

## Electronic Supporting Information

### **An efficient iodide ion chemosensor and rewritable dual-channel security display material based on an ions responsive supramolecular gel**

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## 1. Experiment

### 1.1. Materials

The anions were used as the tetrabutylammonium (TBA) salts, which were purchased from Alfa Aesar and used as received. Other reagents used in the study were analytical grade. Fresh double distilled water was used throughout the experiment. All other reagents and solvents were commercially available at analytical grade and were used without further purification.  $^1\text{H}$  NMR spectra were recorded on Mercury-400BB spectrometer (400MHz) and Bruker Digital RF spectrometer (300MHz).  $^1\text{H}$  chemical shifts are reported in ppm downfield from tetramethylsilane (TMS,  $\delta$  scale with the solvent resonances as internal standards). Low-resolution mass spectra were recorded on a Bruker Esquire 6000 MS instrument. The X-ray diffraction analysis (XRD) was performed on a Rigaku D/Max-2400 X-Ray Diffractometer. The morphologies and sizes of the xerogels were characterized using field emission scanning electron microscopy (FE-SEM, JSM-6701F) at an accelerating voltage of 8 kV. The infrared spectra were performed on a Digilab FTS-3000 Fourier transform-infrared spectrophotometer. Melting points were measured on an X-4 digital melting-point apparatus (uncorrected). Ultraviolet-visible (UV-vis) spectra were recorded on a Shimadzu UV-2550 spectrometer. Fluorescence spectra were recorded on a Shimadzu RF-5301PC spectrofluorophotometer. Elemental analyses were performed by Thermo Scientific Flash 2000 organic elemental analyzer.

### 1.2 General procedure for fluorescence experiments

Fluorescence spectroscopy was carried out keeping the host concentration constant

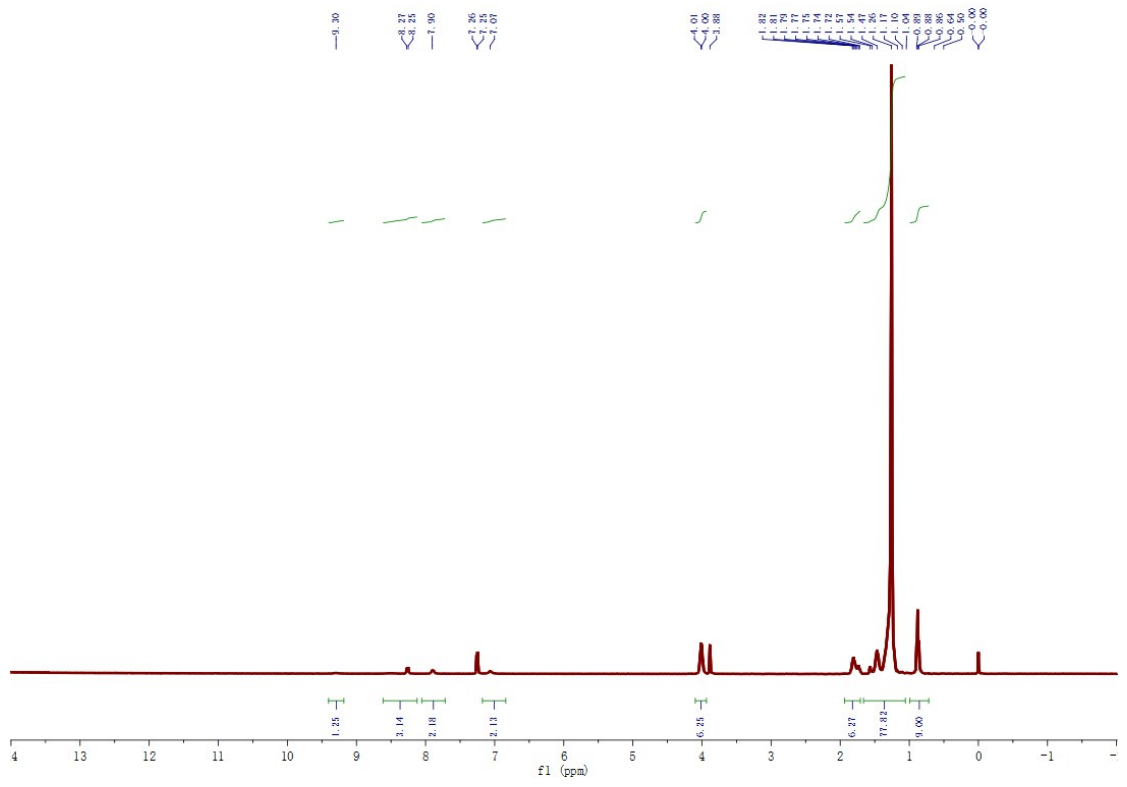
in ethanol solution on a Shimadzu RF-5301PC spectrofluorophotometer. The I<sup>-</sup> water solution was prepared from its tetrabutylammonium (TBA) salts, the Pb<sup>2+</sup> solution was originated from its perchlorate salts.

