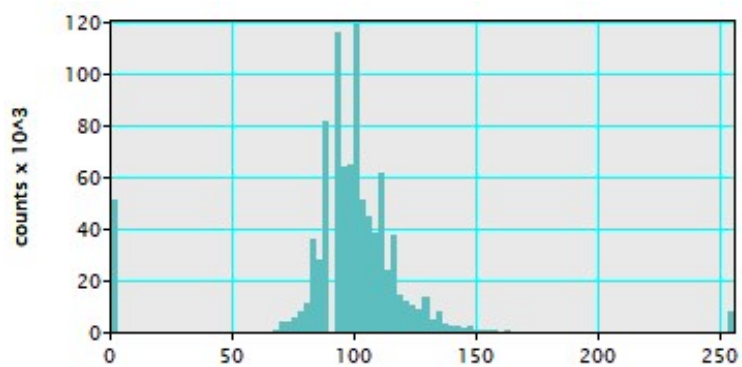


## Electronic Supplementary Information

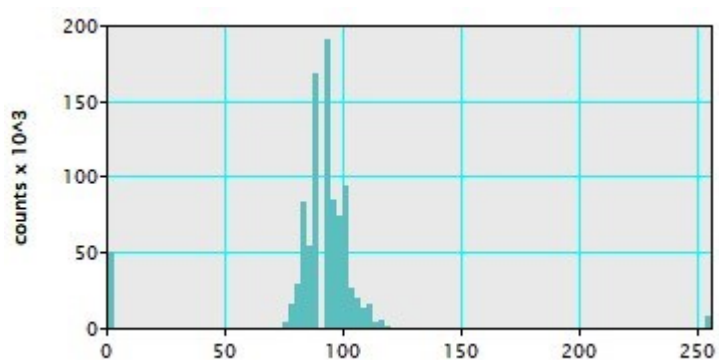
Zirconium-based metal-organic framework gels for selective luminescent sensing

Shujian Sun, Caifeng Wei, Yali Xiao, Guangqin Li and Jianyong Zhang\*

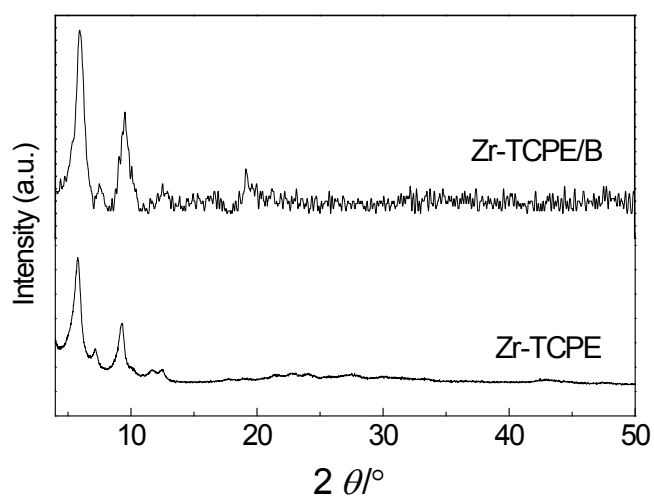
*Sun Yat-Sen University, MOE Laboratory of Polymeric Composite and Functional Materials, School of Materials Science and Engineering, School of Chemical Engineering and Technology, School of Chemistry, Guangzhou 510275, China. E-mail: zhjyong@mail.sysu.edu.cn.*



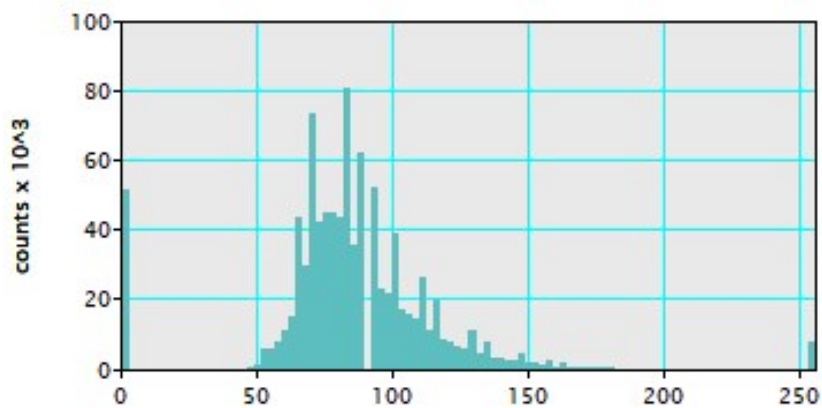
**Fig. S1** Statistical particle size distribution of Zr-TBAPy xerogel.



