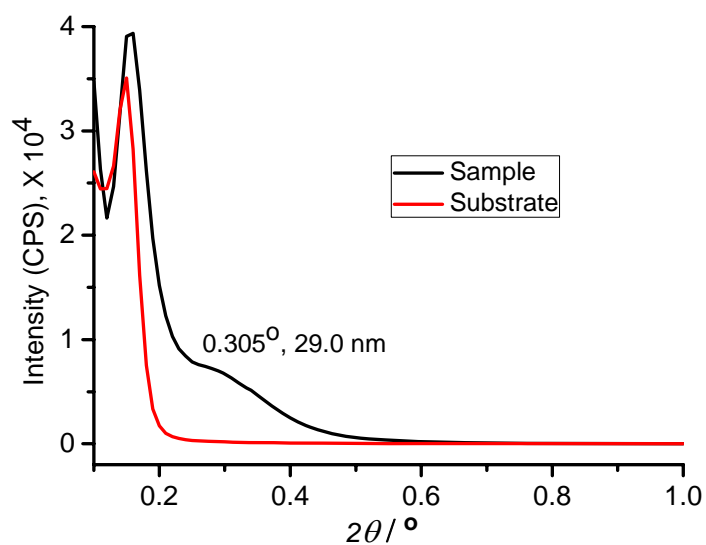
Graduate School of Chinese Academy of Sciences, Beijing 100190, (China)

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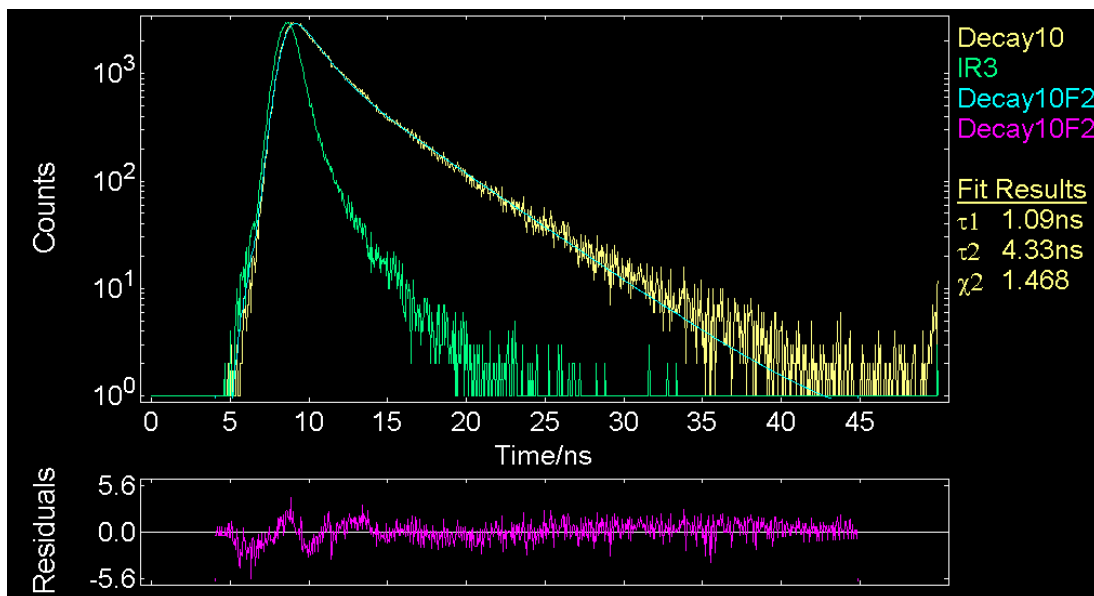
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**Figure S1.** Confocal laser scanning microscopy fluorescence image (*left*) and bright-field image (*right*) of the xerogel prepared from the organogel with LMWG1 (20 mg/mL) in toluene,  $\lambda_{exc.} = 365$  nm.

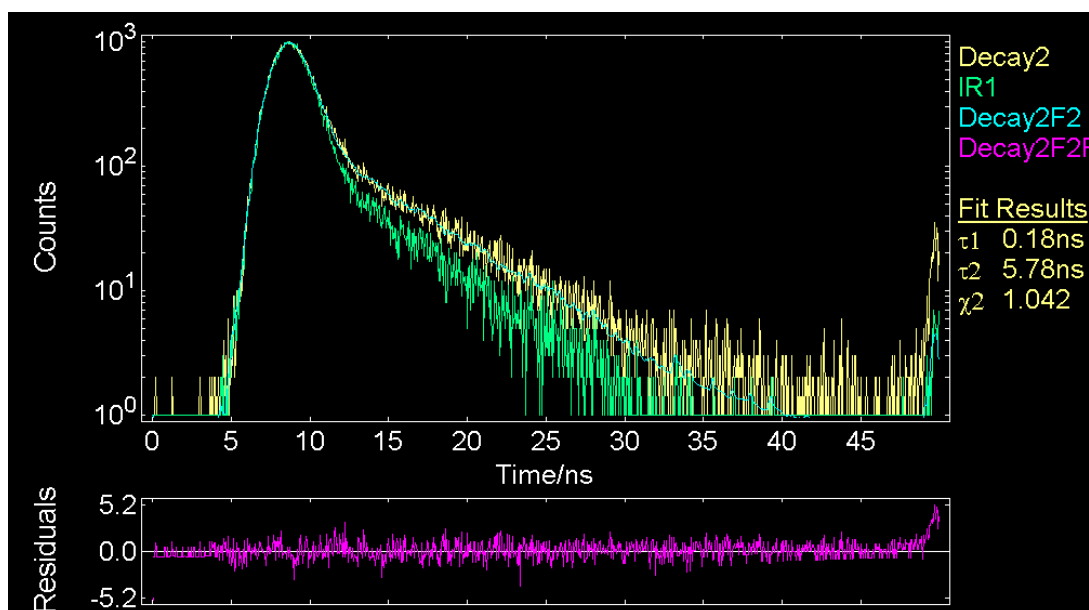


**Figure S2.** XRD pattern of the xerogel prepared from the organogel with LMWG1 (20 mg/mL) in toluene.



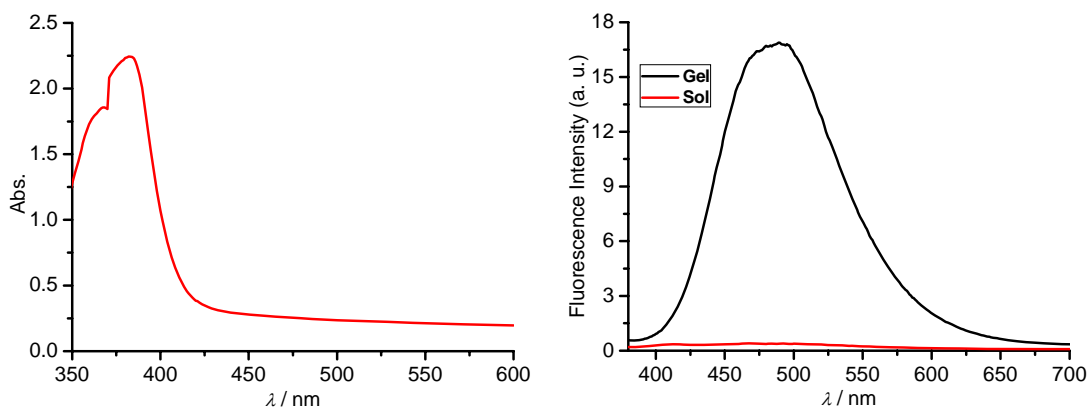
**Figure S3.** Fluorescence decay profile of organogel formed with LMWG1 (20 mg/mL) in toluene; the fluorescence intensity at 490 nm was monitored;  $\lambda_{exc.} = 365$  nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

|          | Value    | Std Dev   |       | Value    | Std Dev  | Rel % |
|----------|----------|-----------|-------|----------|----------|-------|
| $\tau_1$ | 1.091E-9 | 2.011E-11 | $B_1$ | 4.702E-2 | 5.135E-4 | 47.24 |
| $\tau_2$ | 4.334E-9 | 3.407E-11 | $B_2$ | 1.322E-2 | 2.542E-4 | 52.76 |
| $\chi^2$ | 1.468    |           | A     | 3.810E-1 |          |       |

