Electronic Supplementary Material (ESI) for Analyst.


# Supplementary Information

## Section 1. General Characterizations

### Crystal date of Cd-MOF

Table S1 Selective Bond lengths [Å] and angles [°] for Cd-MOF.

| | | | |
|---|---|---|---|
| Cd(1)-N(1) | 2.2367(15) | Cd(1)-O(2) | 2.2393(13) |
| Cd(1)-N(3) | 2.3095(16) | Cd(1)-O(4)#1 | 2.3465(15) |
| Cd(1)-O(3)#1 | 2.4139(15) | Cd(1)-O(1) | 2.5968(14) |
| | | | |
| N(1)-Cd(1)-O(2) | 129.90(6) | N(1)-Cd(1)-N(3) | 94.22(6) |
| O(2)-Cd(1)-N(3) | 98.99(5) | N(1)-Cd(1)-O(4)#1 | 128.75(6) |
| O(2)-Cd(1)-O(4)#1 | 100.50(5) | N(3)-Cd(1)-O(4)#1 | 85.22(5) |
| N(1)-Cd(1)-O(3)#1 | 100.95(6) | O(2)-Cd(1)-O(3)#1 | 100.94(6) |
| N(3)-Cd(1)-O(3)#1 | 137.53(5) | O(4)#1-Cd(1)-O(3)#1 | 54.48(5) |
| N(1)-Cd(1)-O(1) | 82.76(5) | O(2)-Cd(1)-O(1) | 53.19(5) |
| N(3)-Cd(1)-O(1) | 132.30(6) | O(4)#1-Cd(1)-O(1) | 132.59(5) |
| O(3)#1-Cd(1)-O(1) | 89.16(5) | | |

Symmetry code: #1 x+1, y, z

## Section 2. Comparison

### Table S2.

| Journal | MOFs | $K_{sv}$ ($M^{-1}$) | Antibiotic type | LOD | Reference |
|---|---|---|---|---|---|
| *J Am Chem Soc* | Zr(IV)-based MOFs | $1.1 \times 10^5$ | 12 | 58 ppb | [1] |
| *J. Mater. Chem. A* | Cd(II)-based MOFs | $1.33 \times 10^5$ | 9 | 60 ppb | [2] |
| *Anal Chem* | In-MOFs | - - - | 10 | 0.2 ppm | [3] |
| *Crystal growth & Design* | Zn/Cd-MOFs | $4.063 \times 10^4$ | 11 | 0.90 μM | [4] |

## Section 3. FT-IR spectrum of Cd-MOF

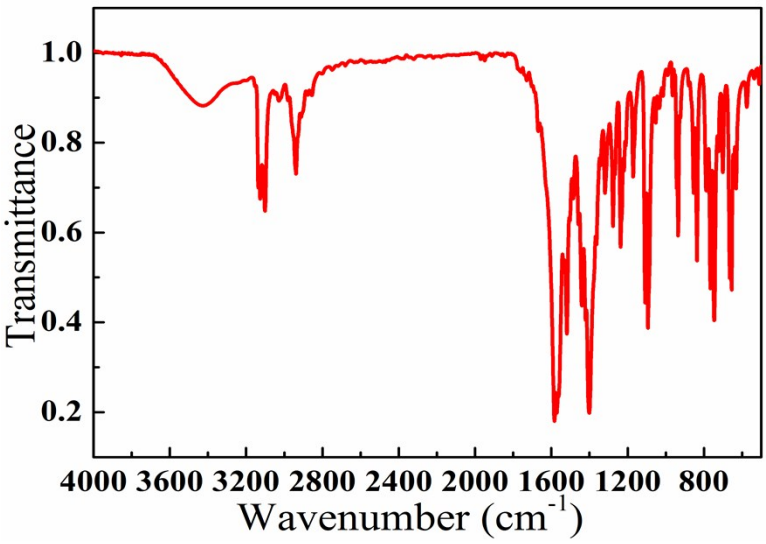



**Fig. S1:** FT-IR spectrum of Cd-MOF

## Section 4. PXRD patterns

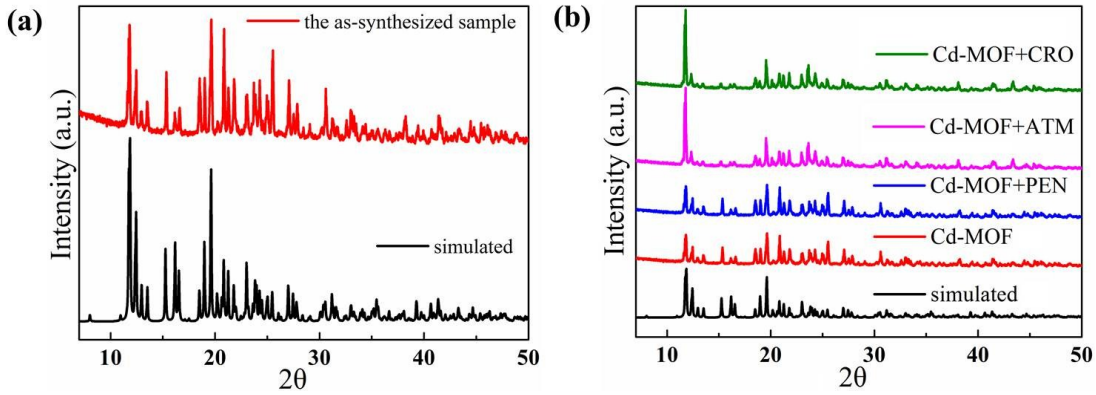



**Fig. S2:** (a) The PXRD pattern of the as-synthesied sample(Cd-MOF); (b) The PXRD pattern of Cd-MOF immersed in antibiotic solution(14 μM).