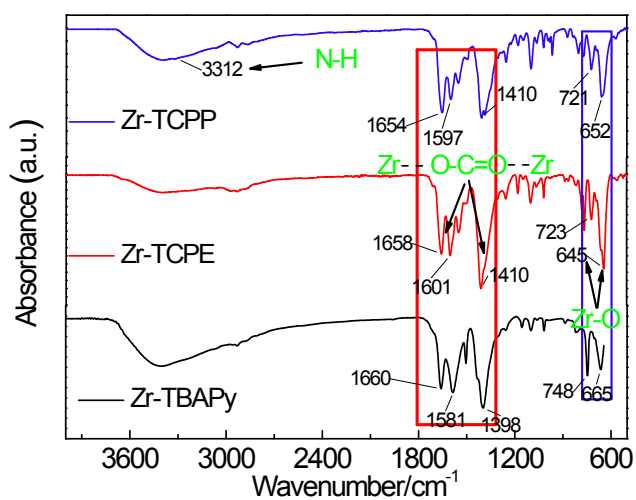
**Fig. S2** Statistical particle size distribution of Zr-TCPE xerogel.



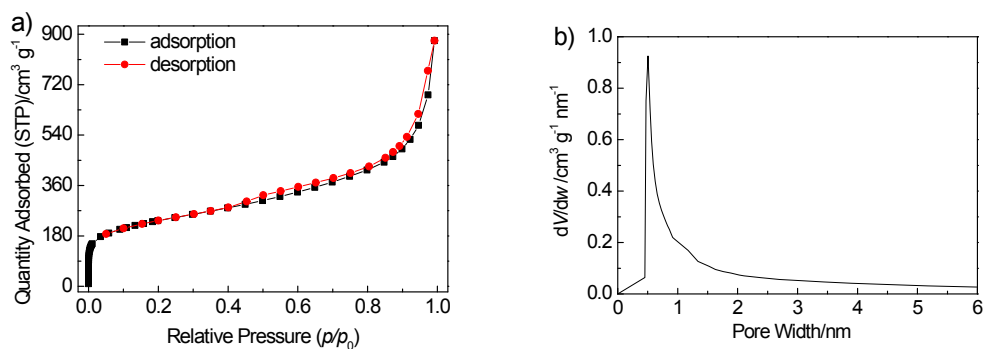
**Fig. S3** PXRD patterns of Zr-TCPE xerogel and Zr-TCPE/B.



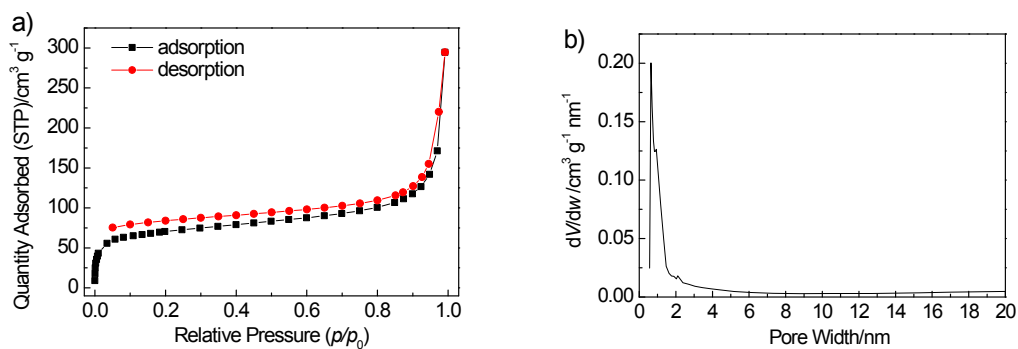
**Fig. S4** Statistical particle size distribution of Zr-TCPP xerogel.