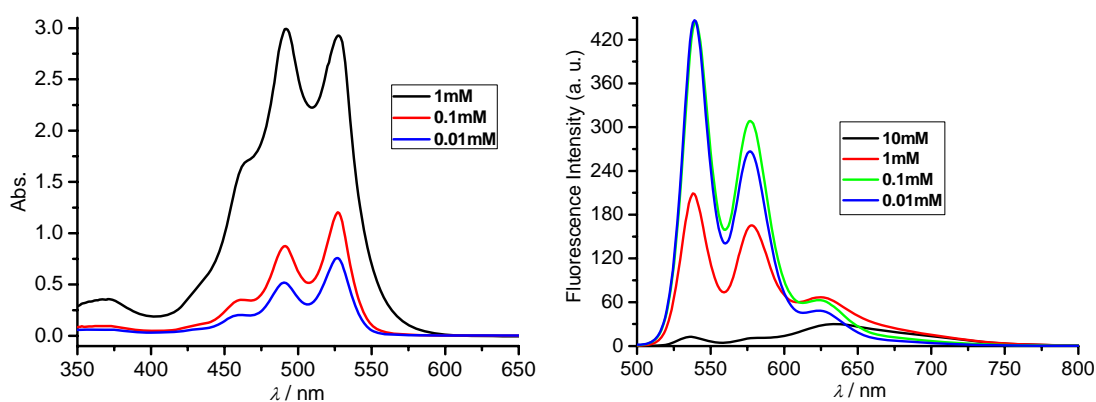


**Figure S4.** Fluorescence decay profile of the solution of LMWG1 (20 mg/mL) in toluene; the fluorescence intensity at 490 nm was monitored;  $\lambda_{exc.} = 365$  nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

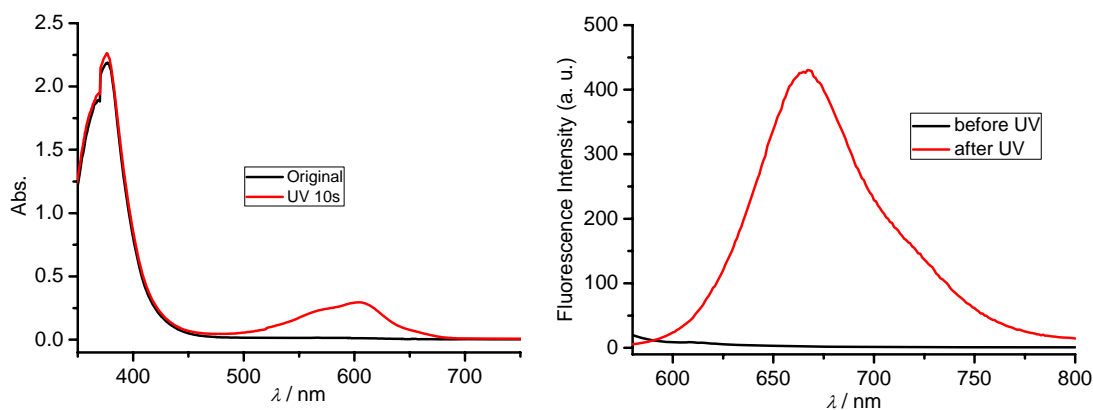
|          | Value     | Std Dev   |       | Value    | Std Dev  | Rel % |
|----------|-----------|-----------|-------|----------|----------|-------|
| $\tau_1$ | 1.759E-10 | 1.711E-11 | $B_1$ | 2.733E-1 | 2.603E-2 | 88.16 |
| $\tau_2$ | 5.777E-9  | 1.787E-10 | $B_2$ | 1.117E-3 | 5.698E-5 | 11.84 |
| $\chi^2$ | 1.042     |           | A     | 5.380E-1 |          |       |



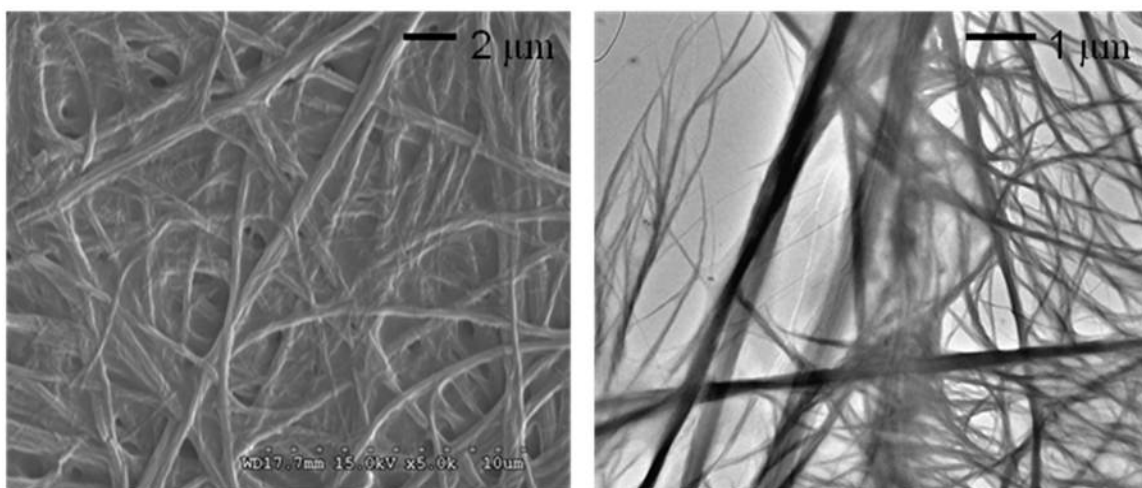
**Figure S5.** Absorption spectra of the organogel formed with LMWG1 (20 mg/mL) in toluene, and the fluorescence spectra of the gel and its corresponding heated solution;  $\lambda_{\text{exc.}} = 365$  nm.



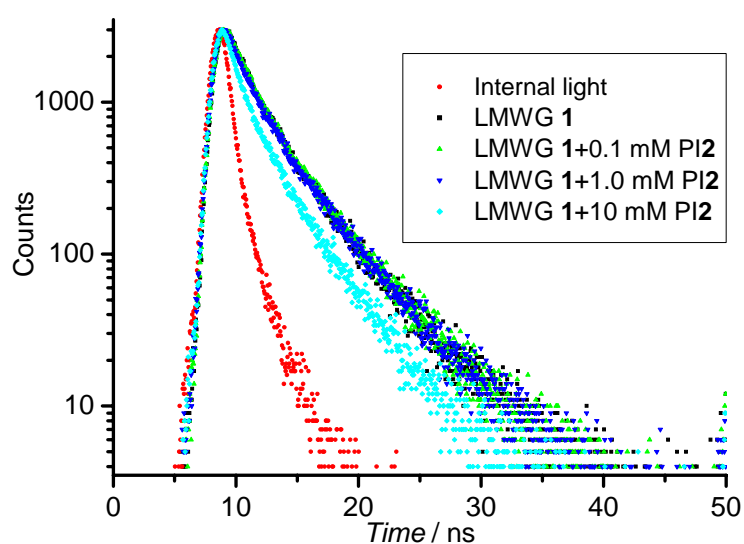
**Figure S6.** Absorption spectra of PI2 in toluene with different concentration of 0.01 mM, 0.1 mM and 1 mM, and fluorescence spectra of PI2 in toluene with different concentration of 0.01 mM, 0.1 mM, 1 mM and 10 mM;  $\lambda_{\text{exc.}} = 490$  nm.



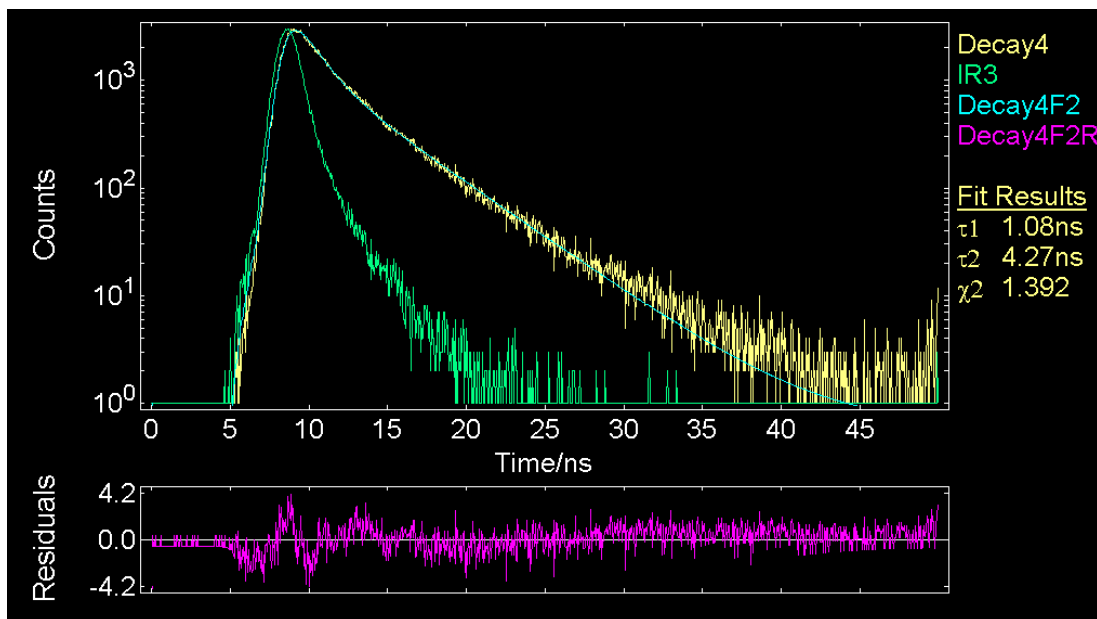
**Figure S7.** Absorption and fluorescence spectra of organogel formed with SP3 (20 mg/mL) in toluene before and after UV light irradiation;  $\lambda_{\text{exc.}} = 560$  nm.