### *1.3 General procedure for <sup>1</sup>H NMR titrations*

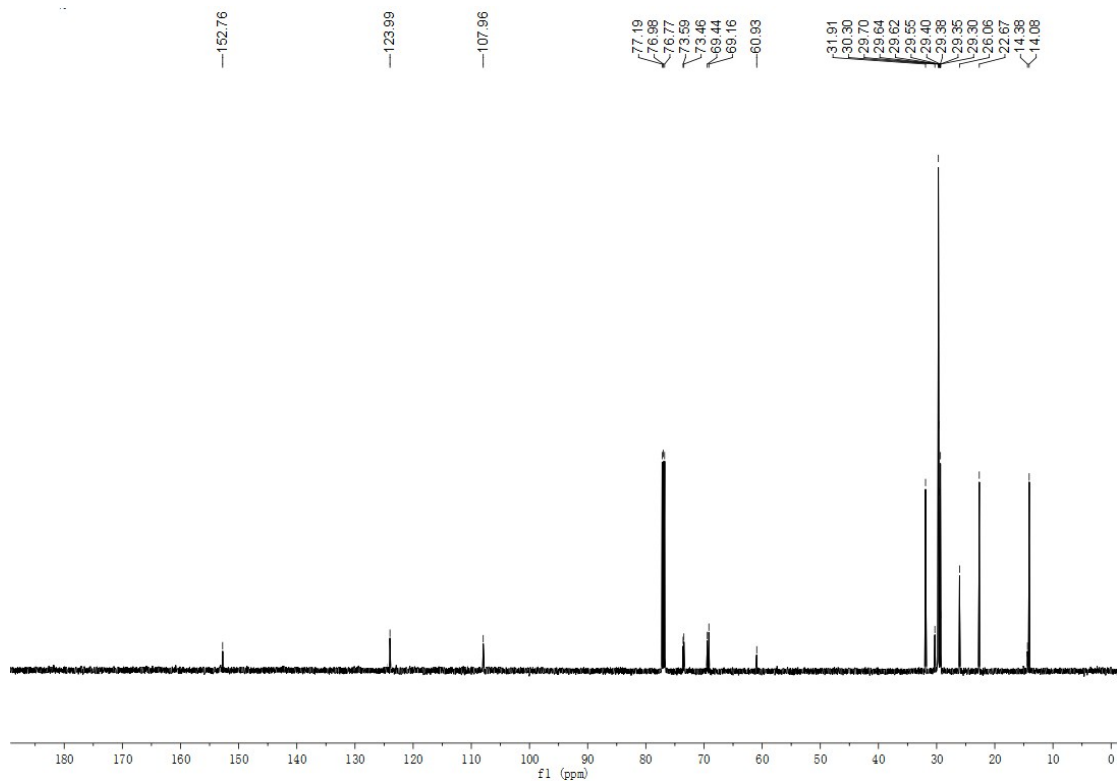
For <sup>1</sup>H NMR titrations, two stock solutions were prepared: one of them contained the host only in Ethanol-*d*<sub>6</sub> and the second one contained an appropriate concentration of guest in Ethanol-*d*<sub>6</sub>. Aliquots of the two solutions were mixed directly in NMR tubes.