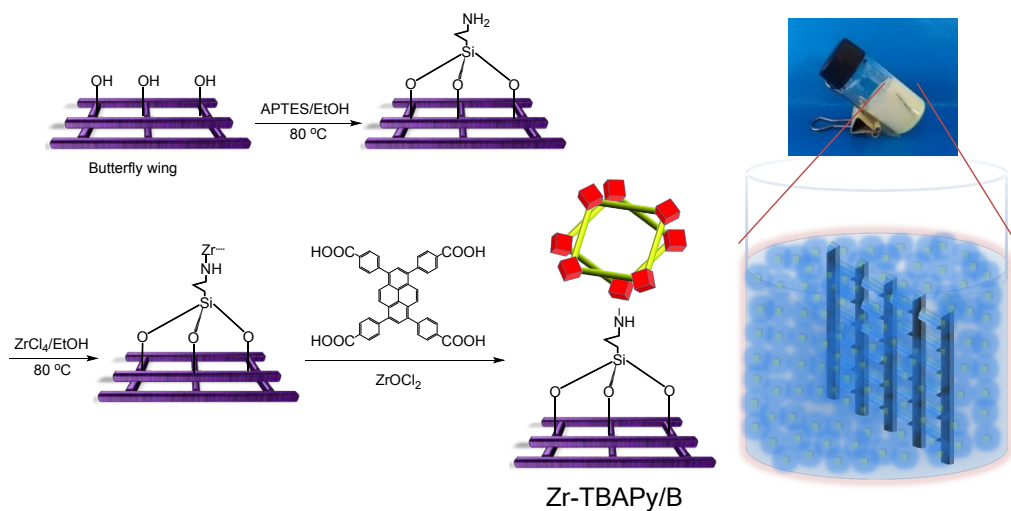
**Fig. S5** FT-IR spectra of Zr-TBAPy, Zr-TCPE and Zr-TCPP xerogels.



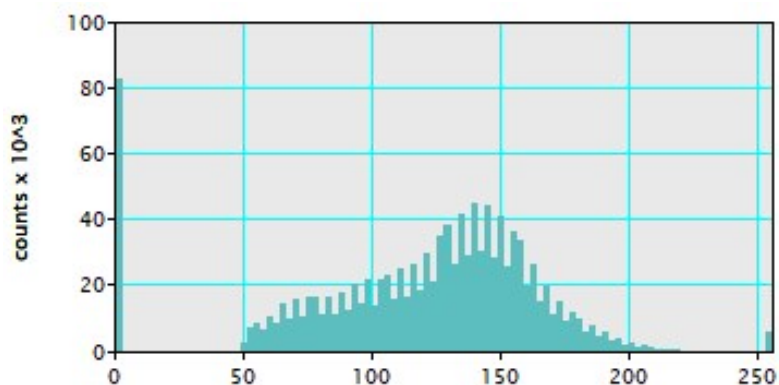
**Fig. S6** a)  $N_2$  adsorption-desorption isotherms and b) Horvath-Kawazoe micropore analysis of Zr-TCPE xerogel.



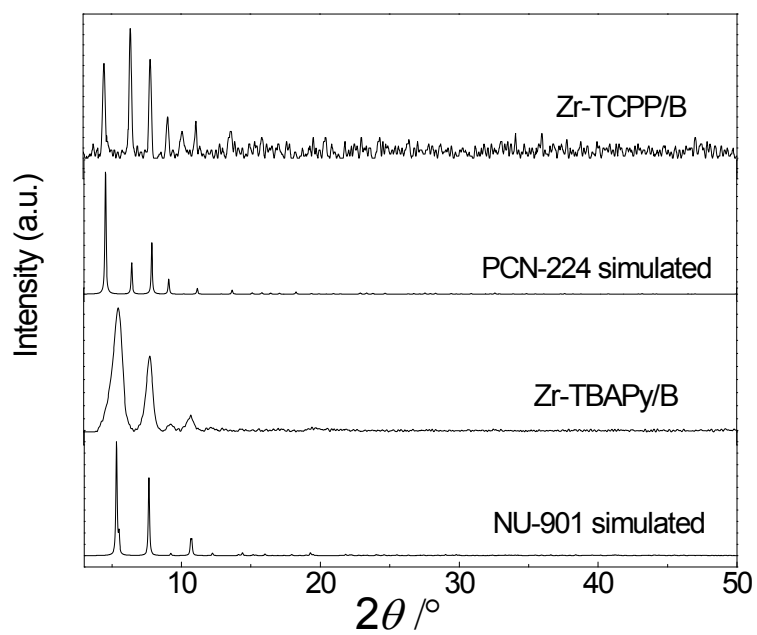
**Fig. S7** a)  $\text{N}_2$  adsorption-desorption isotherms and b) Horvath-Kawazoe micropore analysis of Zr-TCPP xerogel.



