Electronic Supplementary Material (ESI) for Analytical Methods.

An exceptionally stable Zr-based fluorescent metal-organic framework for highly selective detection of pH

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Supporting Information

Fig. S9 Effects of various interferents of body fluids on the fluorescence intensity of UiO-67-bpydc at 365 nm in HAc-NaAc buffer. (1) Blank, (2)1 mM NH_4^+, (3) 3 mM Na^+, (4) 2 mM Mg^{2+}, (5) 2 mM K^+, (6) 1 mM Ca^{2+}, (7) 1 mM $H_2PO_4^-$, (8) 2 mM Cre, (9) 1 mM Urea, (10) Saturated Uric acid, (11) 0.1 mM Zn^{2+}, (12) 0.01 mM Cu^{2+}, (13) 0.01 mM Fe^{3+}.

Table S1. Standard deviation for UiO-67-bpydc.

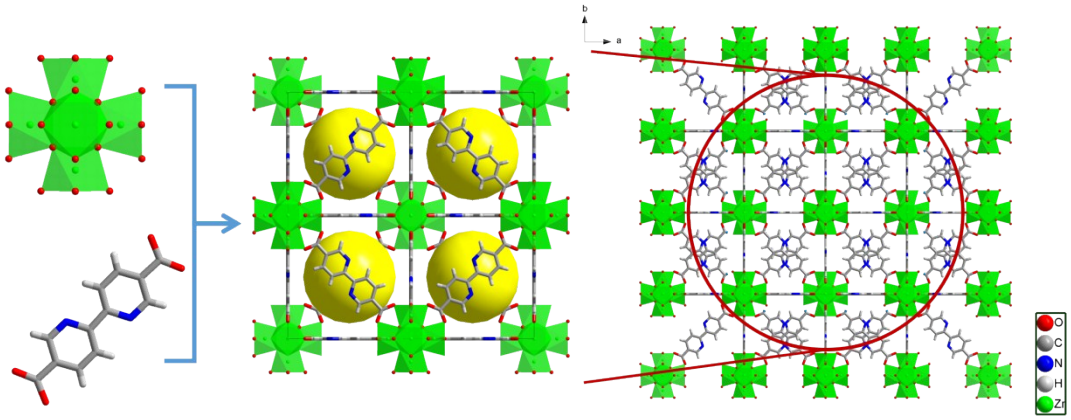

Fig. S1 Crystal structures of UiO-67-bpydc (gray: C; red: O; blue: N; white: H; green: Zr).