### *1.4 General procedure for concentration-dependent <sup>1</sup>H NMR measurements*

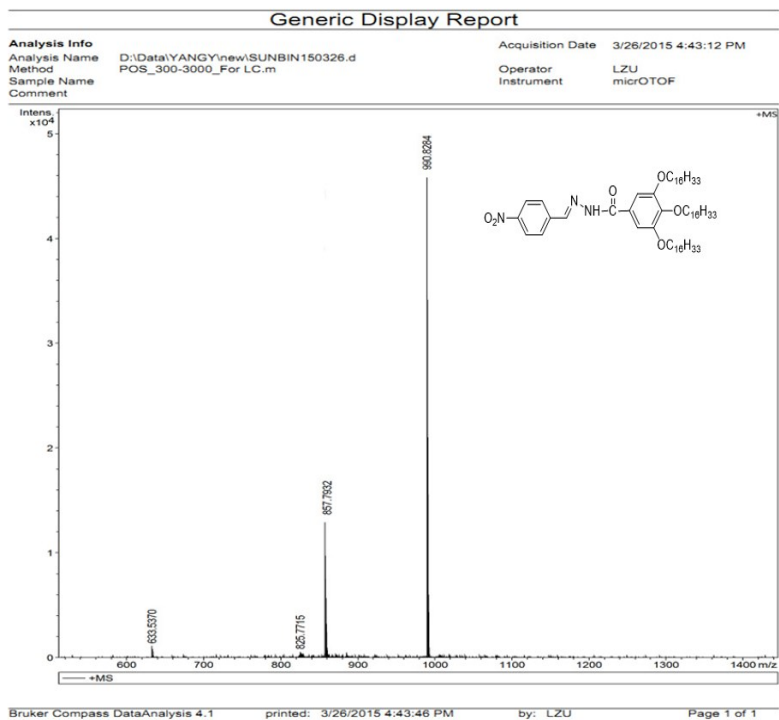
The concentration-dependent <sup>1</sup>H NMR was carried out by gradually increasing the concentration of the CDCl<sub>3</sub> solution of **G1**. The initial concentration of the **G1** is 0.8 mM, the concentration was adjusted by directly addition right amount of powdery **G1** into the CDCl<sub>3</sub> solution.



**Fig. S1.** <sup>1</sup>H NMR spectra of G1.



**Fig. S2.**  $^{13}\text{C}$  NMR spectra of G1.



**Fig. S3** Mass spectra of **G1**.

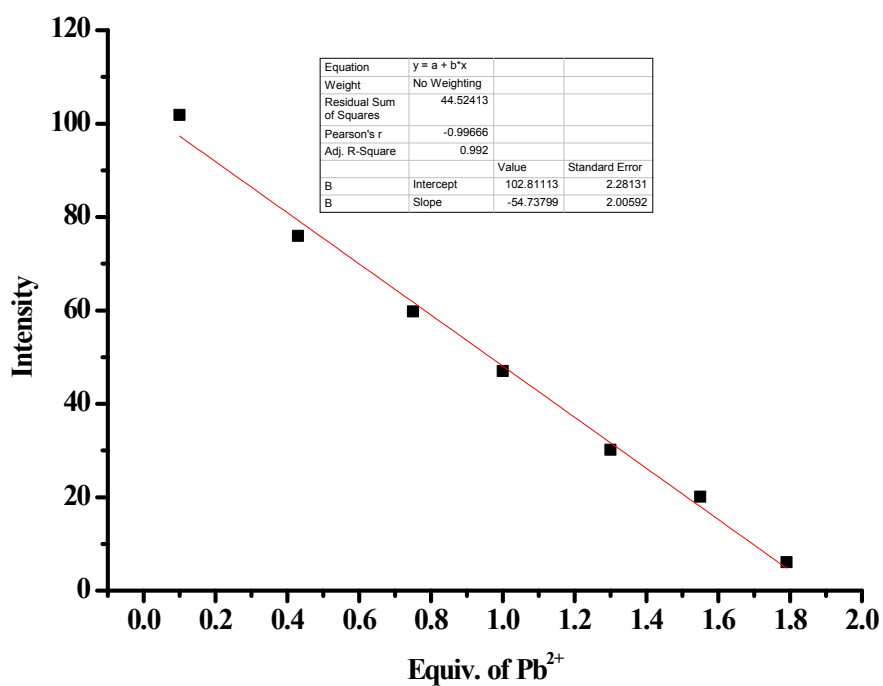
**Table S1.** Gelation property of organogelator **G1**.

Entry	Solvent	State <sup>a</sup>	CGC <sup>b</sup>	T <sub>gel</sub> <sup>c</sup> (°C, wt/v %)
1	Cyclohexane	S	\	\
2	Toluene	S	\	\
3	Petroleum ether	P	\	\
4	THF	S	\	\
5	Chloroform	S	\	\
6	Dichloromethane	S	\	\
7	Acetone	G	0.52	67
8	Acetonitrile	P	\	\
9	DMF	G	0.58	62
10	DMSO	S	\	\
11	Methanol	P	\	\
12	Ethanol	G	0.40	78
13	Ethenediol	P	\	\
14	Propyl alcohol	G	0.50	60
15	Isopropanol	F	\	\
16	n-Butyl alcohol	G	0.54	63
17	n-Amyl alcohol	S	\	\
18	Isoamyl alcohol	G	0.45	64
19	Hexyl alcohol	PG	\	\

<sup>a</sup> G, P, F, PG, and S denote gelation, precipitation, fluid, part gelation and solution, respectively.

