Electronic Supplementary Information for

A Visual Test Paper based on Pb(II) Metal-Organic Nanotube Utilized as H_2S Sensor with High Selectivity and Sensitivity

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CONTENTS

1. **Materials and methods.** All chemicals and solvents are purchased and used as received without further purification. ^{t}BuOOH could be used to induce ROS . The H_2S gas was made by the reaction of FeS and H_2SO_4 (H_2SO_4 : H2O = 2 : 3 [v/v]) in a flask, and collected in a flask of 150 ml for an hour through a desiccant of P_2O_5 and waste gas is absorbed by a NaOH solution at the end of equipment.

2. **Synthetic strategy:** $PbCl_2$ (0.80 mmol, 0.2250 g) and β-cyclodextrin (β-CD) (0.10 mmol, 0.1150 g) were suspended in 30 mL distilled water, and then stirred at 80 °C for an hour. The mixture is cooled to room temperature and filtered. The obtained solution is transformed to glass vial with a diameter of 1.6 centimeter, and then the vial was cooled to 4 °C to make cyclohexanol become solid state. Subsequently, the triethylamine was layered onto the solid cyclohexanol, and the vial was sealed and heated at 110 °C for 50 hours. After cooling, the colourless rod-like crystals were collected by filtration and washed with water.

3. **PXRD of CD-MONT-2.**

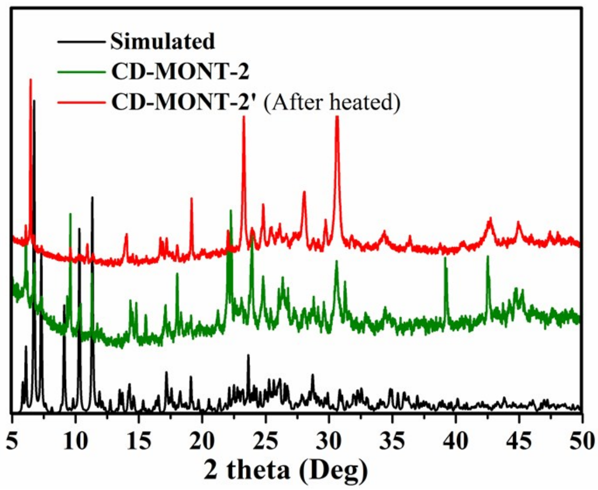

Fig. S1 PXRD patterns of simulated based on crystal data, as-synthesized and after heated at 120 °C for an hour.

4. PXRD of CD-MONT-2’ test papers.

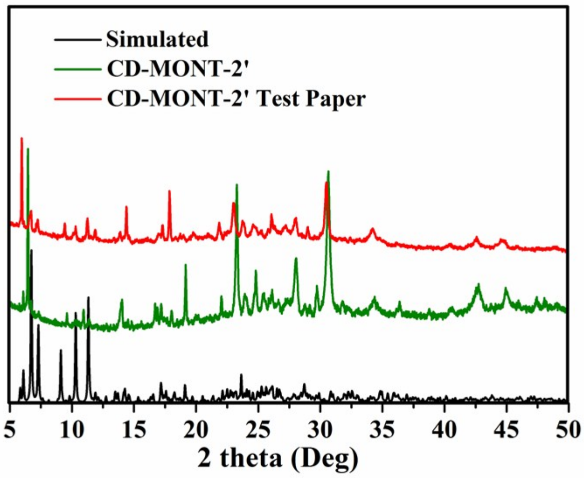

Fig. S2 PXRD patterns of the simulated one from single-crystal data of **CD-MONT-2**, **CD-MONT-2’** and **CD-MONT-2’**-based test papers.