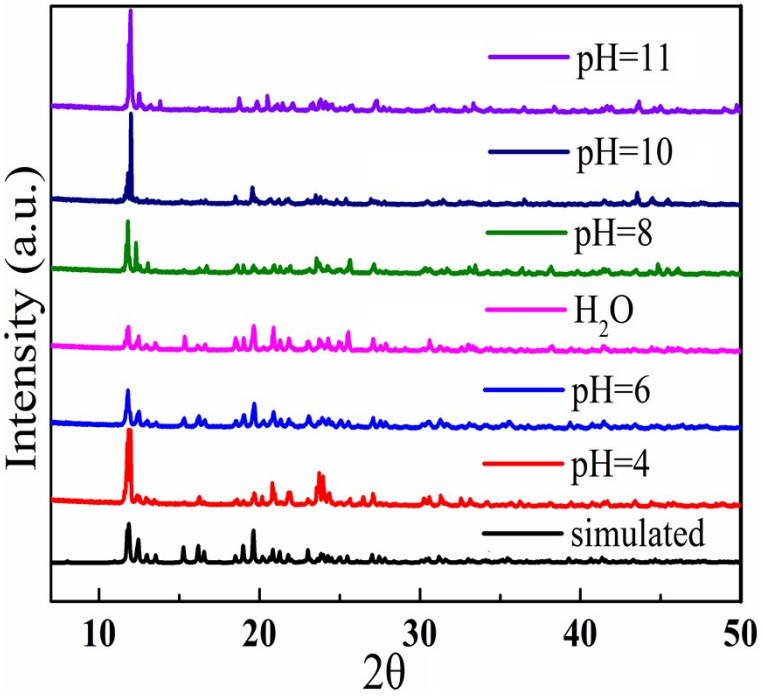



**Fig. S3:** The PXRD pattern of Cd-MOF immersed in pH= 4, 6, 8, 10, 11 aqueous solutions and $H_2O$ for 24 h.

**Section 5.** The fluorescence spectra of solid samples

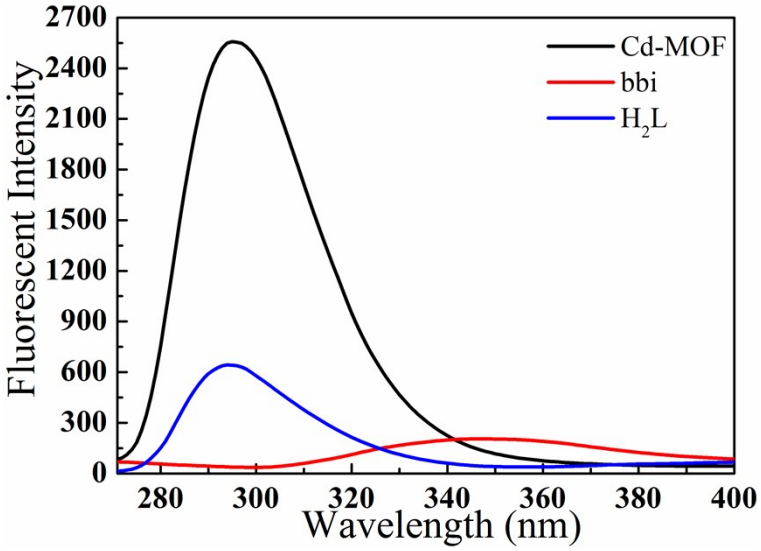
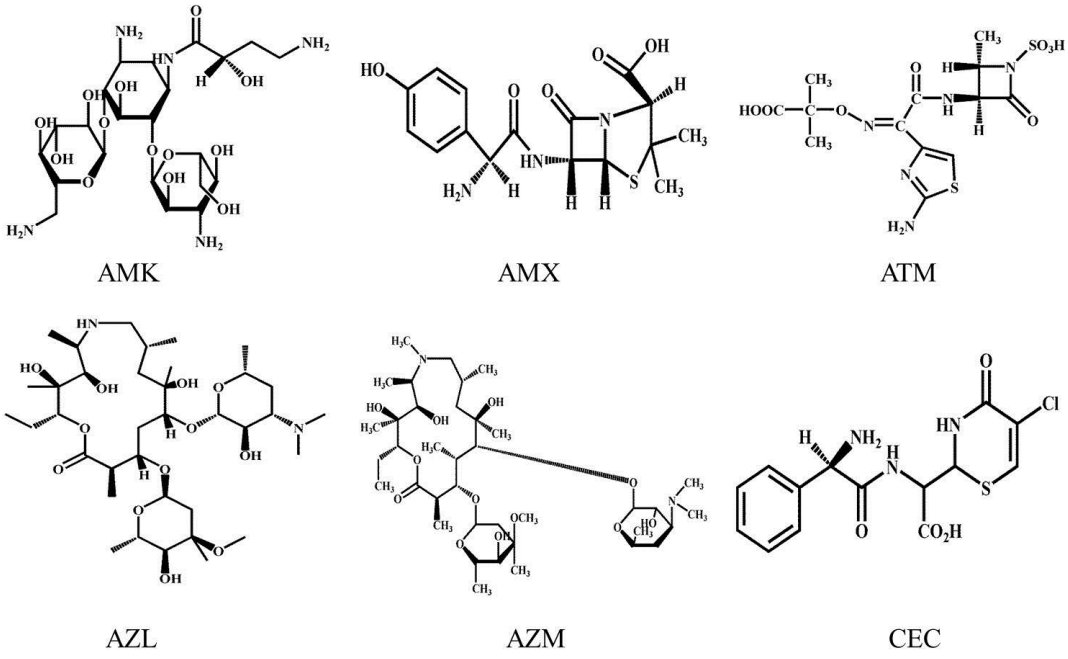