<sup>b</sup> The critical gelation concentration (wt/v %, 10 mg/mL = 1%).

<sup>c</sup> The gelation temperature (°C).



**Fig. S4** The photograph of the linear range.

Linear Equation:  $Y = -54.738X + 102.811$

$$R^2 = 0.992 \quad S = 5.4738 \times 10^7$$

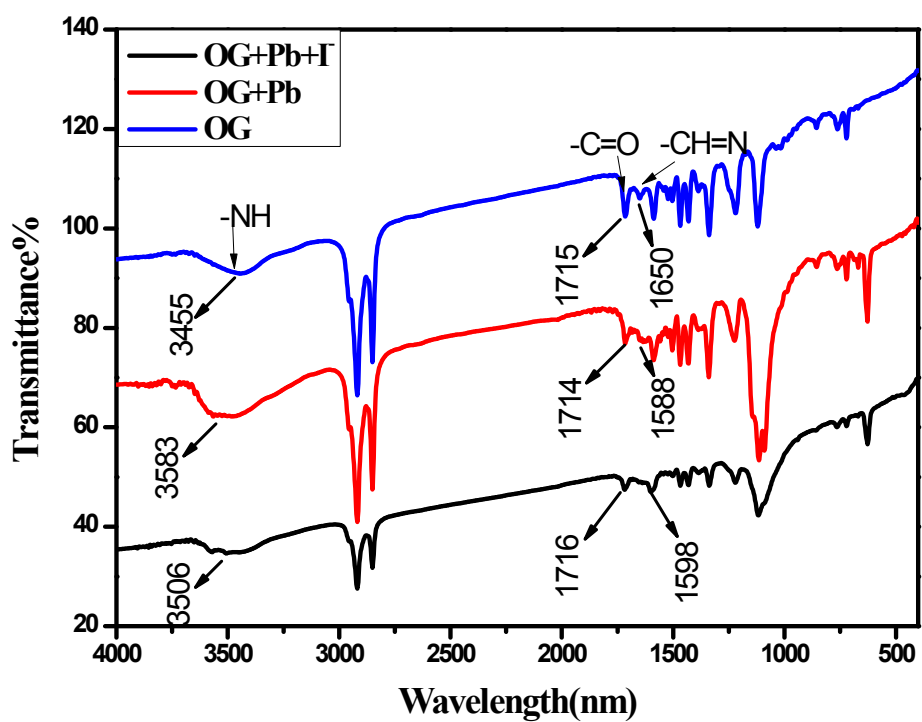
$$\delta = \sqrt{\frac{\sum(F_i - F_0)^2}{N - 1}} = 36.6738 \quad (N=20)$$