5. The decrease of fluorescence intensities with the increasement of Na_2S

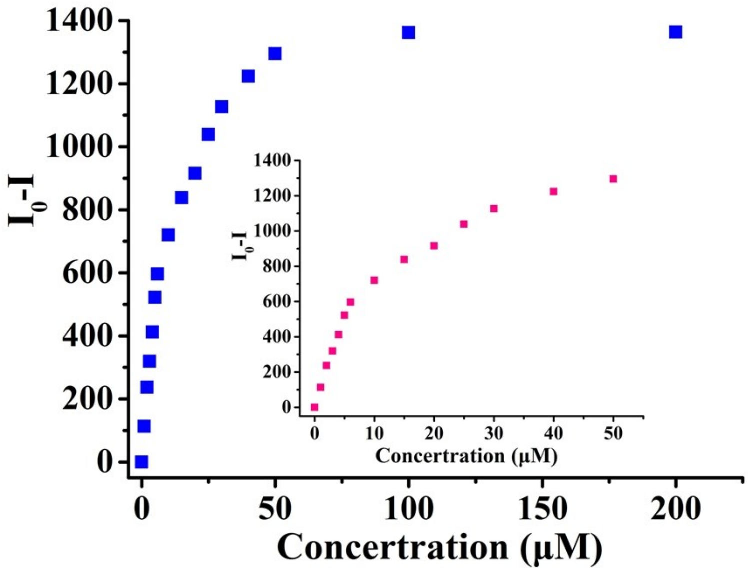

Fig. S3 The decrease of fluorescence intensities with the increasement of Na_2S.