**Fig. S4:** The fluorescence spectra of solid samples of Cd-MOF, bbi and $H_2L$ ligands.

## **Section 6.** The structural figure of antibiotics



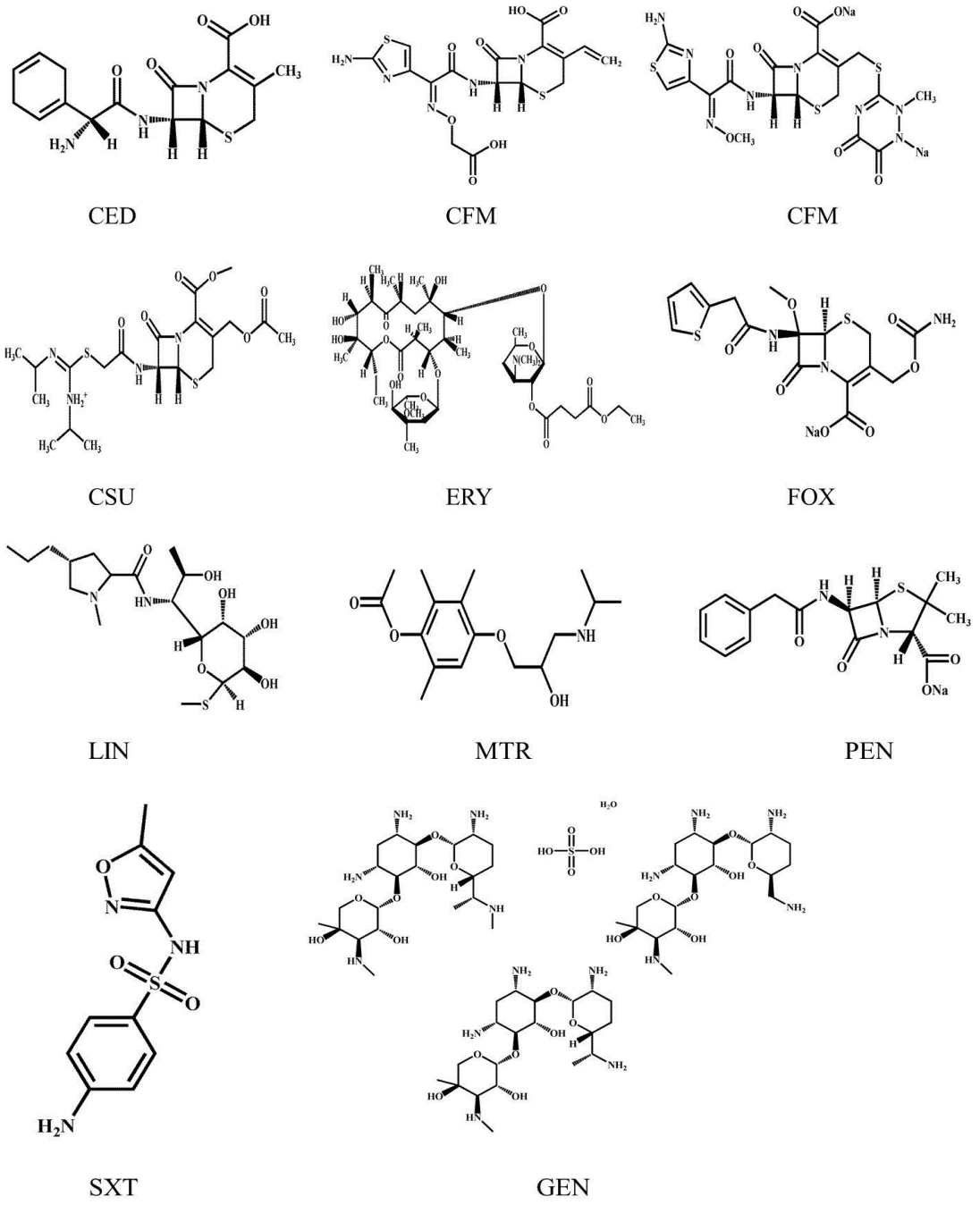



**Fig. S5:** The structural figure of antibiotics

## Section 7. UV-vis and FL spectra of ligands

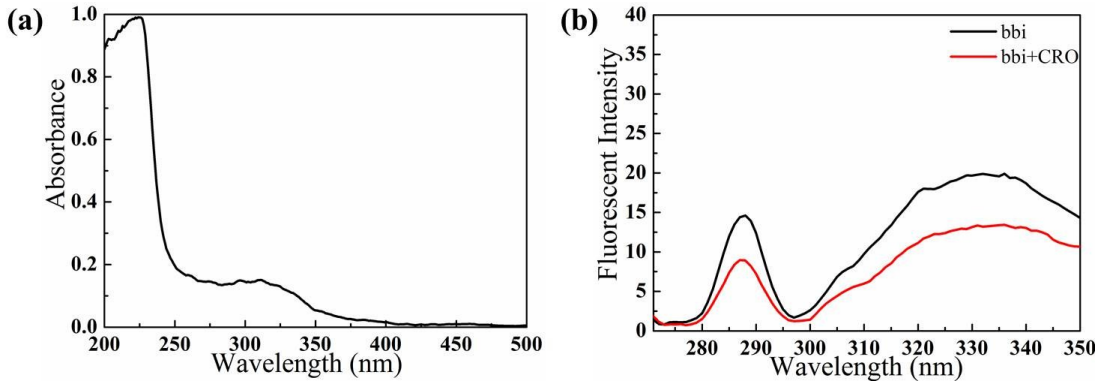



**Fig. S6:** (a) UV–vis absorbance spectra of bbi; (b) The fluorescent spectra of a queous solution of bbi and CRO(14 μM) added to aqueous solution of bbi.