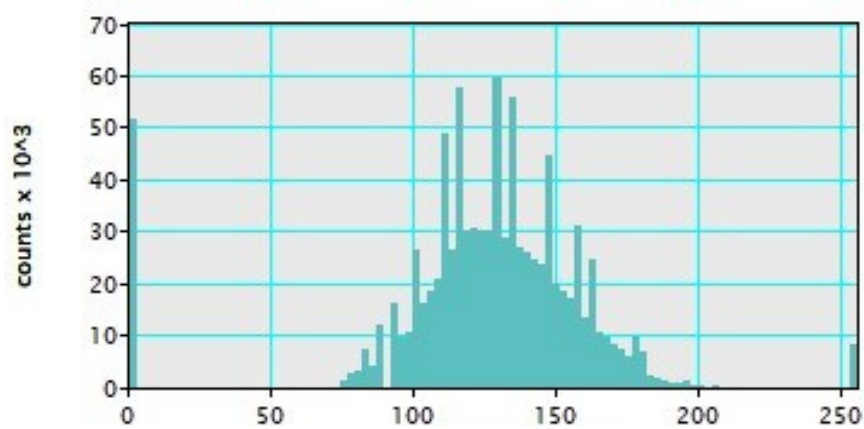
**Fig. S8** Schematic diagram to illustration the synthetic route of Zr-TBAPy/B.



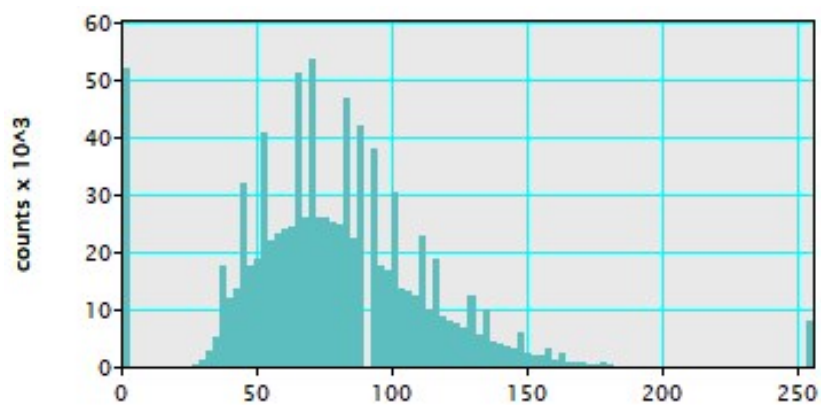
**Fig. S9** Statistical particle size distribution of Zr-TBAPy/B.



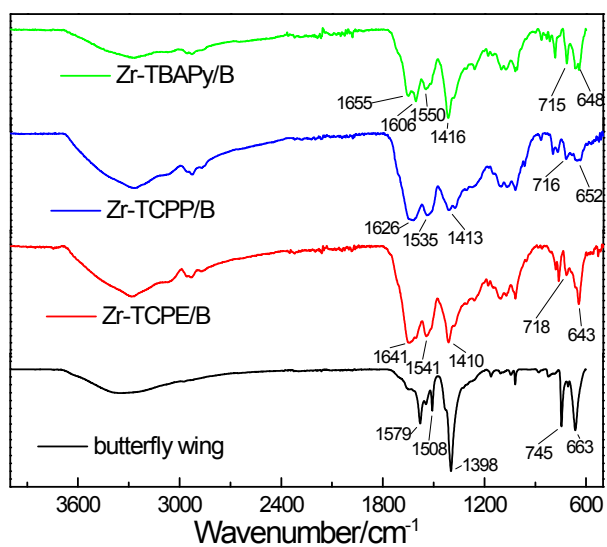
**Fig. S10** PXR D patterns of Zr-TBAPy/B and Zr-TCPP/B.