6. Fluorescent spectra of the CD-MONT-2’ in H_2O with different substances.

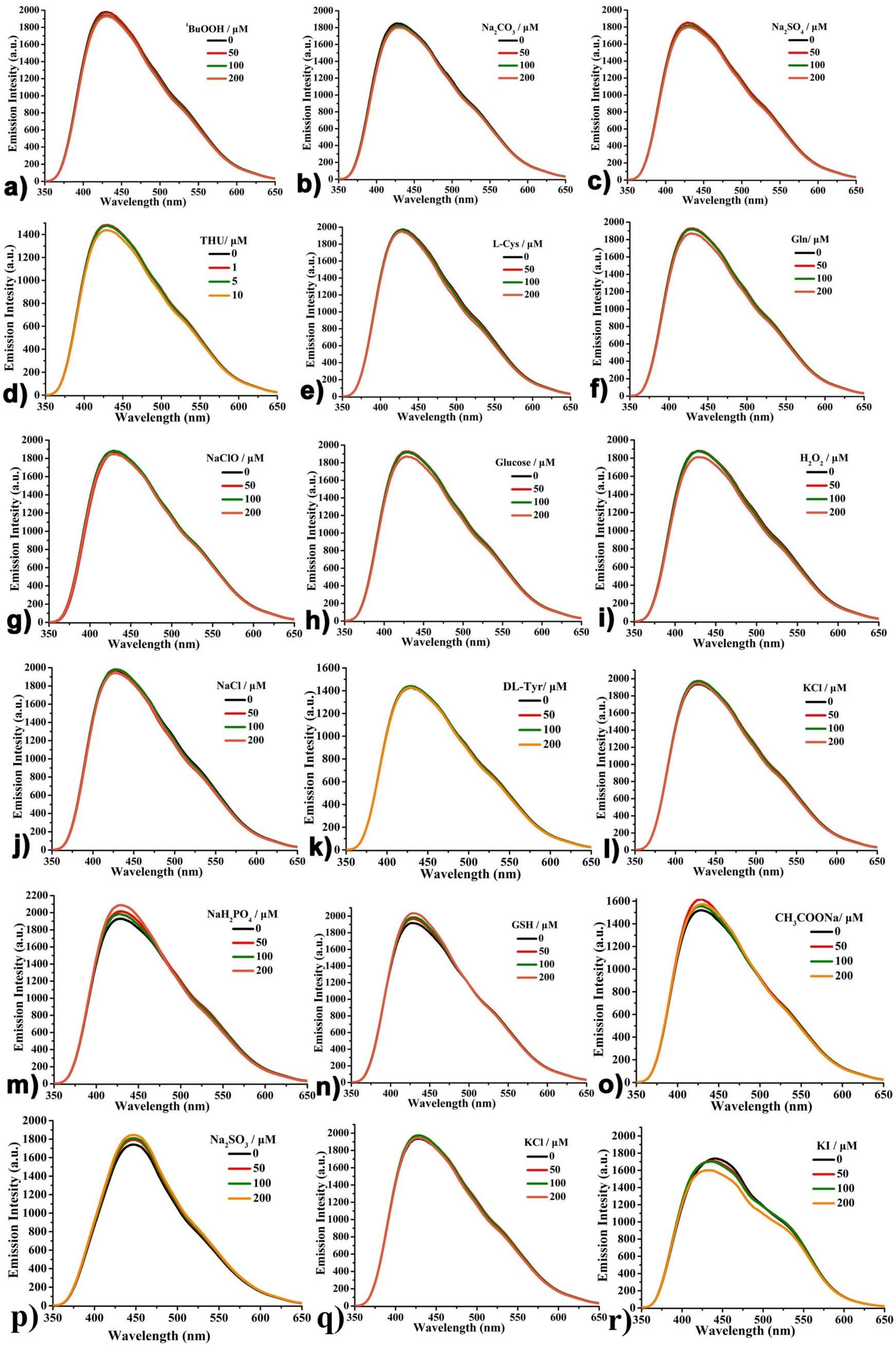

Fig. S4 Fluorescent spectra of 1 mg/mL **CD-MONT-2’** in H_2O treated with: a) ^{t}BuOOH, b) Na_2CO_3, c) Na_2SO_4, d) THU, e) L-Cys, f) Gln, g) NaClO, h) Glucose, i) H_2O_2, j) NaCl, k) DL-Tyr, l) KCl, m) NaH_2PO_4, n) GSH, o) CH_3COONa, p) Na_2SO_3, q) KCl, and r) KI.

7. **The relative fluorescent intensity of I_0/I at 432 nm with 5 μM of Na_2S, and 50 μM of inorganic salts, reducing agents, amino acids and ROS..**

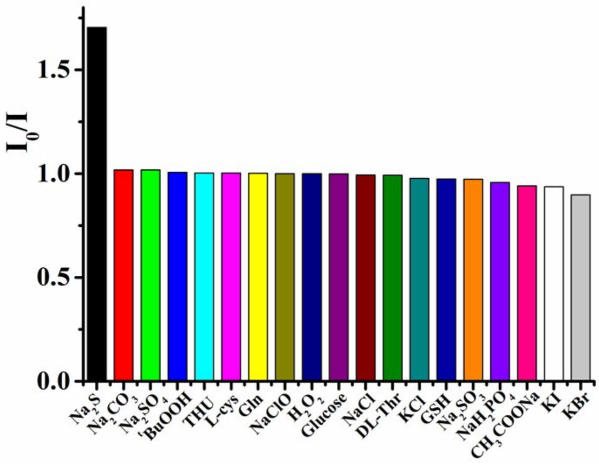

Fig. S5 The relative fluorescent intensity of I_0/I at 432 nm with 5 μM of Na_2S, and 50 μM of inorganic salts, reducing agents, amino acids and ROS.

