Supporting Information for

Tunable multicolor emissions in monocomponent gel system by varying solvents, temperature and fluoride anion

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Scheme S1 the synthesis procedure of N1

The synthesis of 1-3 could be seen from our previous literature.\textsuperscript{13b}

**Synthesis of 4-diamine-1, 8-naphthalic anhydride-N-haxanioc acid imide-N-ethyl amine-3-β-cholest-5-en-3-yl-ester-N-Lysine acid ethyl ester (4)**

The compound 3 (1mmol, 843 mg), 8 mL hydrazine hydrate were refluxed in ethanol for 3 days, the reaction mixture was then concentrated and purified by chromatography (SiO\textsubscript{2}, CHCl\textsubscript{3}/CH\textsubscript{3}OH=10:1) to give 3 as a yellow solid (mg, yield: 30%). Mp: 186-189 °C. \textsuperscript{1}HNMR (500M, CDCl\textsubscript{3}, \(\delta\)): 0.60 (s, 3H), 0.83-1.59 (m, 39H), 1.76-1.92(m, 5H), 2.03-2.06 (t, 2H, \(J=6Hz\)),2.15-2.28(m, 2H), 2.99-3.01(t, \(J=6Hz\)), 3.31(s, 1H), 3.96-3.99 (T, 2H, \(J=8Hz\)), 4.29 (m, 1H), 4.63(s, 1H), 5.28(s, 1H), 6.97-6.99 (t, 1H, \(J=5.0 Hz\)), 7.22-7.24 (d, 1H, \(J=8.5Hz\)), 7.60-7.63 (t, 1H, \(J=8 Hz\)), 7.75-7.77 (d, 1H, \(J=5.5Hz\)), 8.26-8.28 (d, 1H, \(J=8.5Hz\)), 8.39-8.41 (d, 1H, \(J=7.5Hz\)),8.59-8.61 (d, 1H, \(J=8.5Hz\)), 9.10 (s, 1H); \textsuperscript{13}CNMR (125M, DMSO-\textsubscript{d}\textsubscript{6}, \(\delta\)): 11.57, 18.47,18.89, 20.51, 22.40, 22.64, 23.46, 23.71, 25.14, 26.38,
27.38, 27.50, 27.73, 27.89, 31.14, 35.27, 35.59, 35.87, 36.45, 41.68, 49.29, 55.56, 55.83, 72.98, 106.45, 110.80, 116.14, 118.67, 119.51, 120.52, 121.70, 122.04, 124.96, 126.45, 128.31, 129.26, 130.82, 133.62, 139.64, 142.10, 146.38, 155.88, 156.31, 162.90, 172.32. MS for calc. for. (C_{48}H_{69}N_{5}O_{5}+Na)^+ 819.5; Found: 819.0.

Synthesis of N1

Compound 4 (1 mmol, 823 mg) and salicylaldehyde (1 mmol, 98 mg) were refluxed in ethanol for 24 h. The reaction mixture was concentrated and purified by chromatography (SiO_2, CHCl_3/CH_3OH=100:1 to 20:1) to give 3 as an orange solid (461 mg, yield: 50%). Mp: 203-206 °C; ^1HNMR (500M, DMSO-d_6) 6: 0.53 (s, 3H, CH_3), 0.62-0.64 (d, 3H, J=10Hz), 0.82-1.76 (m, 40H), 1.80-1.82 (d, 1H, J=12 Hz), 2.04-2.07 (t, 2H, J=7.5Hz), 2.12-2.24(m, 2H)2.98-3.08(m, 4H), 3.99 (s, 2H), 4.28 (s, 1H), 5.20 (s, 1H), 6.89-6.94 (q, 3H), 7.23-7.26 (t, 1H, J=7.5Hz), 7.63-7.64 (d, 1H, J=8.5Hz), 7.74-7.84 (m, 3H), 8.37-8.38 (d, 1H, J=8.5Hz), 8.47-8.49 (d, 1H, J=7Hz), 8.80-8.84 (t, 2H, J=7.5Hz), 10.22 (s, 1H), 11.48 (s, 1H). ^13CNMR (125M, DMSO-d_6, 6): 11.57, 18.47, 18.89, 20.51, 22.40, 22.64, 23.46, 23.71, 25.14, 26.38, 27.38, 27.50, 27.73, 27.89, 31.14, 35.27, 35.59, 35.87, 36.45, 41.68, 49.29, 55.56, 55.83, 72.98, 106.45, 110.80, 116.14, 118.67, 119.51, 120.52, 121.70, 122.04, 124.96, 126.45, 128.31, 129.26, 130.82, 133.62, 139.64, 142.10, 146.38, 155.88, 156.31, 162.90, 163.62, 172.32. HRMS for calc. for. (C_{55}H_{73}N_{5}O_{6}+Na)^+: 922.5459; Found: 922.5562.