**Figure S8.** SEM (left) and TEM (right) images of the xerogel prepared from the organogel formed by LMWG1 (20 mg/mL in toluene) and PI2 (10 mM).

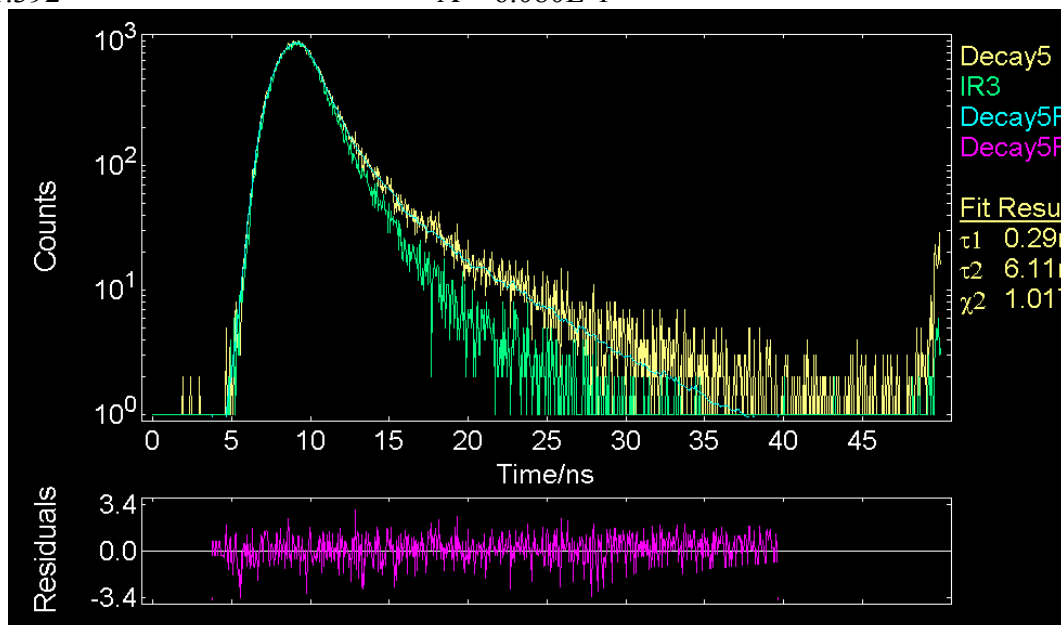


**Figure S9.** Fluorescence decay profiles of organogels formed with LMWG1 (20 mg/mL) in toluene and with different concentrations of 0.1 mM, 1.0 mM and 10 mM of PI2; the fluorescence intensity was monitored at 490 nm and excitation wavelength was 365 nm.



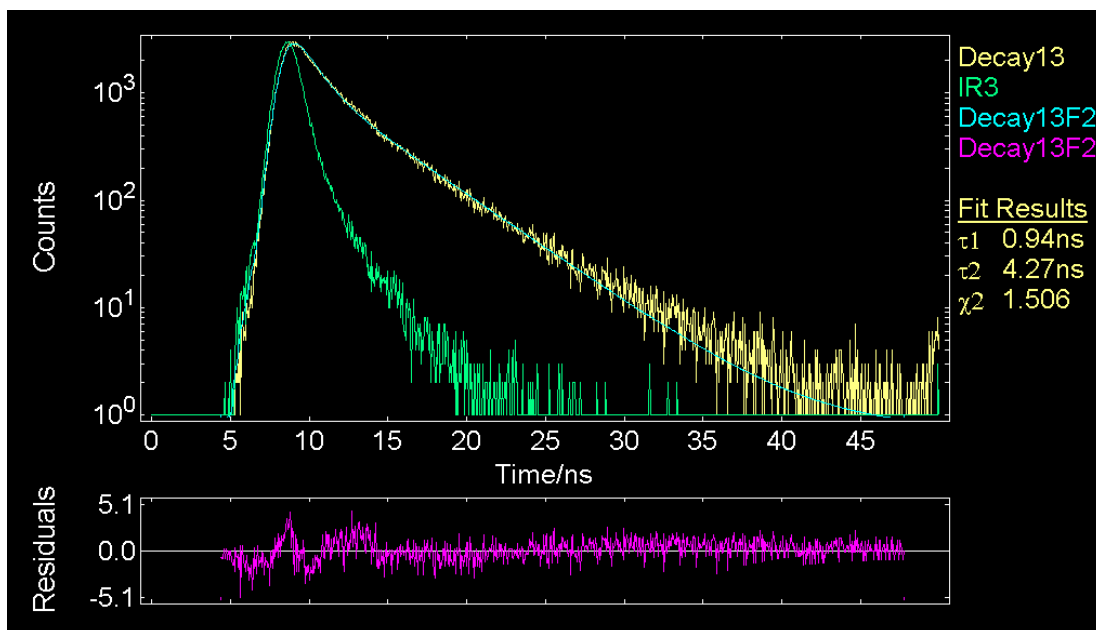
**Figure S10.** Fluorescence decay profile of organogel formed with LMWG1 (20 mg/mL) and PI2 ( $1.0 \times 10^{-4}$ M), the fluorescence intensity at 490 nm was monitored;  $\lambda_{exc.} = 365$  nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

|          | Value    | Std Dev   | Value | Std Dev  | Rel %    |
|----------|----------|-----------|-------|----------|----------|
| $\tau_1$ | 1.082E-9 | 1.941E-11 | $B_1$ | 4.732E-2 | 5.062E-4 |
| $\tau_2$ | 4.270E-9 | 3.214E-11 | $B_2$ | 1.304E-2 | 2.475E-4 |
| $\chi^2$ | 1.392    |           | A     | 6.080E-1 |          |



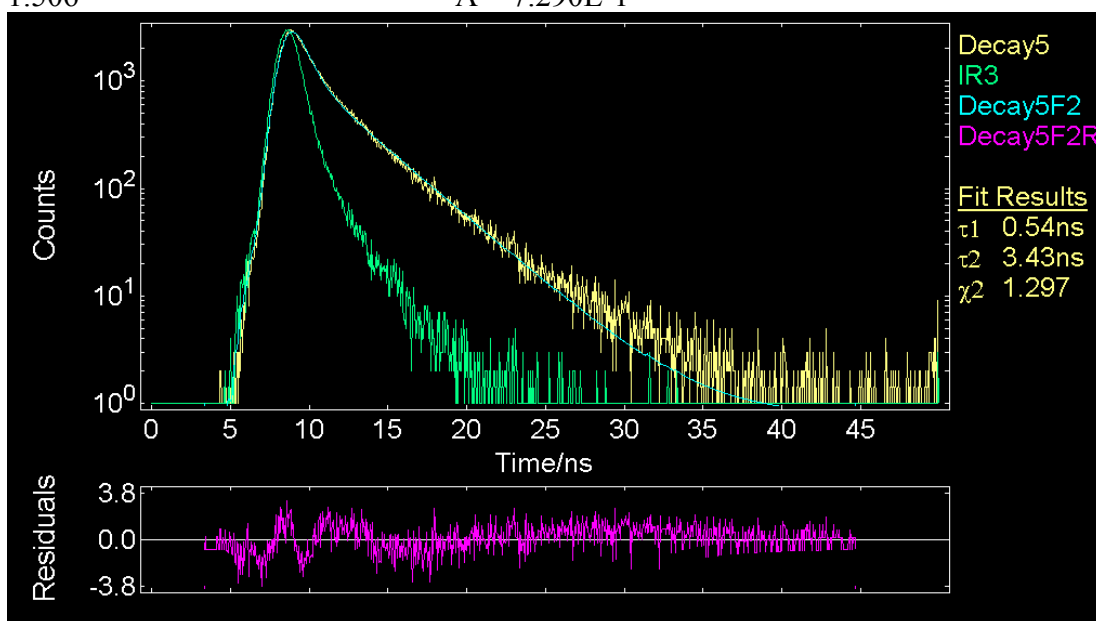
**Figure S11.** Fluorescence decay profile of the solution of LMWG1 (20 mg/mL) and PI2 ( $1.0 \times 10^{-4}$ M), the fluorescence intensity at 490 nm was monitored;  $\lambda_{exc.} = 365$  nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

|          | Value     | Std Dev   | Value | Std Dev  | Rel %    |
|----------|-----------|-----------|-------|----------|----------|
| $\tau_1$ | 2.904E-10 | 1.950E-11 | $B_1$ | 1.689E-1 | 1.107E-2 |
| $\tau_2$ | 6.114E-9  | 2.482E-10 | $B_2$ | 8.690E-4 | 5.413E-5 |
| $\chi^2$ | 1.017     |           | A     | 2.360E-1 |          |



