

## Electronic Supplementary Information

# An electrodeposited lanthanide MOF thin film as a luminescent sensor for carbonate detection in aqueous solution

Huiping Liu,<sup>a</sup> Hongming Wang,<sup>a, b</sup> Tianshu Chu,<sup>a</sup> Minghao Yu<sup>a</sup> and Yangyi Yang<sup>\*a</sup>

*Received (in XXX, XXX) Xth XXXXXXXXXX 20XX, Accepted Xth XXXXXXXXXX 20XX*

DOI: 10.1039/b000000x

<sup>a</sup>*MOE Key Laboratory of Bioinorganic and Synthetic Chemistry, KLGHEI of Environment and Energy Chemistry,*

*School of Chemistry and Chemical Engineering, Sun Yat-Sen University, Guangzhou, 510275, P. R. China.*

E-mail: [cesyyy@mail.sysu.edu.cn](mailto:cesyyy@mail.sysu.edu.cn)

<sup>b</sup>*Department of Chemistry, Guangdong University of Education, Guangzhou, P. R. China.*

## Luminescent Sensing Measurements

Preparation of Eu-HBPTC-anion films and measurement of their luminescence at room temperature: (i) A Eu-HBPTC film was fixed in a cuvette vertically by a home-made teflon holder; (ii) 2 mL aqueous solution of different anions at  $1 \times 10^{-3}$  M was added to the cuvette.  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{ClO}_4^-$ ,  $\text{BrO}_3^-$ ,  $\text{IO}_3^-$ ,  $\text{HPO}_4^{2-}$ , and  $\text{CO}_3^{2-}$  were prepared from their potassium salts while  $\text{PO}_4^{3-}$ ,  $\text{SO}_4^{2-}$  were from their sodium salts; (iii) the emission of the Eu-HBPTC-anions film was measured at once; (iv) the film was kept in the solution for 2 hours and then the luminescence was measured again. All the experimental conditions, such as excitation wavelength, light source power, excitation/emission slit, are kept constant during the measurements.

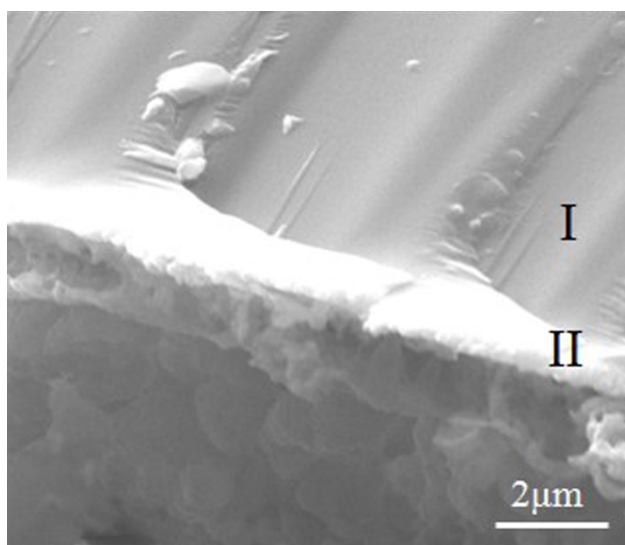


Fig. S1 Cross-sectional SEM showing the thickness of the film deposited for 10min.