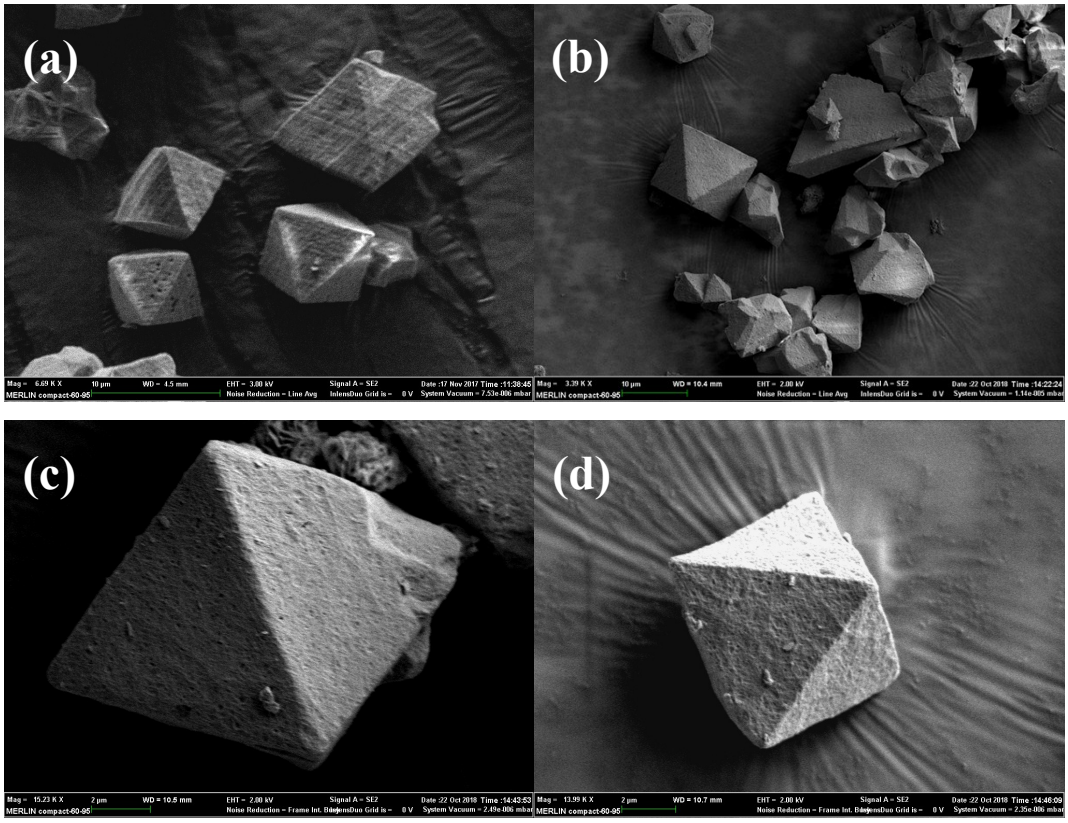

Fig. S2 SEM image of UiO-67-bpydc (a), UiO-67-bpydc soaked in aqueous solutions with pH value of 1 (b), UiO-67-bpydc soaked in aqueous solutions with pH value of 9 (c) and UiO-67-bpydc soaked in HAc-NaAc buffer with pH value of 5.5 (d).

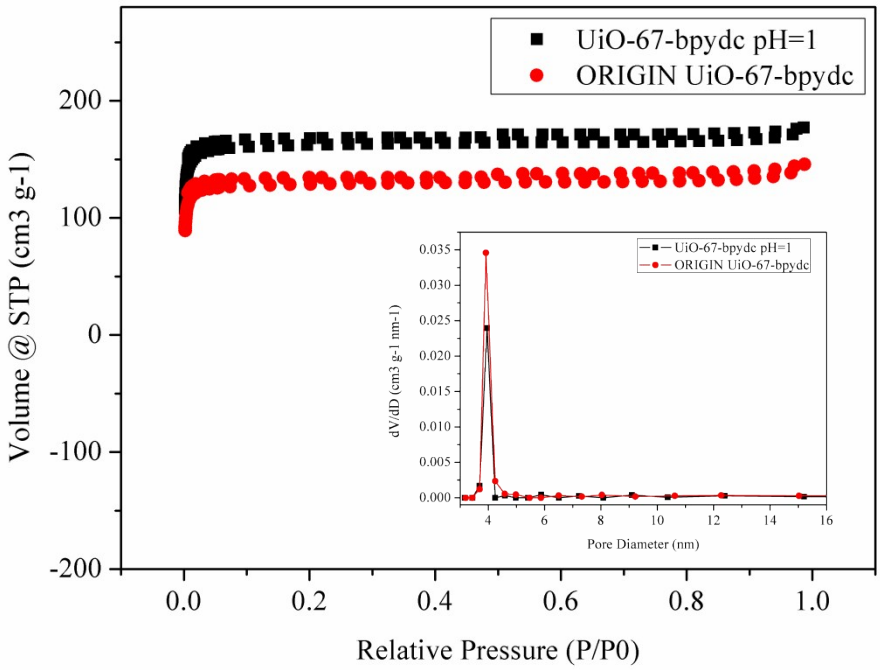

Fig. S3 N_2 adsorption/desorption isotherms of UiO-67-bpydc before and after treated in aqueous solutions with pH values of 1.00, respectively, at 77 K (inset shows DFT pore size distribution for the corresponding MOF evaluated by using N_2 adsorption data measured at 77 K).