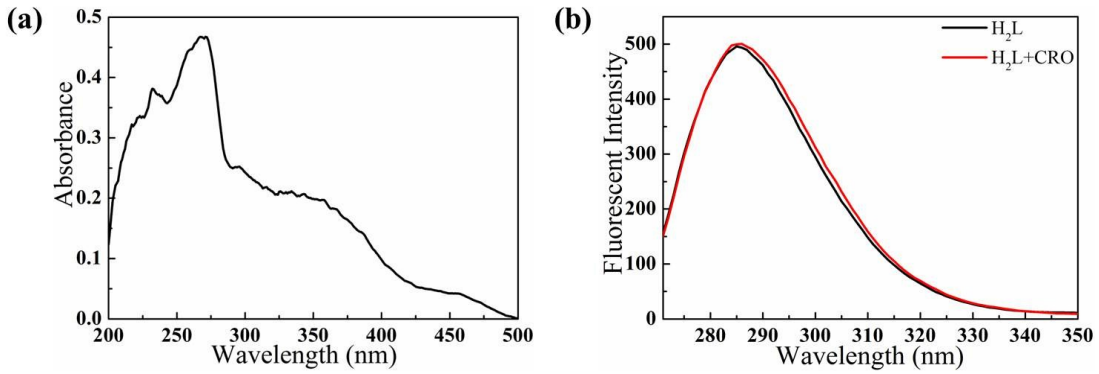



**Fig. S7:** (a) UV–vis absorbance spectra of $H_2L$; (b) The fluorescent spectra of aqueous solution of $H_2L$ and CRO (14 μM) added to aqueous solution of $H_2L$.

## Section 8. The recyclability tests

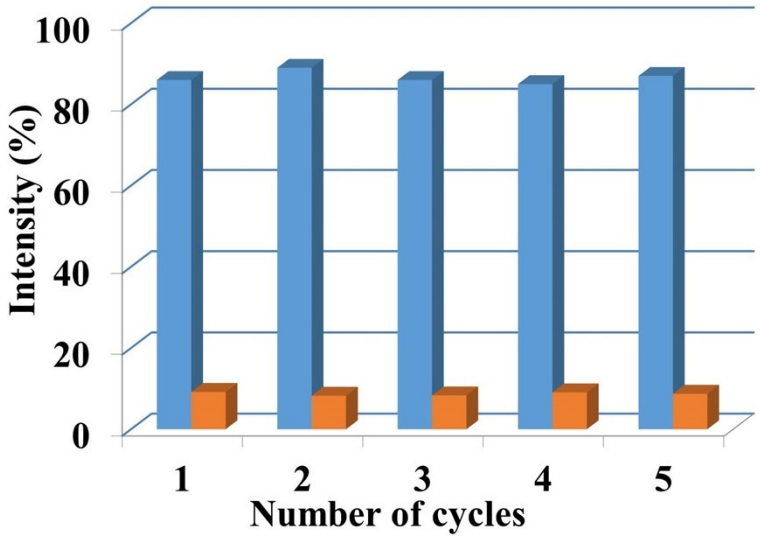



**Fig. S8:** The recyclability tests of Cd-MOFs in CRO(14 μM) solution. The blue columns represent the initial relative luminescent intensity and the yellow columns represent the relative intensity on addition of CRO.

## Section 9. Detection of selected antibiotics

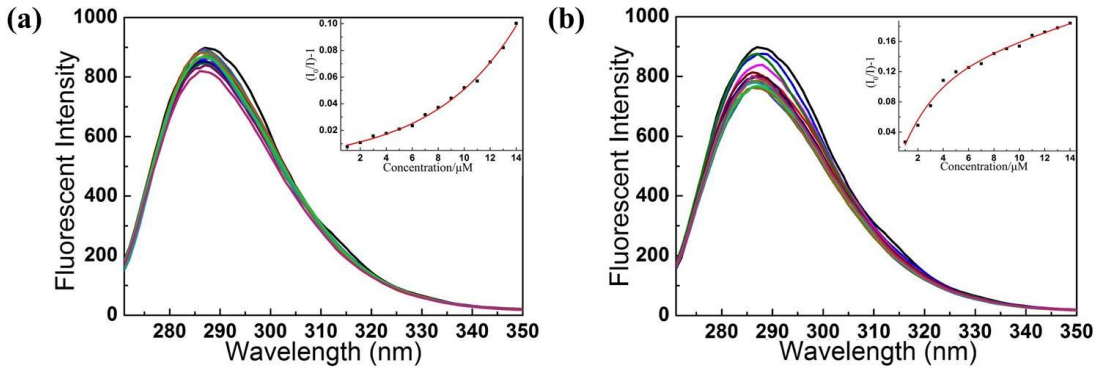



**Fig. S9:** The fluorescent spectra of Cd-MOF dispersed in water upon incremental addition of 70 μL (1 mM, 5 μL addition each time) aqueous solution of (a) SXT (b) ATM, respectively (the corresponding calibration curve of Stern-Volmer plot).

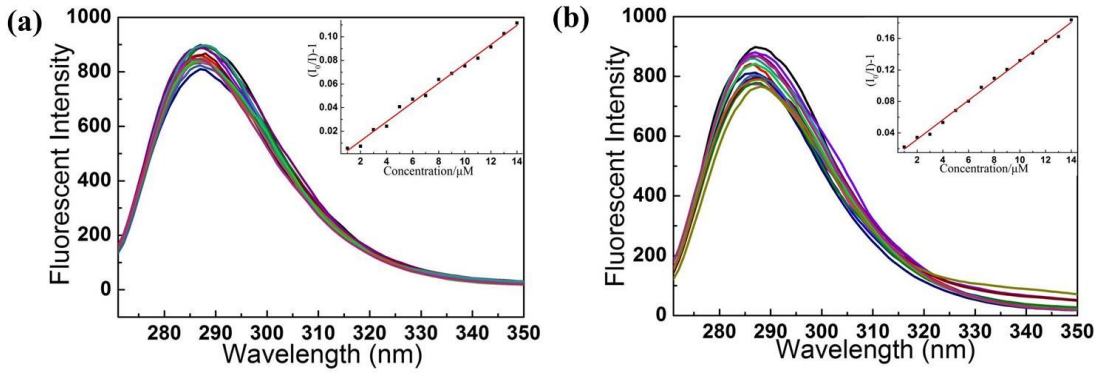



**Fig. S10:** The fluorescent spectra of Cd-MOF dispersed in water upon incremental addition of 70 μL (1 mM, 5 μL addition each time) aqueous solution of (a) AMX (b) CFM, respectively (the corresponding calibration curve of Stern-Volmer plot).