**Figure S12.** Fluorescence decay profile of organogel formed with LMWG1 (20 mg/mL) and PI2 ( $1.0 \times 10^{-3}$  M), the fluorescence intensity at 490 nm was monitored;  $\lambda_{exc.} = 365$  nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

|          | Value     | Std Dev   | Value | Std Dev  | Rel %    |
|----------|-----------|-----------|-------|----------|----------|
| $\tau_1$ | 9.394E-10 | 1.804E-11 | $B_1$ | 5.069E-2 | 6.467E-4 |
| $\tau_2$ | 4.274E-9  | 3.005E-11 | $B_2$ | 1.346E-2 | 2.174E-4 |
| $\chi^2$ | 1.506     |           | A     | 7.290E-1 |          |

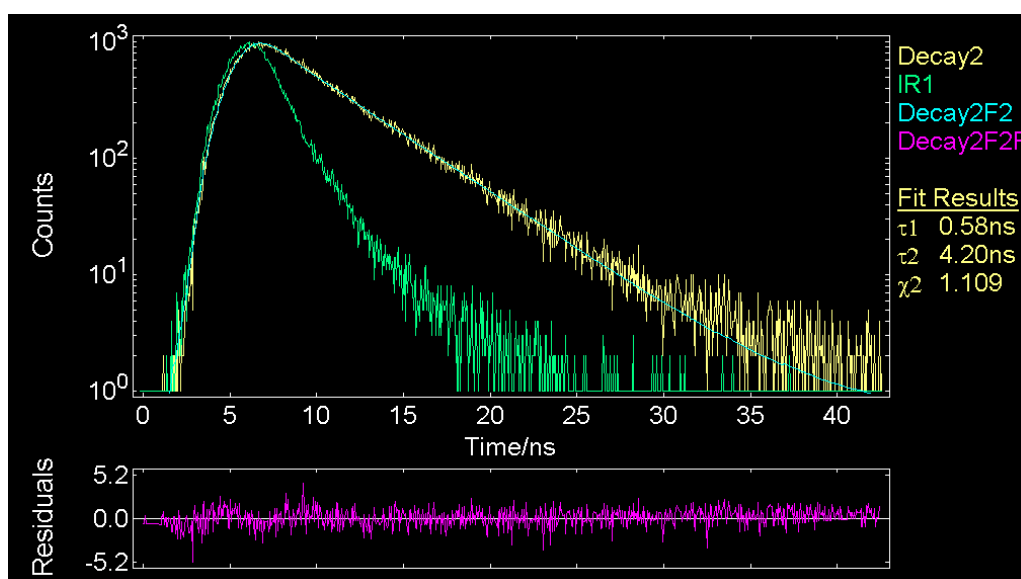


**Figure S13.** Fluorescence decay profile of organogel formed with LMWG1 (20 mg/mL) and PI2 ( $1.0 \times 10^{-2}$  M), the fluorescence intensity at 490 nm was monitored;  $\lambda_{exc.} = 365$  nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

|          | Value     | Std Dev   | Value | Std Dev  | Rel %    |
|----------|-----------|-----------|-------|----------|----------|
| $\tau_1$ | 5.413E-10 | 1.342E-11 | $B_1$ | 8.028E-2 | 1.667E-3 |
| $\tau_2$ | 3.431E-9  | 2.537E-11 | $B_2$ | 1.165E-2 | 1.815E-4 |
| $\chi^2$ | 1.297     |           | A     | 7.690E-1 |          |

**Table S1.** Fluorescence lifetimes of organogels formed with LMWG1 (20 mg/mL) and different concentrations of PI2 [0.1 mM (a), 1.0 mM (b) and 10 mM (c)]; the fluorescence intensity at 580 nm was monitored in case of (a) and (b), and the fluorescence intensity at 650 nm was monitored in case of (c);  $\lambda_{exc.} = 365$  nm.

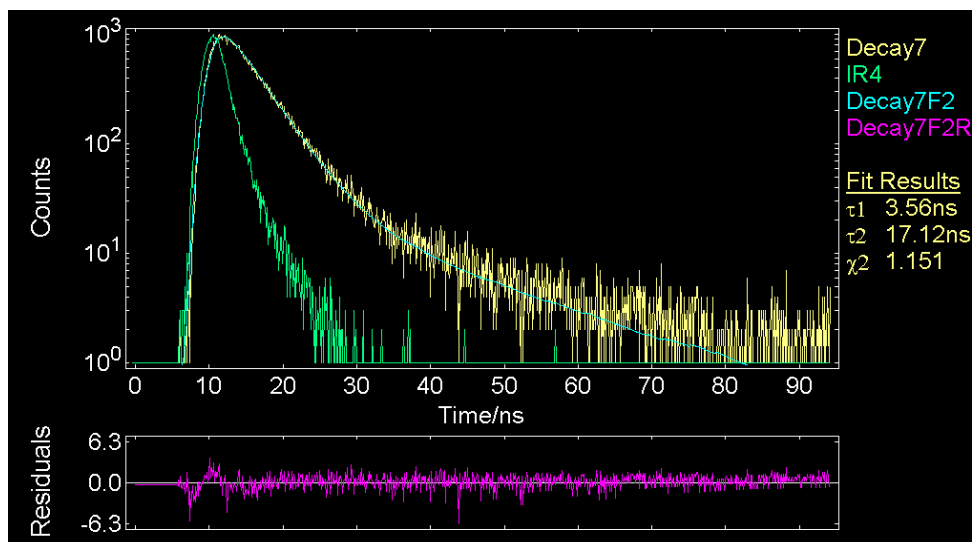
| Organogels | $\tau_1$ (ns)              | $\tau_2$ (ns)              |
|------------|----------------------------|----------------------------|
| a          | $0.583 \pm 0.057(27.47\%)$ | $4.196 \pm 0.034(72.53\%)$ |
| b          | $3.565 \pm 0.036(90.04\%)$ | $17.12 \pm 0.866(9.96\%)$  |
| c          | $0.941 \pm 0.025(13.55\%)$ | $24.89 \pm 0.081(86.45\%)$ |



**Figure S14.** Fluorescence decay profile of organogel formed with LMWG1 (20 mg/mL) and PI2 ( $1.0 \times 10^{-4}$  M); the fluorescence intensity at 580 nm was monitored;  $\lambda_{exc.} = 365$  nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

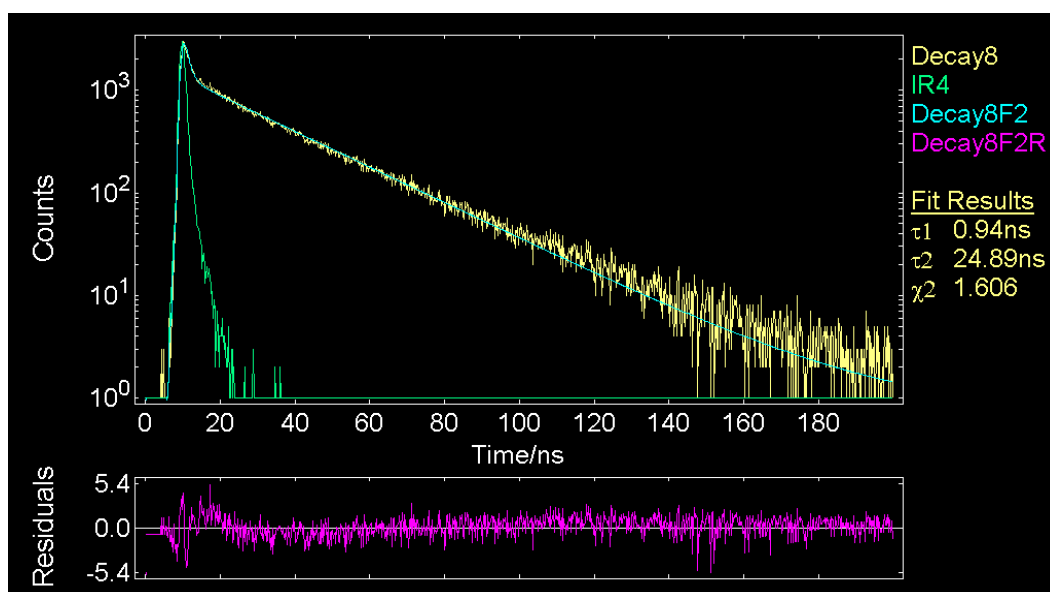
|          | Value     | Std Dev   | Value | Std Dev  | Rel %          |
|----------|-----------|-----------|-------|----------|----------------|
| $\tau_1$ | 5.827E-10 | 5.731E-11 | $B_1$ | 4.216E-2 | 3.893E-3 27.47 |
| $\tau_2$ | 4.196E-9  | 3.415E-11 | $B_2$ | 1.546E-2 | 2.455E-4 72.53 |
| $\chi^2$ | 1.109     |           | A     | 6.080E-1 |                |