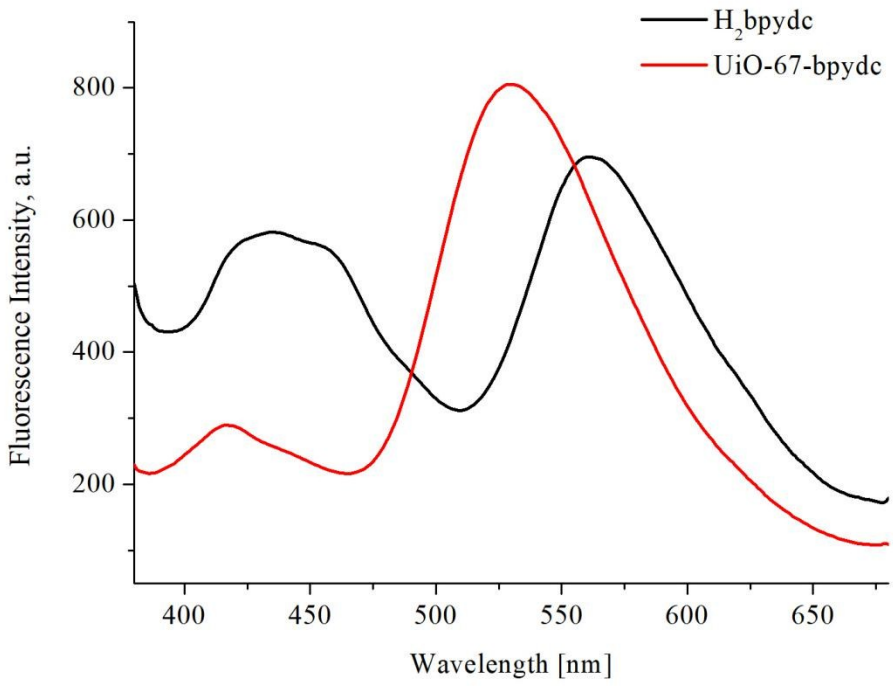

Fig. S4 Photoluminescent spectra of H_2bpydc (black) and UiO-67-bpydc (red) excited at 365 nm.

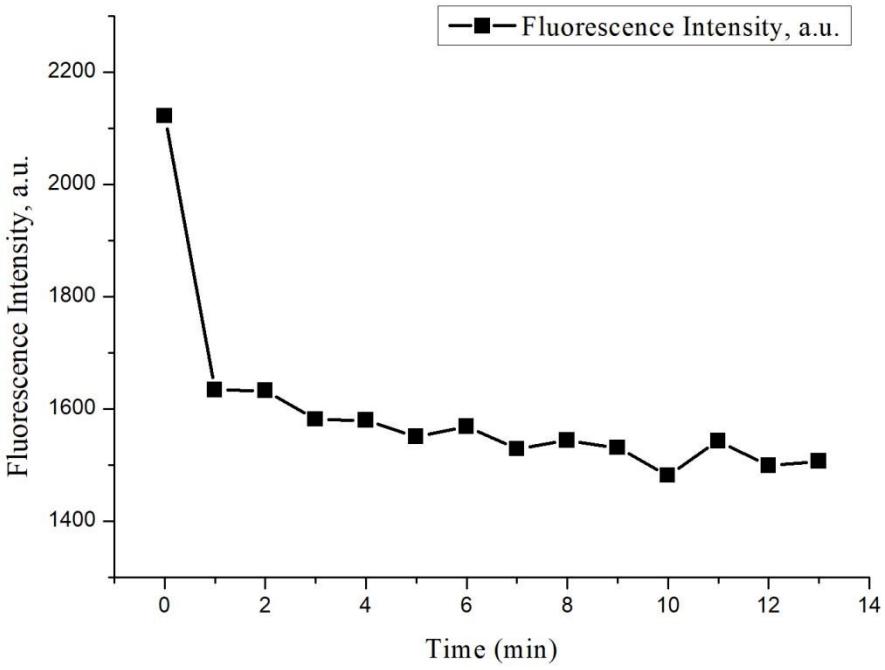

Fig. S5 Time-dependent fluorescent intensity changes of UiO-67-bpydc towards HCl (1 mM) at r.t.