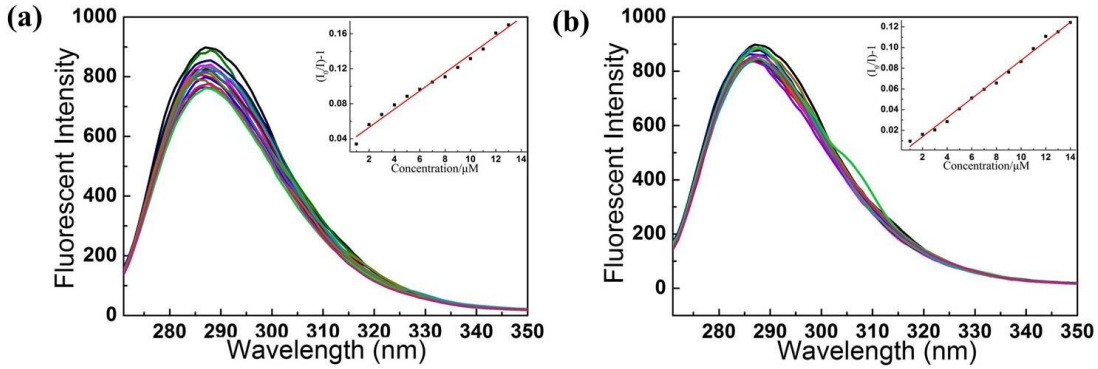



**Fig. S11:** The fluorescent spectra of Cd-MOF dispersed in water upon incremental addition of 70 μL (1 mM, 5 μL addition each time) aqueous solution of (a) CED (b) AZM, respectively (the corresponding calibration curve of Stern-Volmer plot).

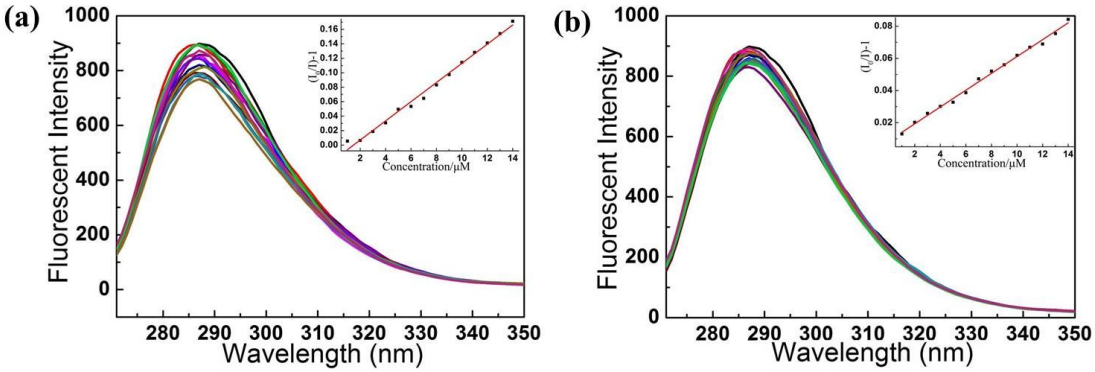



**Fig. S12:** The fluorescent spectra of Cd-MOF dispersed in water upon incremental addition of 70 μL (1 mM, 5 μL addition each time) aqueous solution of (a) CEC (b) PEN, respectively (the corresponding calibration curve of Stern-Volmer plot).

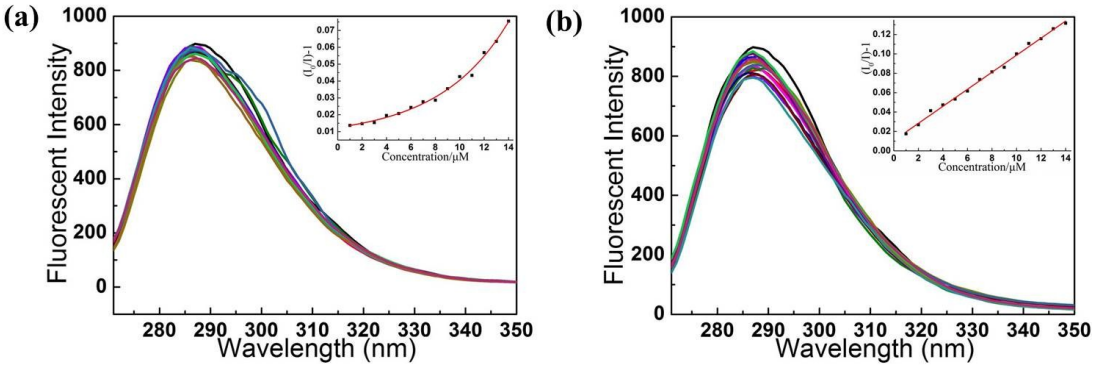



**Fig. S13:** The fluorescent spectra of Cd-MOF dispersed in water upon incremental addition of 70 μL (1 mM, 5 μL addition each time) aqueous solution of (a) AZL (b) FOX, respectively (the corresponding calibration curve of Stern-Volmer plot).