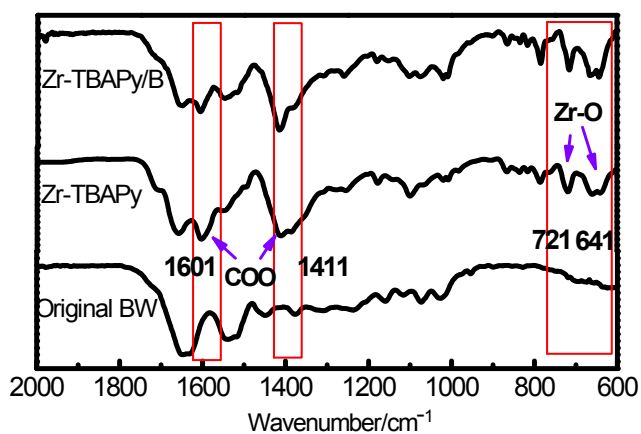
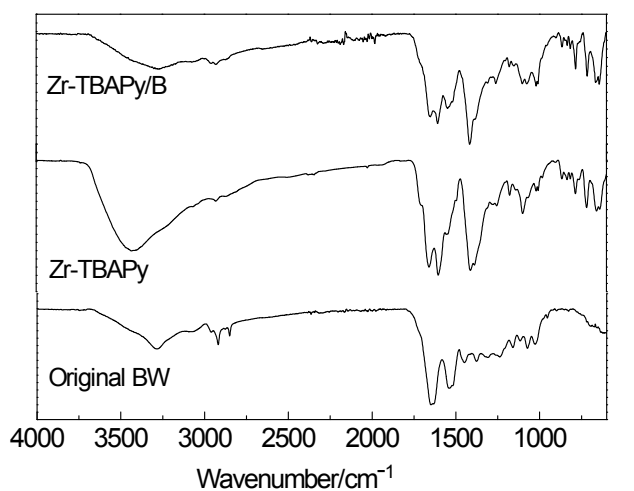
**Fig. S11** Statistical particle size distribution of Zr-TCPE/B.



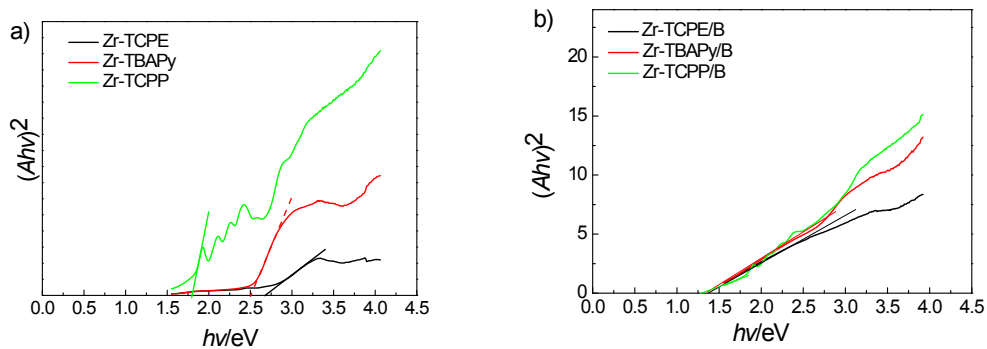
**Fig. S12** Statistical particle size distribution of Zr-TCPP/B.



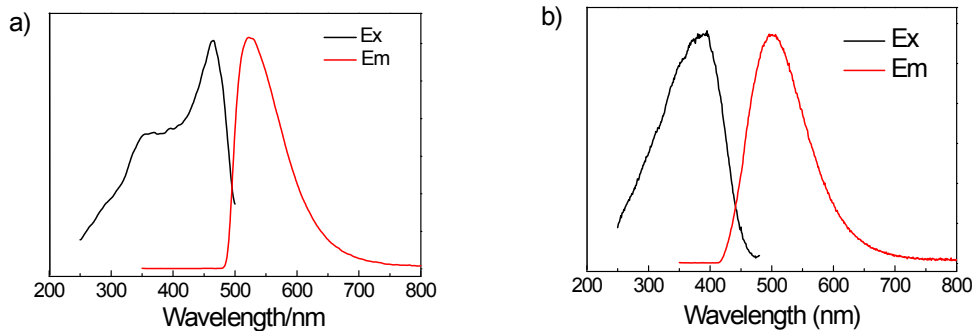
**Fig. S13** FT-IR spectra of Zr-TBAPy/B, Zr-TCPP/B, Zr-TCPE/B and the original butterfly wing.