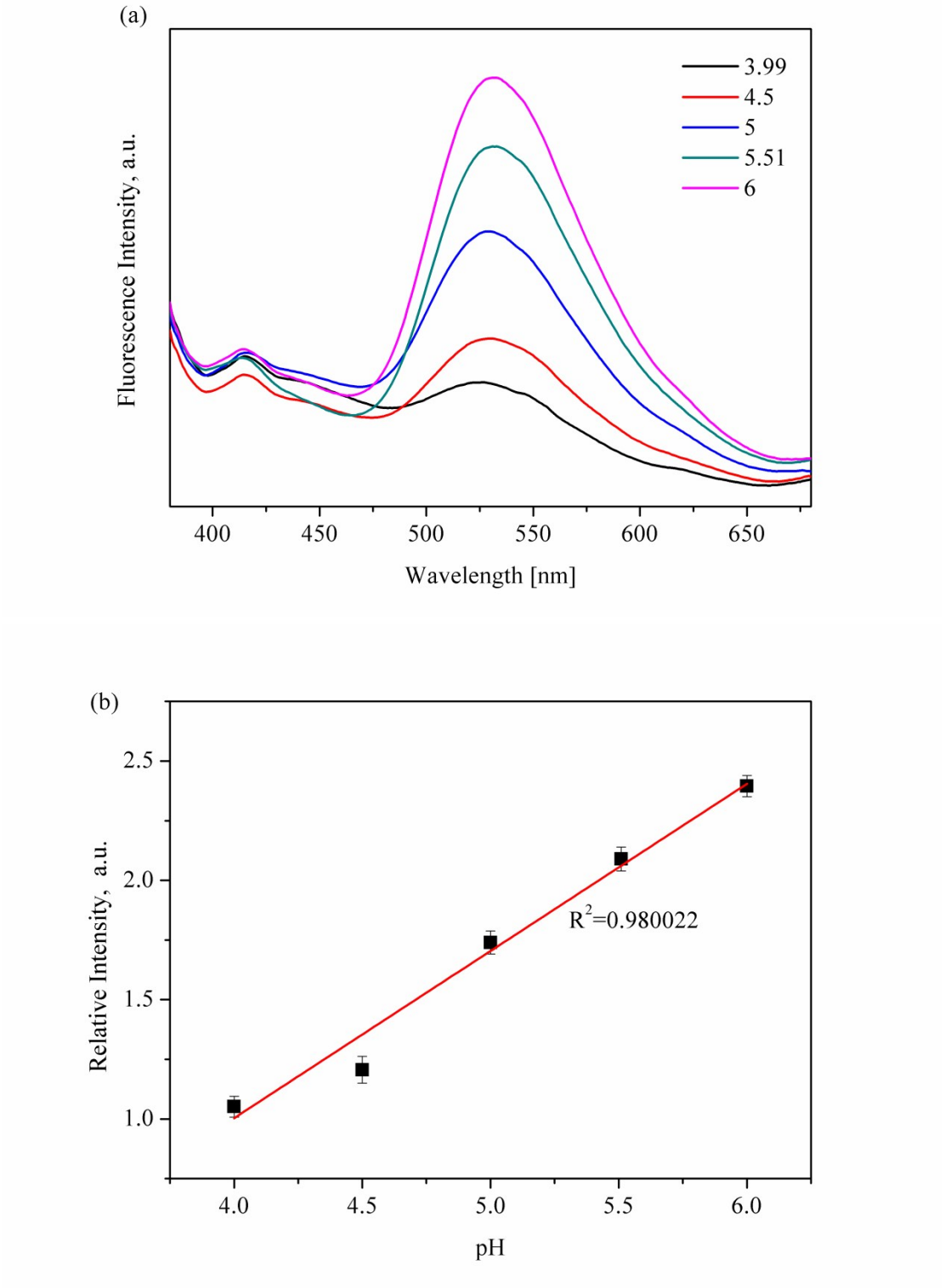

Fig. S6 pH dependent fluorescence (a) and linear variation (b) of UiO-67-bpydc in KHP buffer solution from 3.99 to 6.00 measured under excitation of 365 nm.