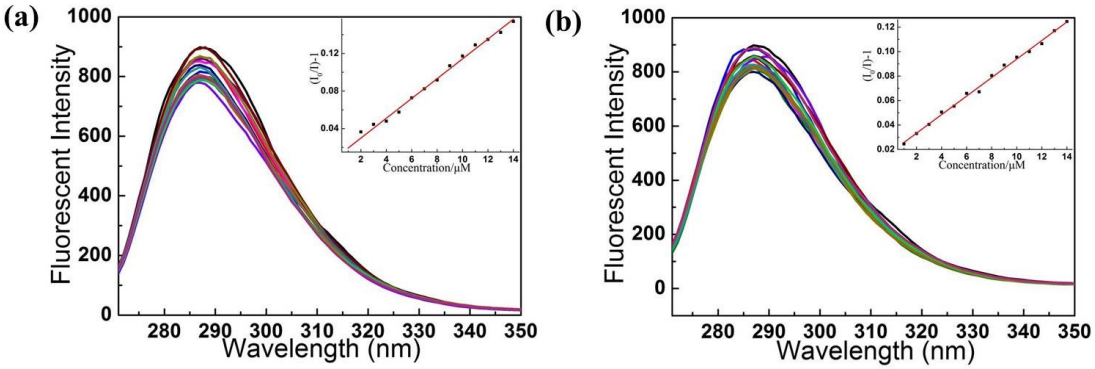



**Fig. S14:** The fluorescent spectra of Cd-MOF dispersed in water upon incremental addition of 70 μL (1 mM, 5 μL addition each time) aqueous solution of (a) CSU (b) ATM, respectively (the corresponding calibration curve of Stern-Volmer plot).

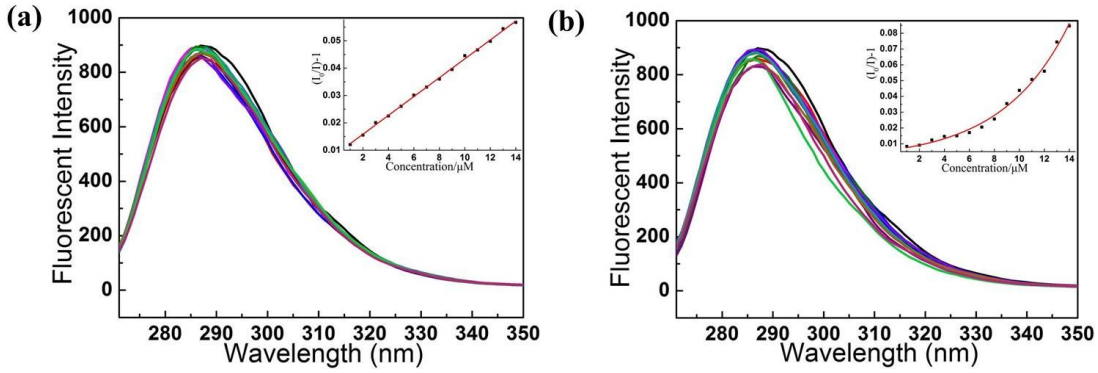



**Fig. S15:**The fluorescent spectra of Cd-MOF dispersed in water upon incremental addition of 70 μL (1 mM, 5 μL addition each time) aqueous solution of (a) LIN (b) AMK, respectively (the corresponding calibration curve of Stern-Volmer plot).

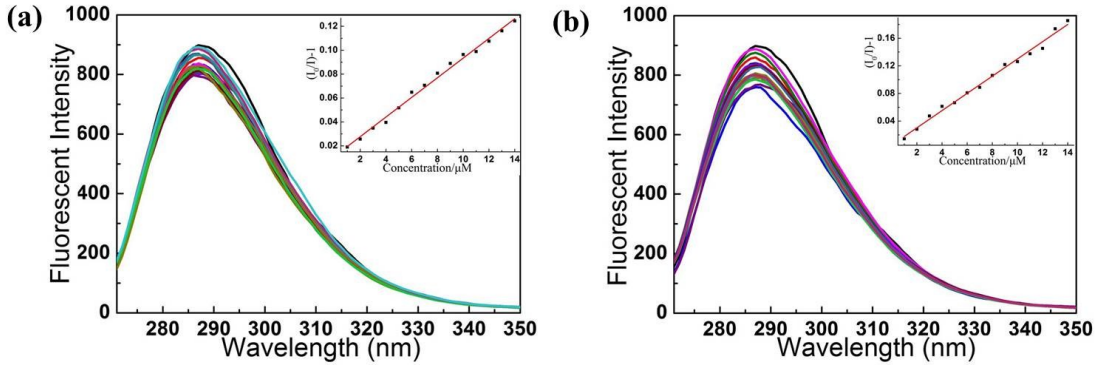



**Figure S16.** The fluorescent spectra of Cd-MOF dispersed in water upon incremental addition of 70 μL (1 mM, 5 μL addition each time) aqueous solution of (a) GEN (b) SXT, respectively (the corresponding calibration curve of Stern-Volmer plot).

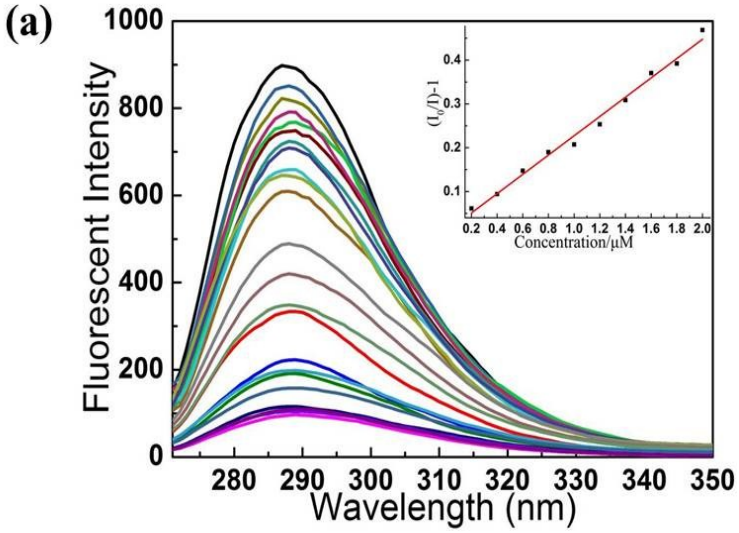



**Figure S17.** The fluorescent spectra of Cd-MOF dispersed in water upon incremental addition of 70 μL (1 uL each time to 10 μL, then 5 μL each time to 70 μL) aqueous solution of (a) CRO (the corresponding calibration curve of Stern-Volmer plot).