8. **The XPS spectra of Pb, C and O of CD-MONT-2' and CD-MONT-2'-derivatives.**

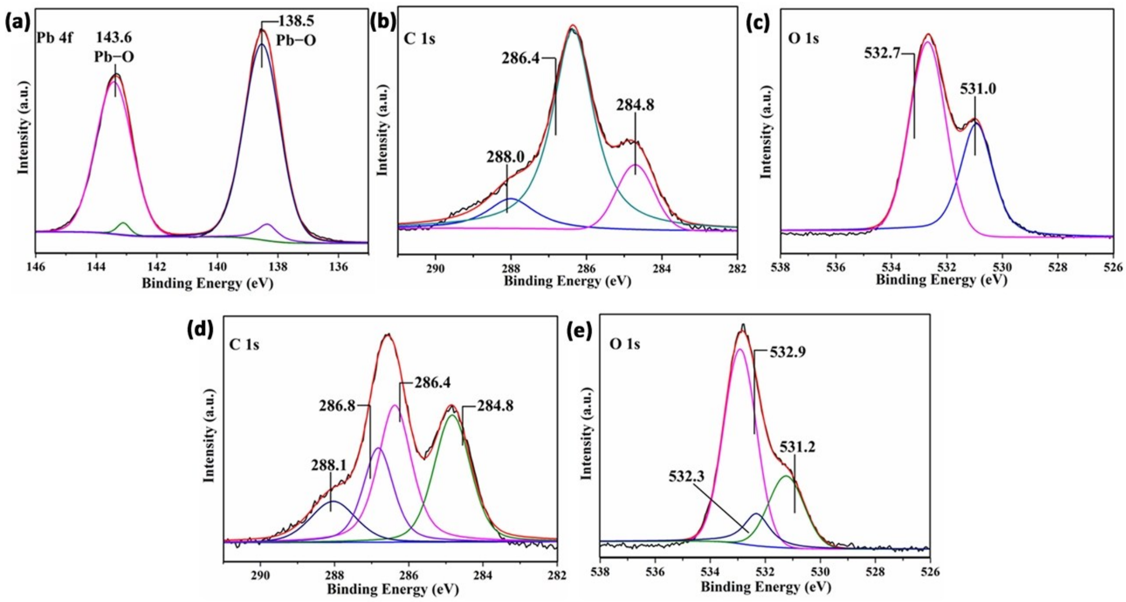

Fig. S6 The XPS spectra of a) Pb 4f, b) C 1s and c) O 1s of **CD-MONT-2'**; the XPS spectra of d) C 1s and e) O 1s of **CD-MONT-2'-derivatives**.

9. FTIR spectra of beta-CD, CD-MONT-2’ and CD-MONT-2’-derivatives.

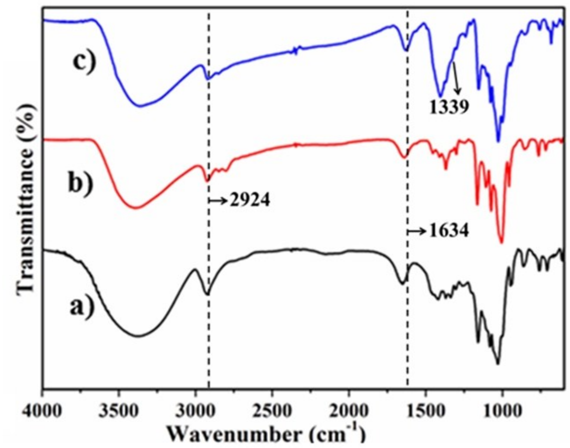

Fig. S7 FTIR spectra of beta-CD a), **CD-MONT-2’** b) and **CD-MONT-2’-derivatives** c).

10. TEM image and SEAD of obtained CD-MONT-2’ and CD-MONT-2’-derivatives.

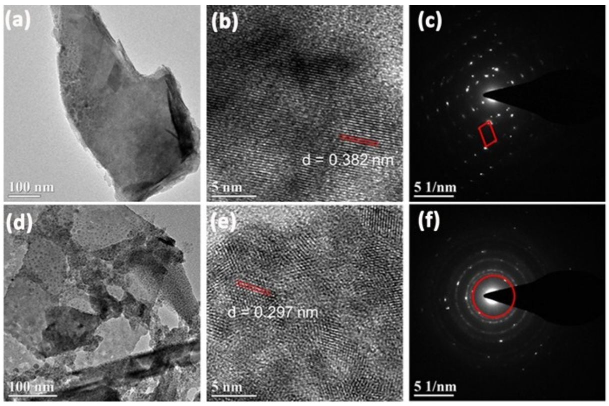

Fig. S8 TEM image and SEAD of obtained **CD-MONT-2’** (a, b and c) and **CD-MONT-2’-derivatives** (d, e and f).