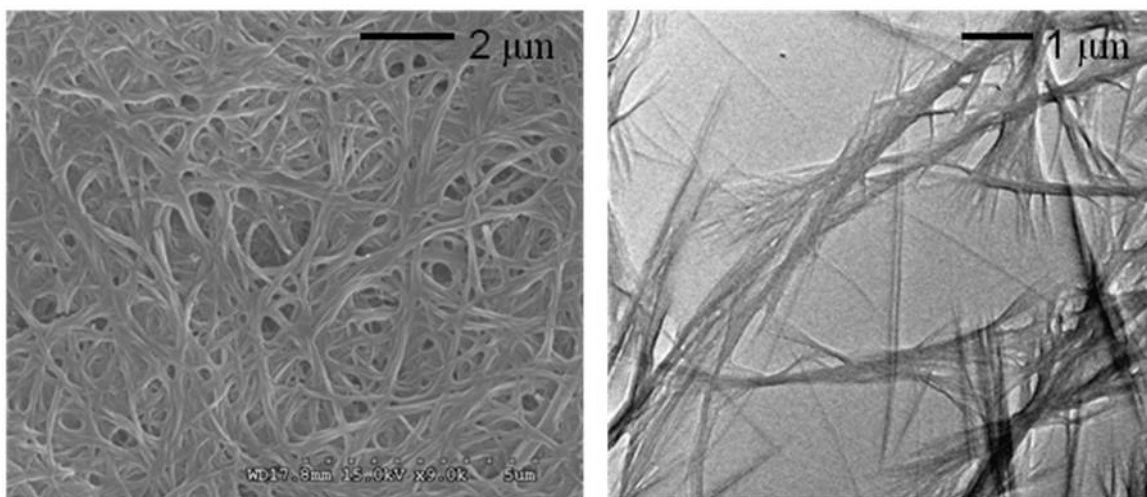
**Figure S15.** Fluorescence decay profile of organogel formed with LMWG1 (20 mg/mL) and PI2 ( $1.0 \times 10^{-3}$ M); the fluorescence intensity at 580 nm was monitored;  $\lambda_{\text{exc.}} = 365$  nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

|          | Value    | Std Dev   |       | Value    | Std Dev  | Rel % |
|----------|----------|-----------|-------|----------|----------|-------|
| $\tau_1$ | 3.565E-9 | 3.612E-11 | $B_1$ | 5.245E-2 | 3.984E-4 | 90.04 |
| $\tau_2$ | 1.712E-8 | 8.659E-10 | $B_2$ | 1.207E-3 | 1.134E-4 | 9.96  |
| $\chi^2$ | 1.151    |           | A     | 2.281E-1 |          |       |

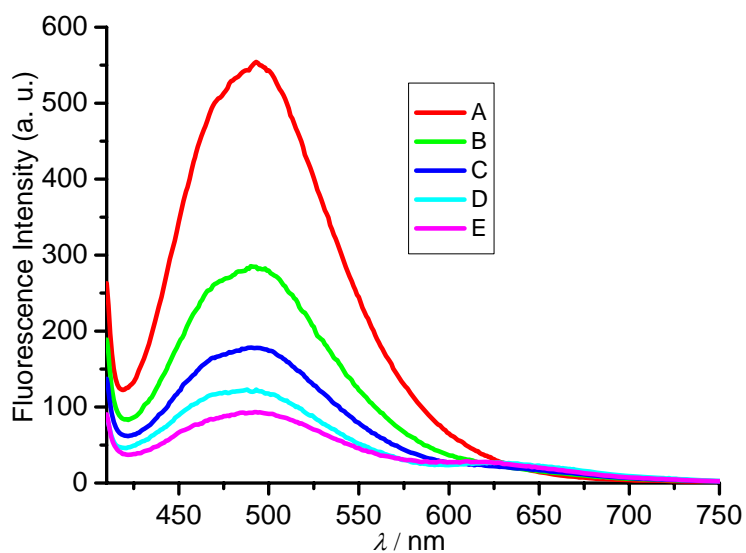


**Figure S16.** Fluorescence decay profile of organogel formed with LMWG1 (20 mg/mL) and PI2 ( $1.0 \times 10^{-2}$ M); the fluorescence intensity at 650 nm was monitored;  $\lambda_{\text{exc.}} = 365$  nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

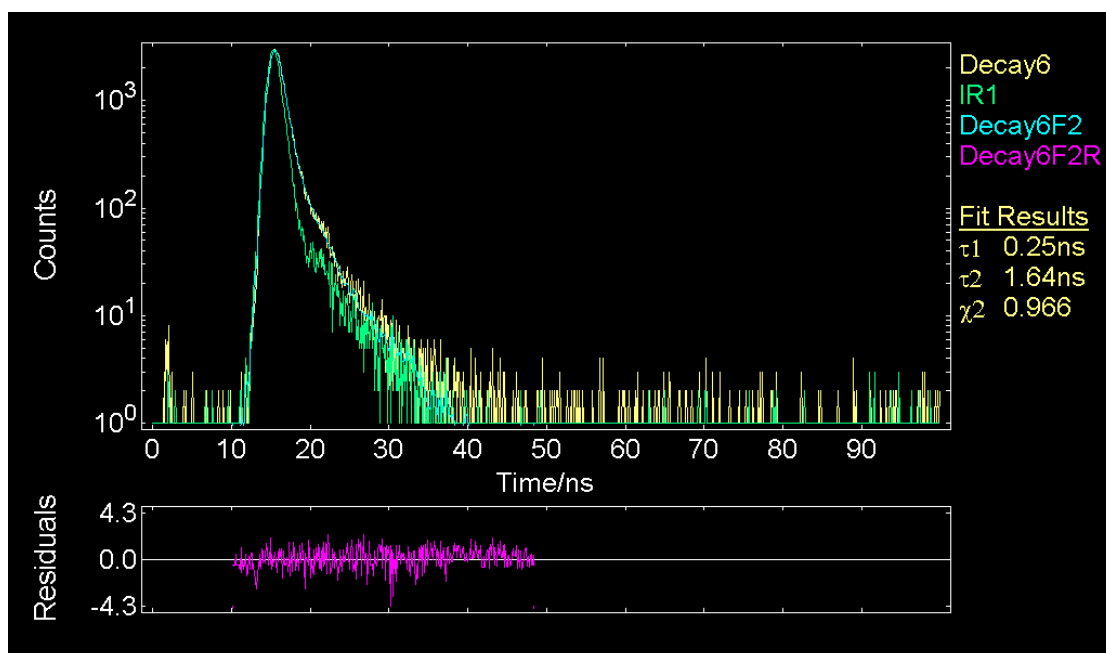
|          | Value     | Std Dev   |       | Value    | Std Dev  | Rel % |
|----------|-----------|-----------|-------|----------|----------|-------|
| $\tau_1$ | 9.409E-10 | 2.517E-11 | $B_1$ | 1.942E-1 | 4.800E-3 | 13.55 |
| $\tau_2$ | 2.489E-8  | 8.149E-11 | $B_2$ | 4.683E-2 | 2.126E-4 | 86.45 |
| $\chi^2$ | 1.606     |           | A     | 7.740E-1 |          |       |



**Figure 17.** SEM (left) and TEM (right) images of the xerogel prepared from the organogel formed by LMWG1 (10 mM in toluene) and SP3 (10 mM).

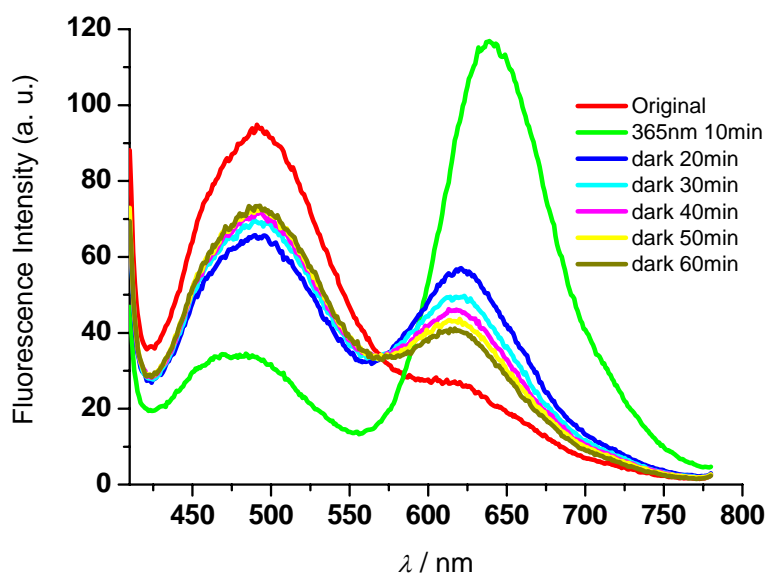


**Figure S18.** Fluorescence spectra of organogels formed with LMWG1 (20 mM) in toluene (A), LMWG1 (18.2 mM) and SP3 (1.8 mM) in toluene (B), LMWG1 (16.7 mM) and SP3 (3.3 mM) (C) in toluene, LMWG1 (13.3 mM) and SP3 (6.7 mM) (D) in toluene, LMWG1 (10 mM) and SP3 (10 mM) (E) in toluene;  $\lambda_{\text{exc.}} = 400$  nm.