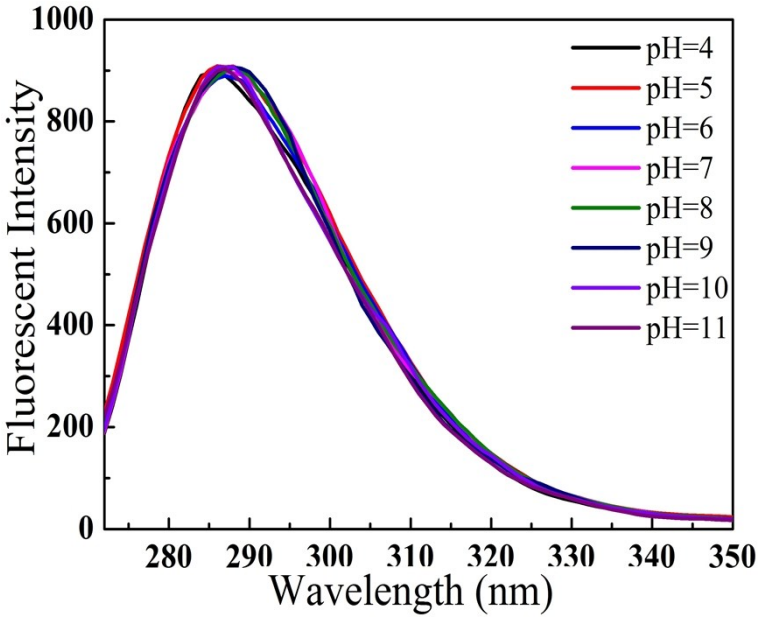



**Figure S18.** In pH=4~11 aqueous solutions, fluorescence intensity of Cd-MOF probe;

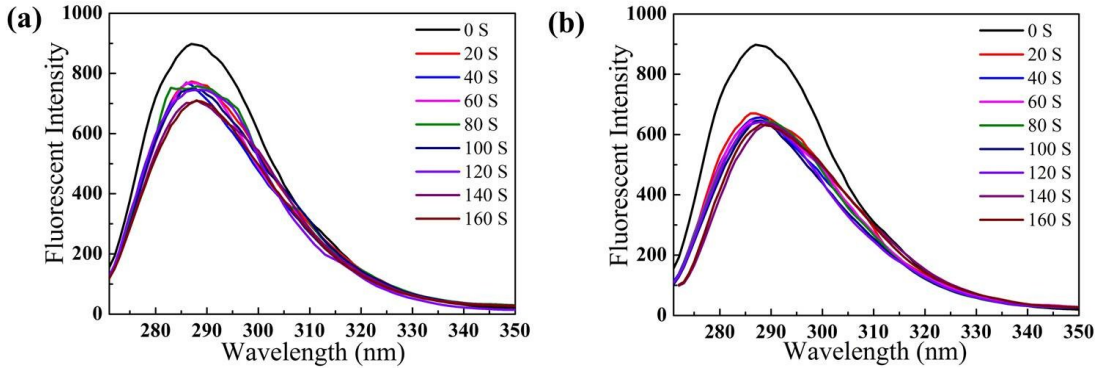



**Fig. S19:** CRO (a.1 μM, b, 1.6 μM) added to Cd-MOF suspensions, fluorescence intensity time curve.

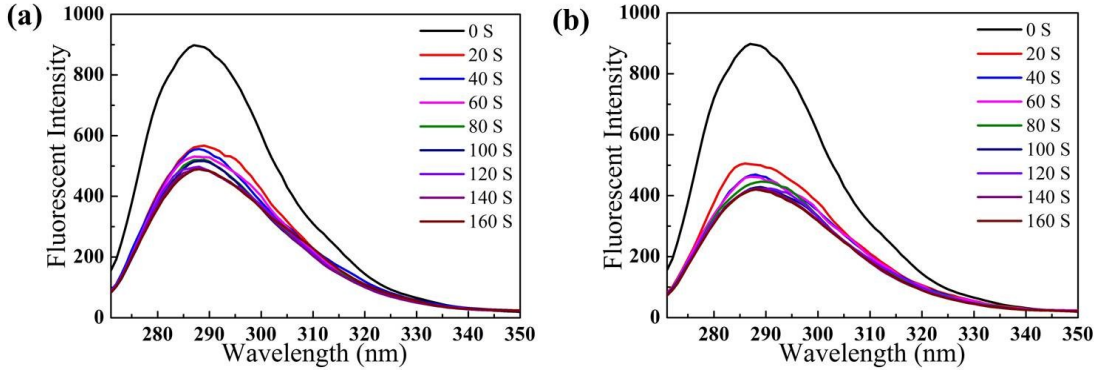



**Fig. S20:** CRO (a.2 μM, b, 3 μM) added to Cd-MOF suspensions, fluorescence intensity time curve.

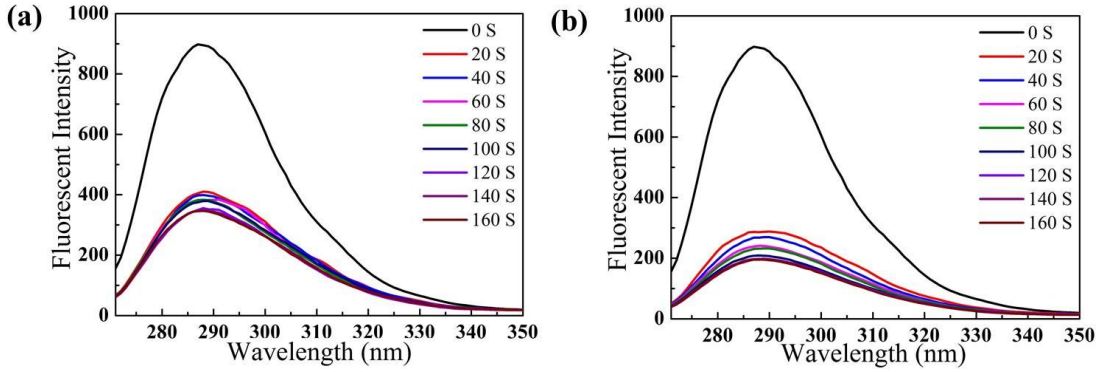



**Fig. S21:** CRO (a.4 μM, b, 6 μM) added to Cd-MOF suspensions, fluorescence intensity time curve.

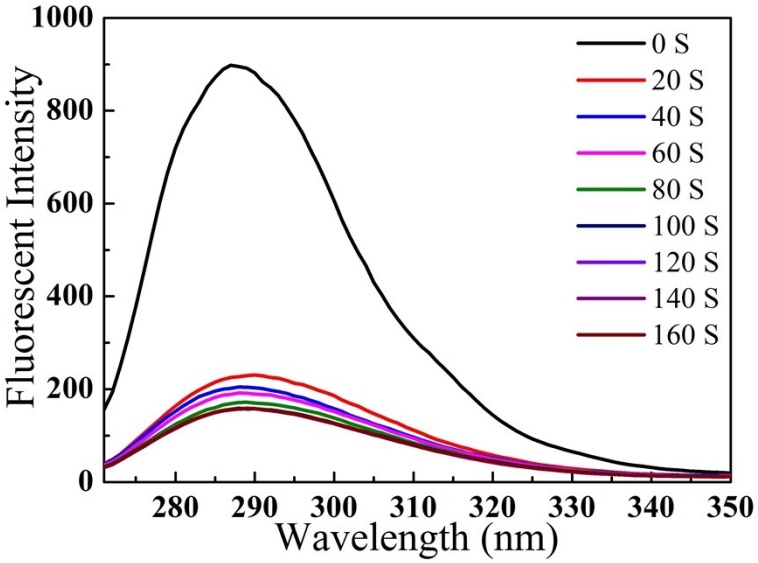



**Fig. S22:** CRO(8 μM) added to Cd-MOF suspensions, fluorescence intensity time curve.

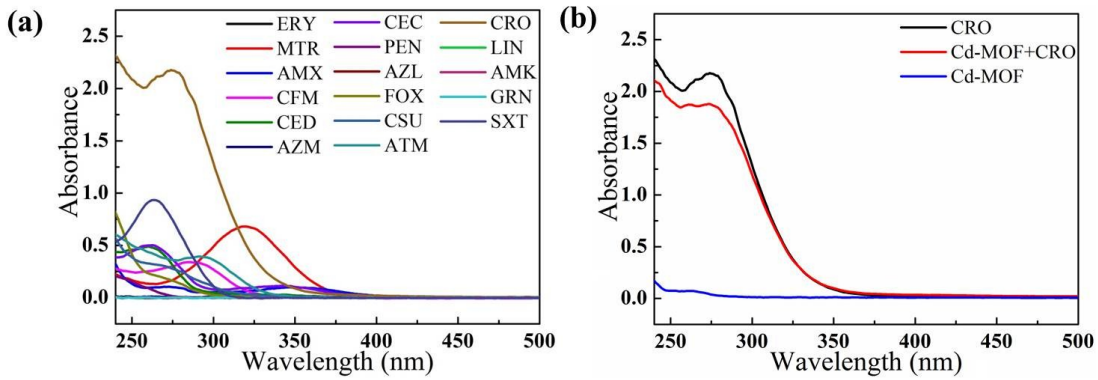



**Fig. S23: (a)** UV-visible spectra of antibiotics in water; (b) UV-visible spectra of CRO, Cd-MOF, mixtures of CRO and Cd-MOF in water.