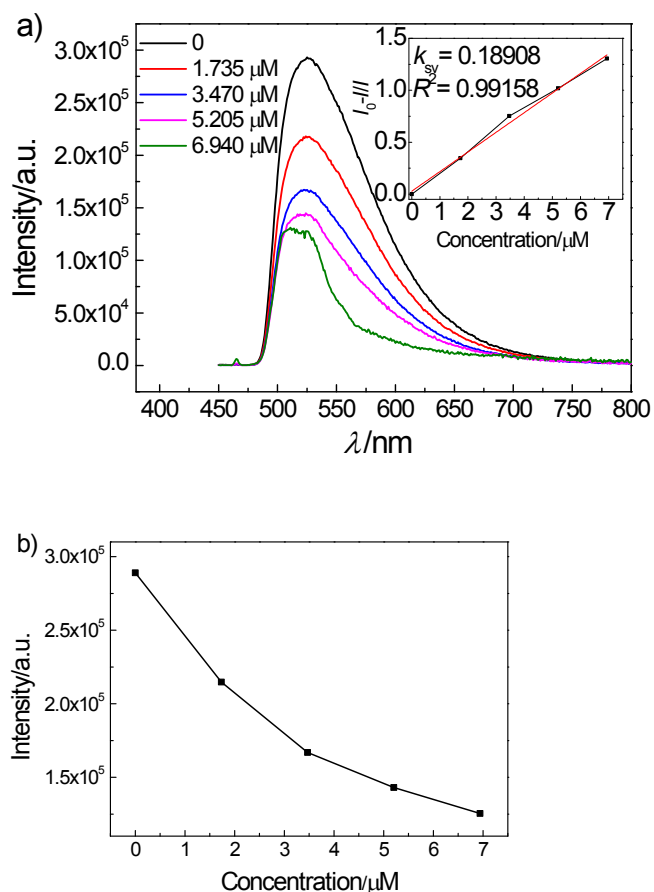
**Fig. S14** FT-IR spectra of Zr-TBAPy and Zr-TBAPy/B.



**Fig. S15** Energy gap calculation of a) Zr-TCPE, Zr-TBAPy and Zr-TCPP xerogels, and b) Zr-TCPE/B, Zr-TBAPy/B and Zr-TCPP /B.

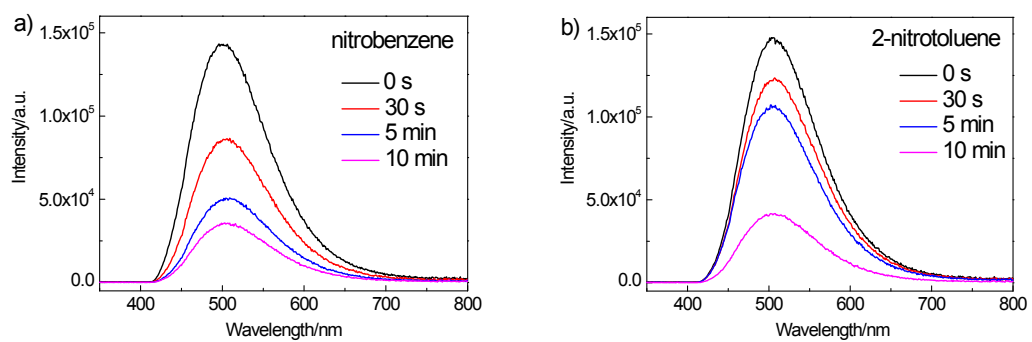


**Fig. S16** Luminescence excitation and emission spectra of a) Zr-TBAPy xerogel ( $\lambda_{em} = 520$  nm,  $\lambda_{ex} = 465$  nm) and b) Zr-TCPE xerogel ( $\lambda_{em} = 498$  nm,  $\lambda_{ex} = 395$  nm) at room temperature.



**Fig. S17** a) Concentration-dependent emission spectra at room temperature ( $\lambda_{ex} = 465$  nm) after the Zr-TBAPy xerogel film device was exposed in nitrobenzene vapour for 5 s. The inset shows the plot of the fluorescence intensity ( $I_0 - I$ )/ $I$  at 520 nm against  $c$ . b) the plot of the emission intensity at 520 nm against  $c$ .





**Fig. S18** Luminescence emission spectra of Zr-TCPE xerogel after exposure to a) nitrobenzene vapour and b) 2-nitrotoluene vapour at different time intervals at room temperature ( $\lambda_{\text{ex}} = 395 \text{ nm}$ ).