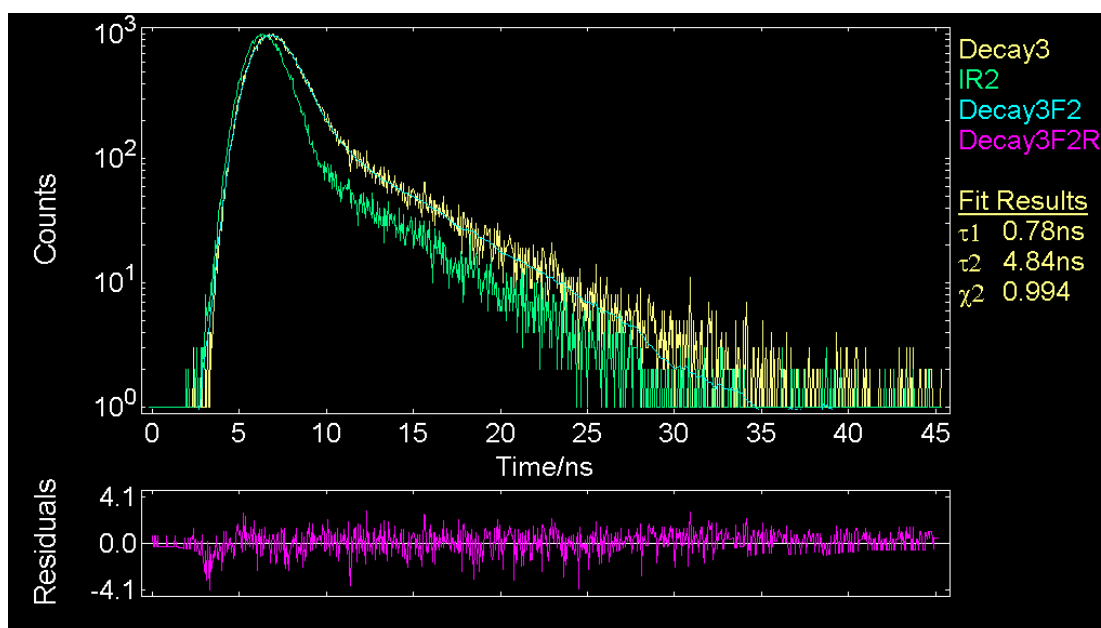


**Figure S19.** Fluorescence decay profile of the organogel formed with LMWG1 (10 mM) and SP3 (10 mM) in toluene after UV light irradiation for 10 min.; the fluorescence intensity was monitored at 490 nm and excitation wavelength was 365 nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

|          | Value     | Std Dev   | Value | Std Dev  | Rel %    |
|----------|-----------|-----------|-------|----------|----------|
| $\tau_1$ | 2.520E-10 | 2.212E-11 | $B_1$ | 3.577E-1 | 2.762E-2 |
| $\tau_2$ | 1.638E-9  | 6.045E-11 | $B_2$ | 1.474E-2 | 1.276E-3 |
| $\chi^2$ | 9.656E-1  |           | A     | 4.180E-1 |          |

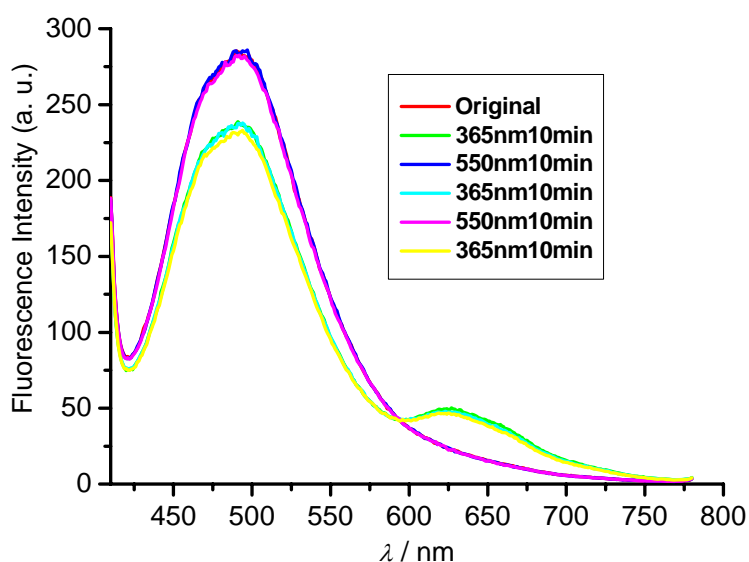


**Figure S20.** Fluorescence spectra of the organogel formed with LMWG1 (10 mM) and SP3 (10 mM) in toluene, after UV light irradiation for 10 minutes and then being left in dark for different times;  $\lambda_{exc.} = 400$  nm.

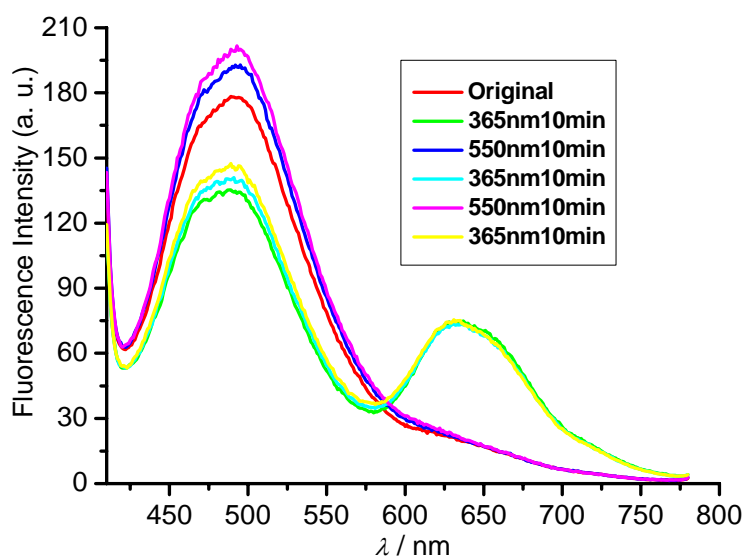


**Figure S21.** Fluorescence decay profile of the organogel formed with LMWG1 (10 mM) and SP3 (10 mM) in toluene after UV light irradiation for 10 min.; the fluorescence intensity was monitored at 650 nm and excitation wavelength was 365 nm; Fit =  $A + B_1 \exp(-t/\tau_1) + B_2 \exp(-t/\tau_2)$ . The fit parameters are:

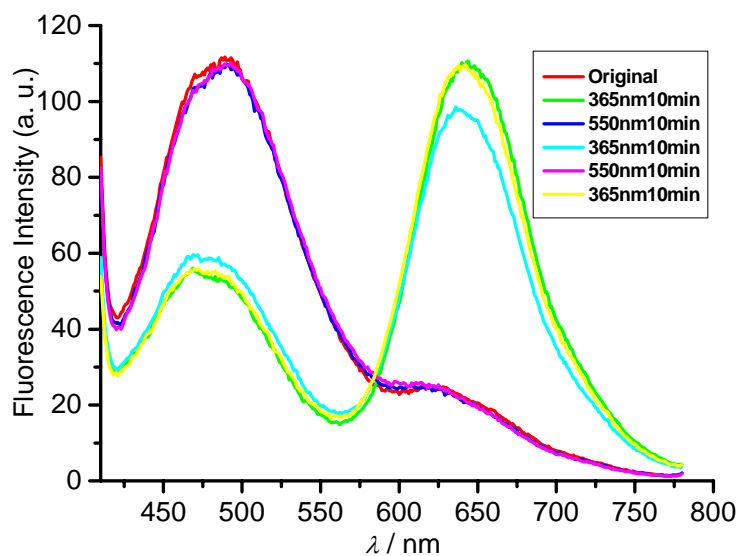
|          | Value     | Std Dev   | Value | Std Dev  | Rel %    |
|----------|-----------|-----------|-------|----------|----------|
| $\tau_1$ | 7.797E-10 | 1.965E-11 | $B_1$ | 6.967E-2 | 1.416E-3 |
| $\tau_2$ | 4.838E-9  | 2.390E-10 | $B_2$ | 1.425E-3 | 1.504E-4 |
| $\chi^2$ | 9.937E-1  |           | $A$   | 3.180E-1 |          |



**Figure S22.** Fluorescence tuning of the organogel formed with LMWG1 (18.2 mM) and SP3 (1.8 mM) in toluene by alternating UV (365 nm) and visible light (550 nm) irradiation for 10 min.;  $\lambda_{exc.} = 400$  nm.



**Figure S23.** Fluorescence tuning of the organogel formed with LMWG1 (16.7 mM) and SP3 (3.3 mM) in toluene by alternating UV (365 nm) and visible light (550 nm) irradiation for 10 min.;  $\lambda_{\text{exc.}} = 400$  nm.