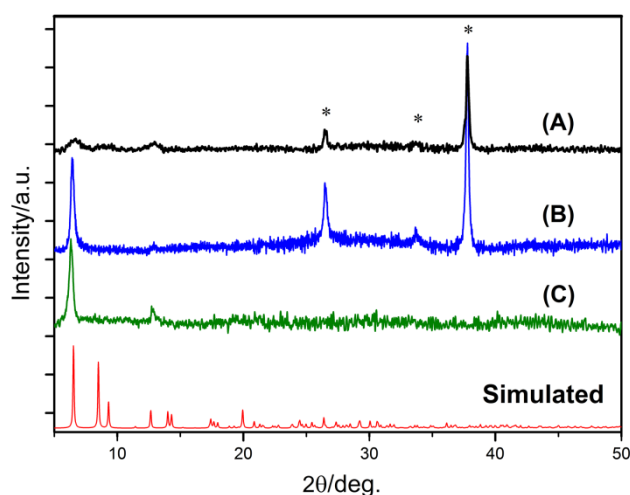
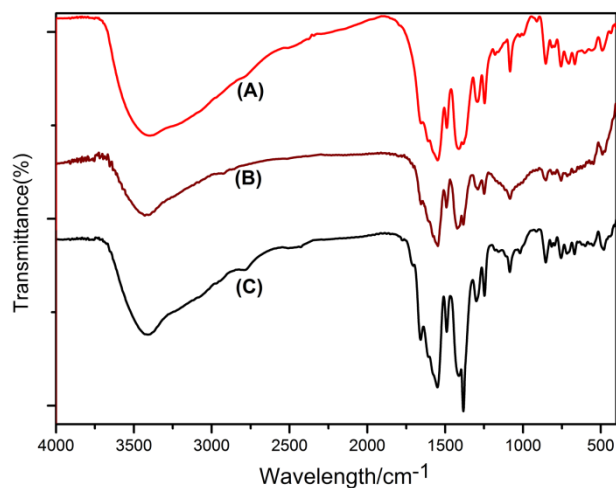
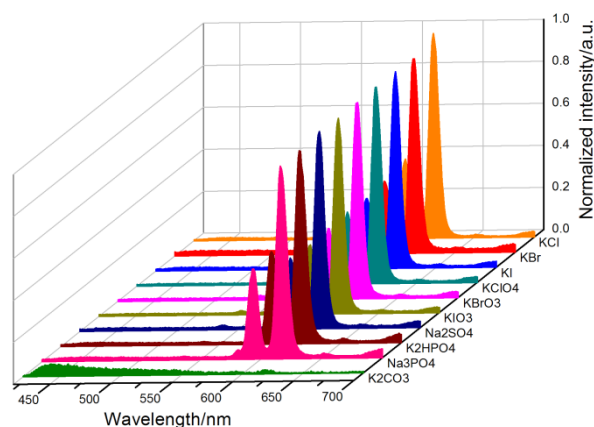


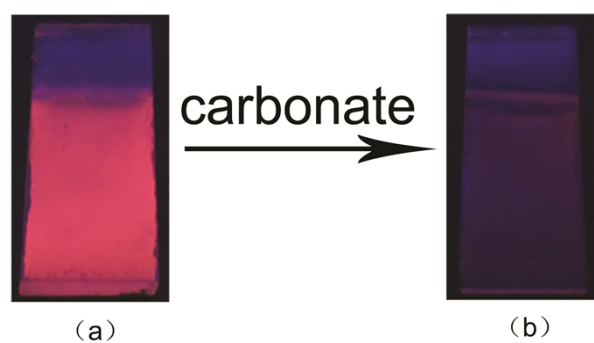
Fig. S2 PXR D spectra of Eu-HBPTC films (A) before or (B) after treating hydrothermally and (C) the powder synthesized through reported method. The red spectrum at the bottom indicates the simulated pattern for Eu-HBPTC and asterisks indicate the peaks of FTO.



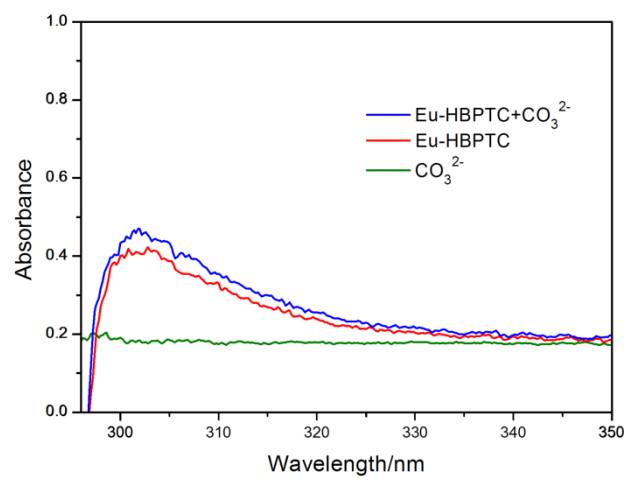
**Fig. S3** FT-IR spectra of Eu-HBPTC films (A) before or (B) after treating hydrothermally, and (C) the powder synthesized through reported method.



**Fig. S4** Emission spectra of the Eu-HBPTC film after being immersed in different 10<sup>-3</sup> M anions aqueous solution when excited at 317 nm (298 K). The data were normalized to the intensity of the blank sample.



**Fig. S5** Photographs of the Eu-HBPTC film that illuminated by a lab UV lamp (254 and 365 nm): (a) before and (b) after immersion in 10<sup>-3</sup> M CO<sub>3</sub><sup>2-</sup> aqueous solution.



**Fig. S6** UV-Vis spectra of CO<sub>3</sub><sup>2-</sup> and Eu-HBPTC aqueous solution.