$$\text{LOD} = K \times \delta / S = 2.037 \times 10^{-6} \text{ M}$$

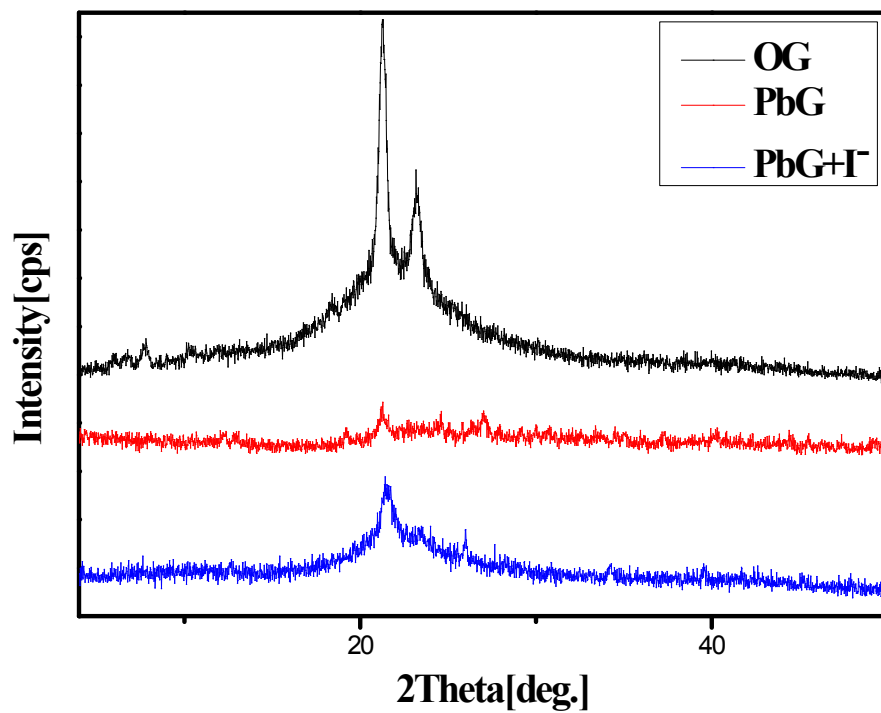
$K=3$

$F_0$  is fluorescence intensity of **PbG**;  $F_i$  is the average of fluorescence intensity  $F_0$ .

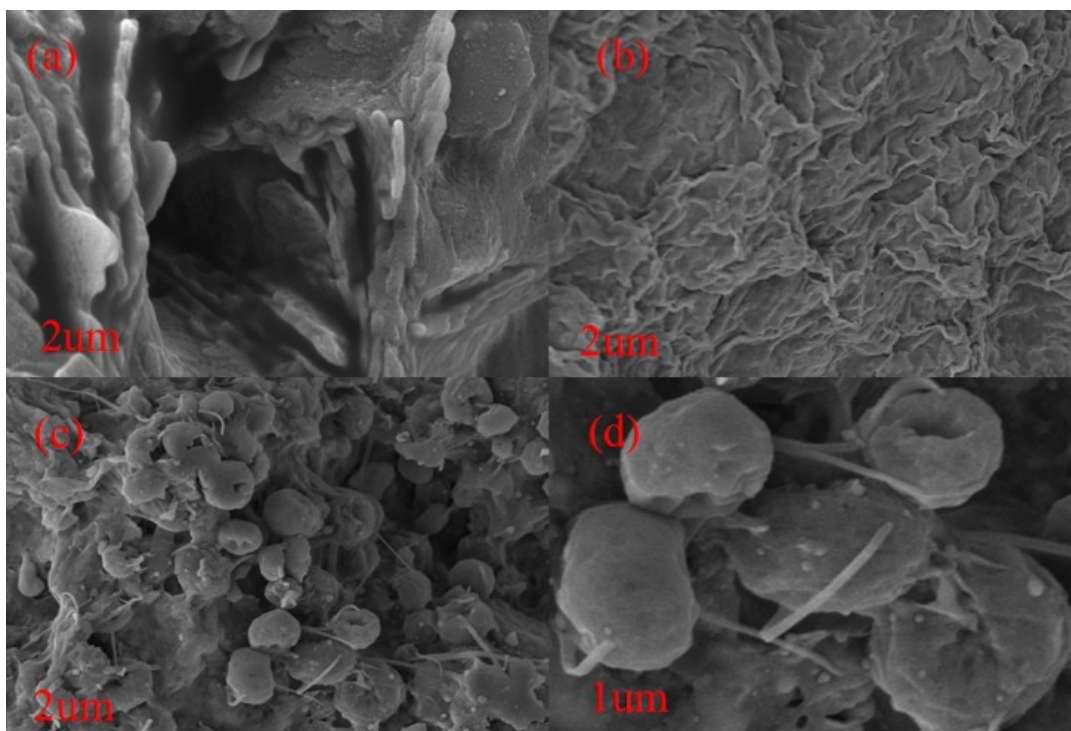




**Fig. S5** IR Spectra of xerogel of organogel **OG** (obtained from 1% ethanol organogel) and metallo gel **PbG** (obtained from 1% ethanol metallo gel, **PbG** ( $G1-Pb^{2+} = 1 : 1$ )).



**Fig. S6** Powder XRD patterns of xerogel of **OG** (obtained from 1% ethanol organogel), **PbG** (obtained from 1% ethanol metallogel, **G1**–**Pb**<sup>2+</sup> = 1 : 1) and **PbG** xerogel treated with (5 equiv., using 1 mol L<sup>-1</sup> TBAI water solution as the I<sup>-</sup> sources).



**Fig. S7** SEM images of (a) **OG** xerogel (obtained from 1% ethanol organogel) (b) **PbG** xerogel (obtained from 1% ethanol metallogel, **G1**–  $\text{Pb}^{2+}$  = 1: 1) (c) & (d) **PbG** xerogel treated with  $\text{I}^-$  in situ.