**Figure S24.** Fluorescence tuning of the organogel formed with LMWG1 (13.3 mM) and SP3 (6.7 mM) in toluene by alternating UV (365 nm) and visible light (550 nm) irradiation for 10 min.;  $\lambda_{\text{exc.}} = 400$  nm.

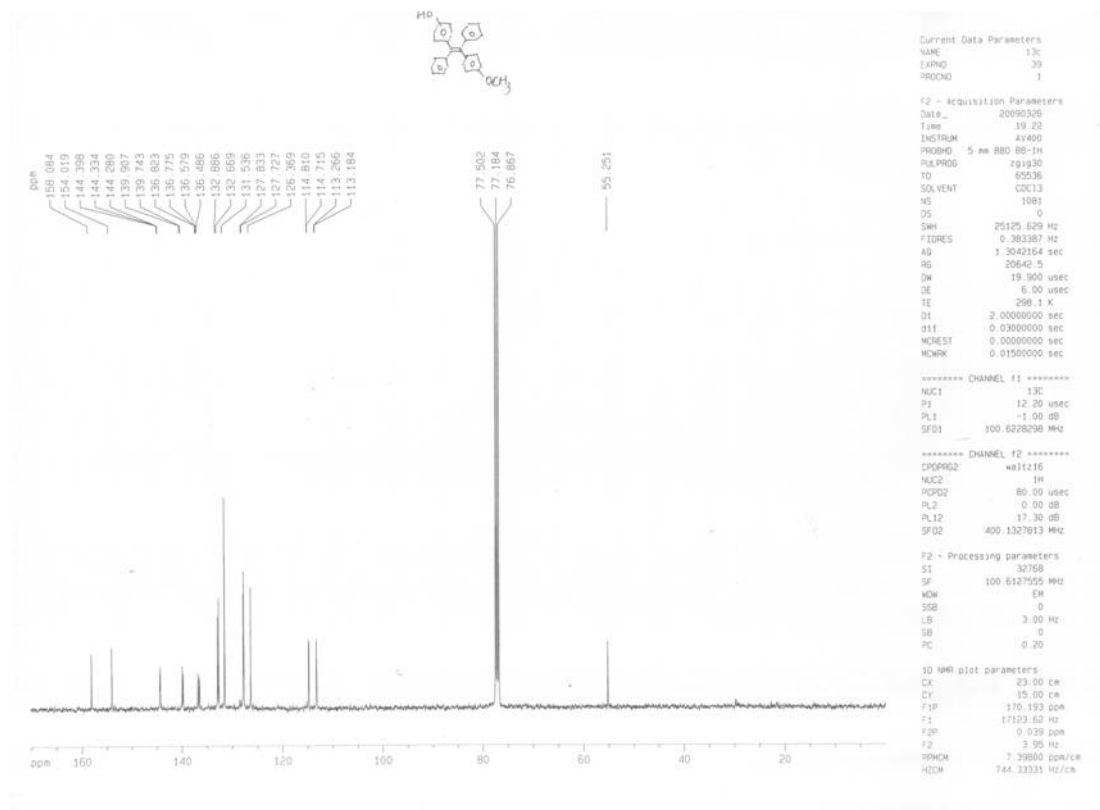
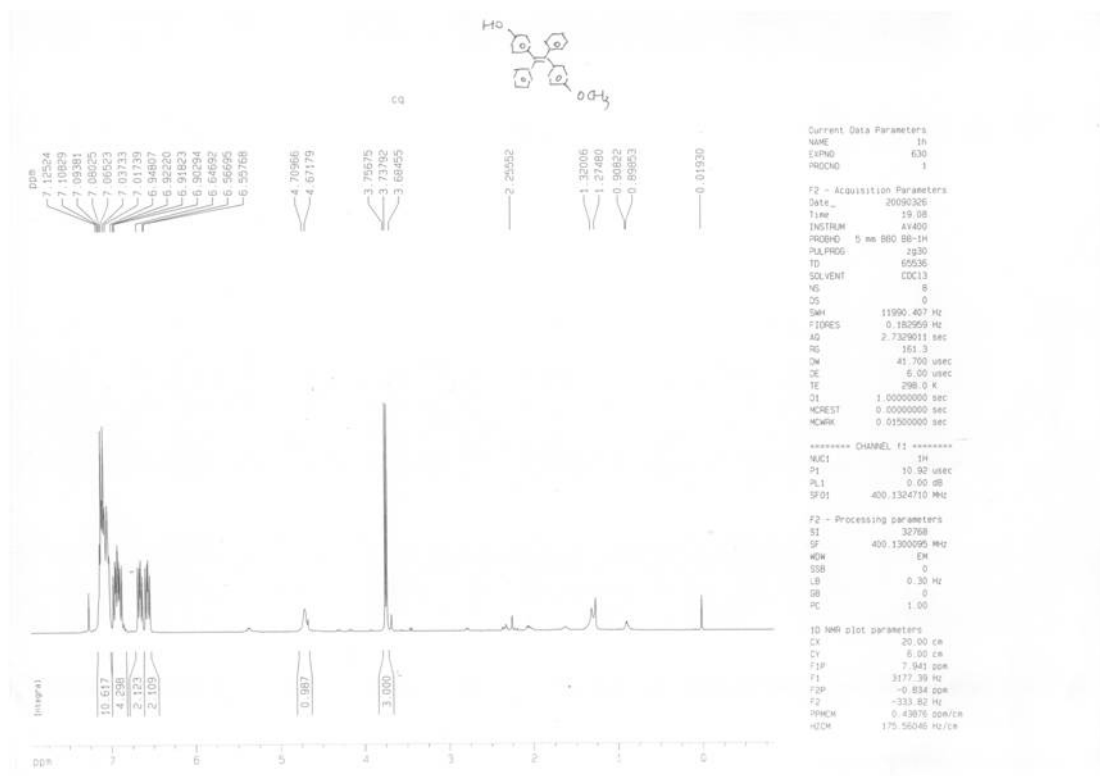