![Image](image_url)

**Fig. S1** The photos of the N1 organogels in different organic solvents. From left to right: dichloromethane, n-propanol, isopropanol, acetone, n-butanol, ethanol, benzene.
Fig. S2 the photos of the transparent gel in benzene.

Fig. S3 Plots of $T_{gel}$ (gel collapsing temperature) of N1 versus solvents, unit: °C.
**Fig. S4** the fluorescent spectra of N1 aggregates in solvent mixture of CH$_2$Cl$_2$ and benzene with different volume ratios.

**Fig. S5** a) Photos of N1 xerogels evaporated from different kind of organic solvents.
From left to right: dichloromethane, n-propanol, isopropanol, acetone, n-butanol, ethanol, benzene; b) fluorescent spectra of xerogels.

**Table S2** The absorption peaks of N1 in solution (10^{-5} M) and gel (25 mg/mL).

<table>
<thead>
<tr>
<th>Solvents</th>
<th>Solution(nm)</th>
<th>Gel(nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH\textsubscript{2}Cl\textsubscript{2}</td>
<td>435</td>
<td>489</td>
</tr>
<tr>
<td>n-propanol</td>
<td>459</td>
<td>442</td>
</tr>
<tr>
<td>isopropanol</td>
<td>459</td>
<td>456</td>
</tr>
<tr>
<td>acetone</td>
<td>444</td>
<td>436</td>
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<tr>
<td>butanol</td>
<td>458</td>
<td>442</td>
</tr>
<tr>
<td>ethanol</td>
<td>457</td>
<td>461</td>
</tr>
<tr>
<td>benzene</td>
<td>431</td>
<td>460</td>
</tr>
</tbody>
</table>

**Fig. S6** UV-vis spectra of N1 gels in different organic solvents.
Fig. S7 Temperature dependent fluorescence changes of N1 organogel in benzene (5 mg/200 μL) from 20 to 180 °C.

Fig. S8 CD spectra of the gel (25 mg/mL) in different organic solvents.
**Fig. S9** FT-IR spectra of these N1 xerogels from different organic solvents.

**Fig. S10** the gel N1 in CH$_2$Cl$_2$ and sol triggered by fluoride anions.

**Fig. S11** the gel N1 in benzene and sol triggered by fluoride anions.
**Fig. S12** $^1$HNMR titration of N1 upon the addition of $F^-$.  

**Fig. S13** $^1$HNMR spectra of 4 in DMSO-$d_6$.  

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**Chemical shift/ppm**

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Fig. S14 $^{13}$C NMR spectra of 4 in DMSO-$d_6$.

Fig. S15 MS spectrum of compound 4.
Fig. S16 $^1$H NMR spectra of N1 in DMSO-$d_6$.

Fig. S17 $^{13}$C NMR spectra of N1 in DMSO-$d_6$. 
Fig. S18 HR-MS spectra of N1.

Fig. S19 MS spectra of N1.