## 4. References


1 B. Wang, X.L Lv, D.W. Feng, L.H. Xie, J. Zhang, M. Li, Y.B. Xie, J.R. Li, H.C. Zhou, Highly Stable Zr(IV)-Based Metal-Organic Frameworks for the Detection and Removal of Antibioticsand Organic Explosives in Water, *J Am Chem Soc*, 2016, 138(19), 6204-6216.

2 D. Zhao, X.H. Liu, Y. Zhao, P. Wang, Y. Liu, M. Azam, SI. Al-Resayes, Y. Lu, W.Y. Sun, Luminescent Cd(II)-organic frameworks with chelating $NH_2$ sites for selective detection of Fe(III) and antibiotics, *J Am Chem Soc*, 2017, 5(30) 15797-15807.

3 S.L. Hou, J. Dong, X.L. Jiang, Z.H. Jiao, C.M. Wang, B. Zhao, Interpenetration-Dependent Luminescent Probe in Indium-Organic Frameworks for Selectively Detecting Nitrofurazone in Water, *Anal Chem*, 2018, 90(3)1516-1519.

4 Z.W. Zhai, S.H. Yang, M. Cao, L.K. Li, C.X. Du, S.Q. Zang, Rational Design of Three Two-Fold Interpenetrated Metal-Organic Frameworks: Luminescent Zn/Cd-Metal-Organic Frameworks for Detection of 2,4,6-Trinitrophenol and Nitrofurazone in the Aqueous Phase, *Crystal Growth & Design*, 2018, 18(11) 7173-7182.