Figure S25. <sup>1</sup>H-NMR and <sup>13</sup>C-NMR spectra of 5

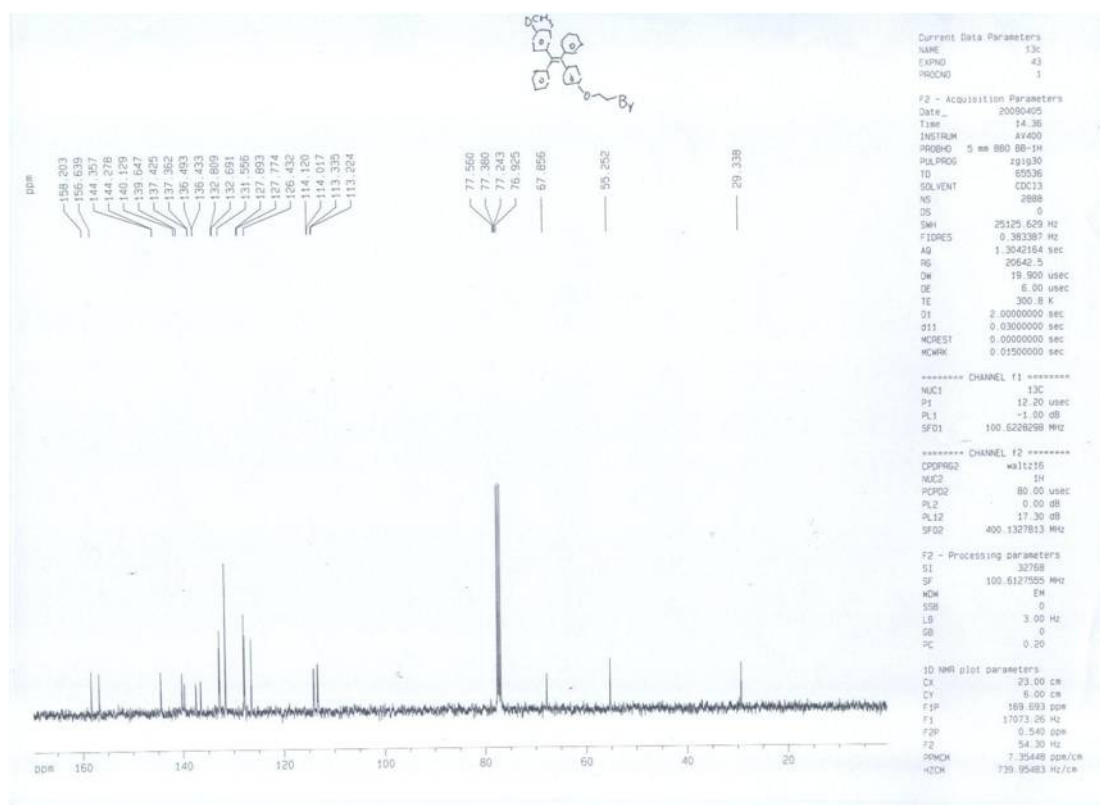
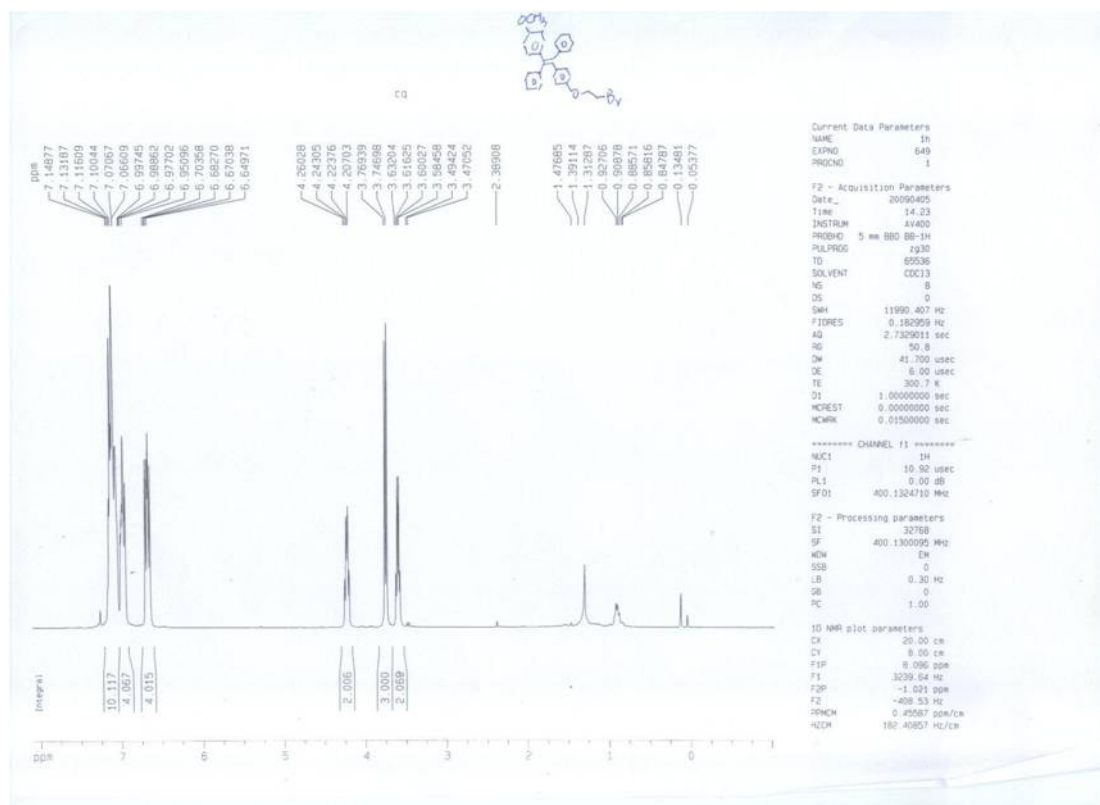
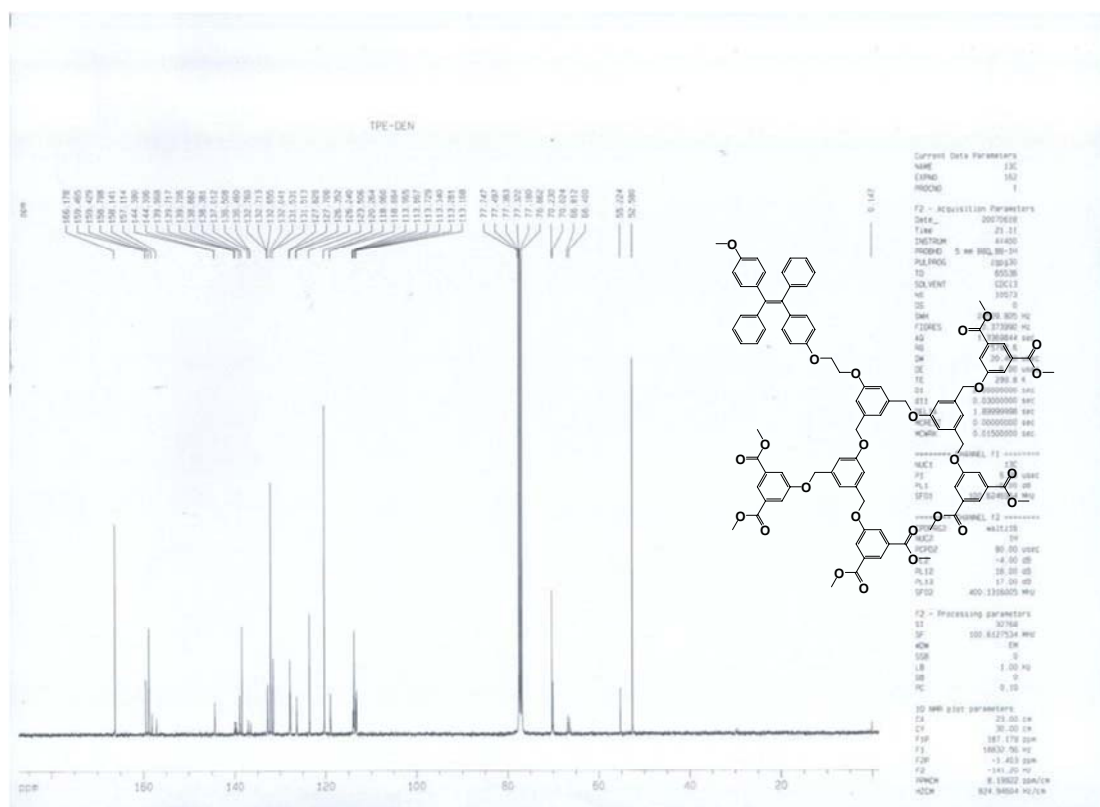
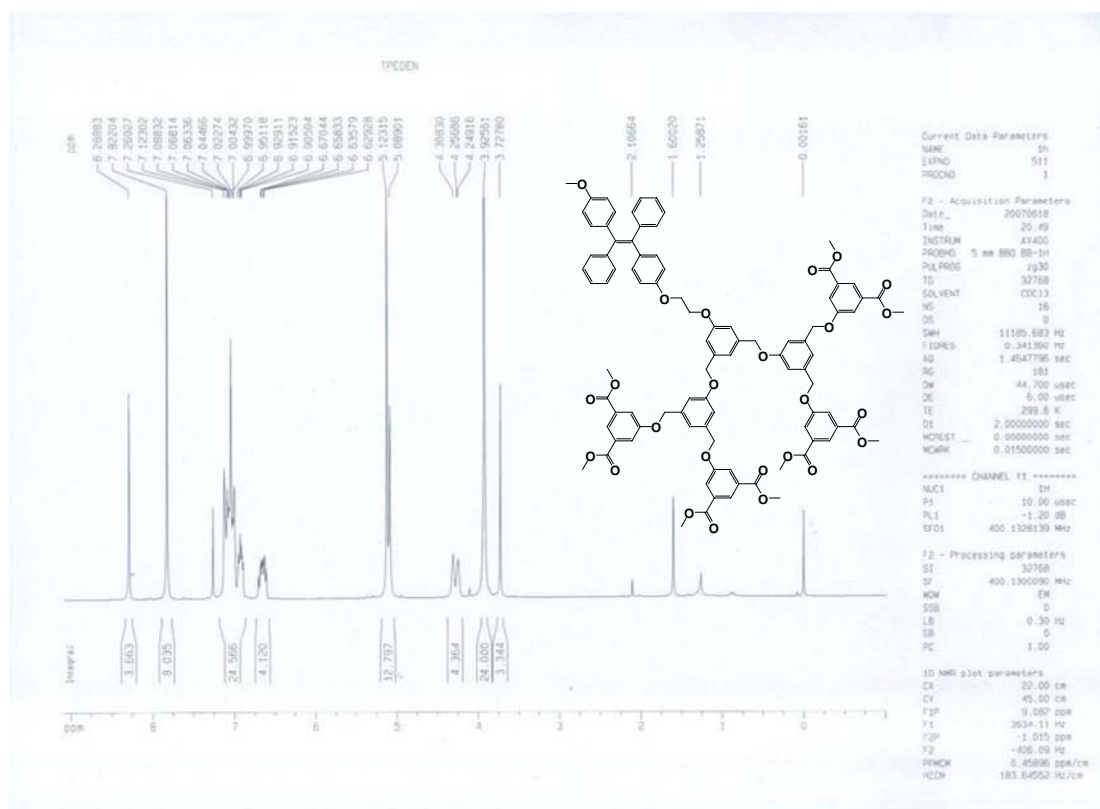


Figure S26. <sup>1</sup>H-NMR and <sup>13</sup>C-NMR spectra of 6



**Figure S27.** <sup>1</sup>H-NMR and <sup>13</sup>C-NMR spectra of LMWG1