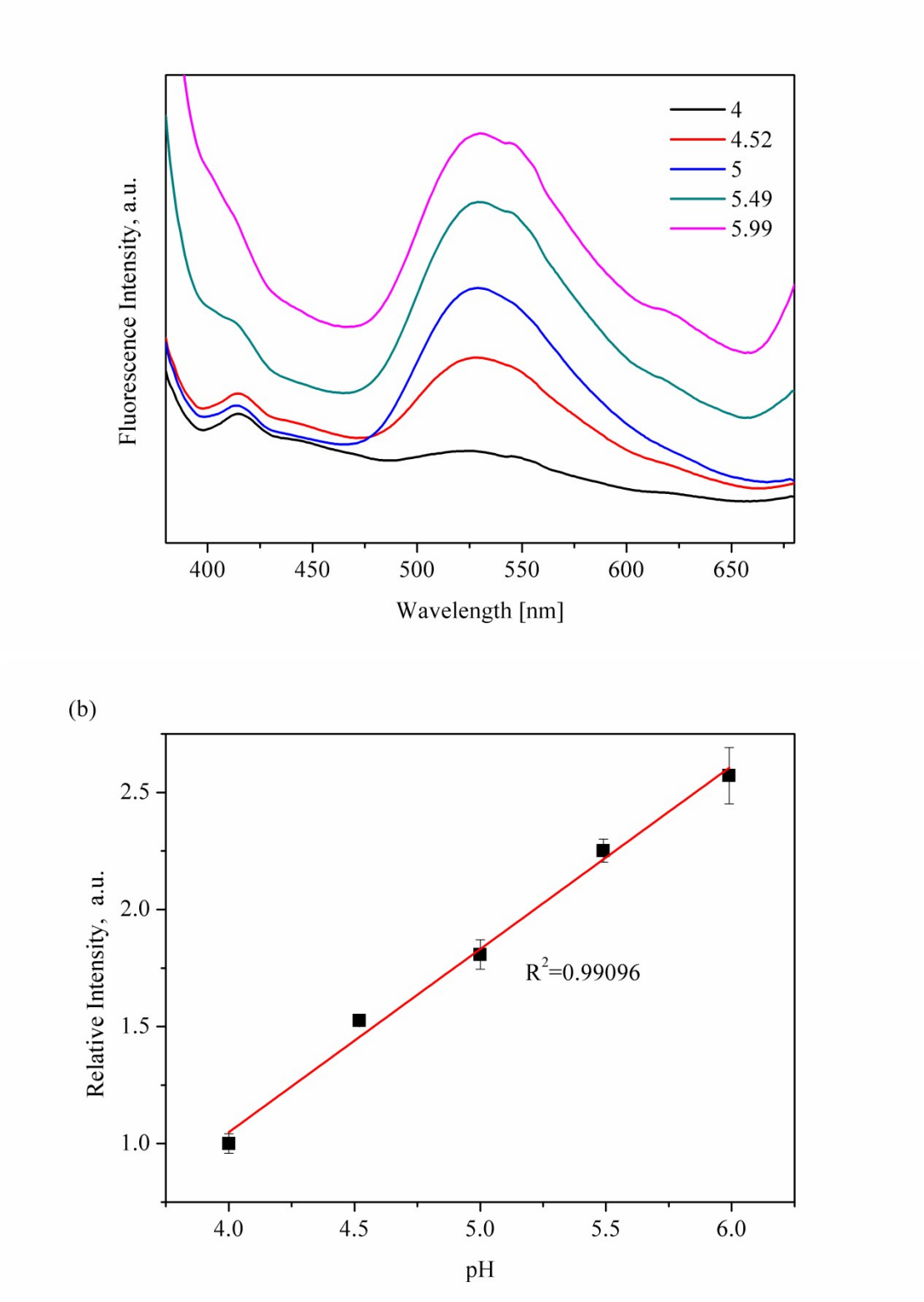

Fig. S7 pH dependent fluorescence (a) and linear variation (b) of UiO-67-bpydc in citrate buffer

solution from 4.00 to 5.99 measured under excitation of 365 nm.

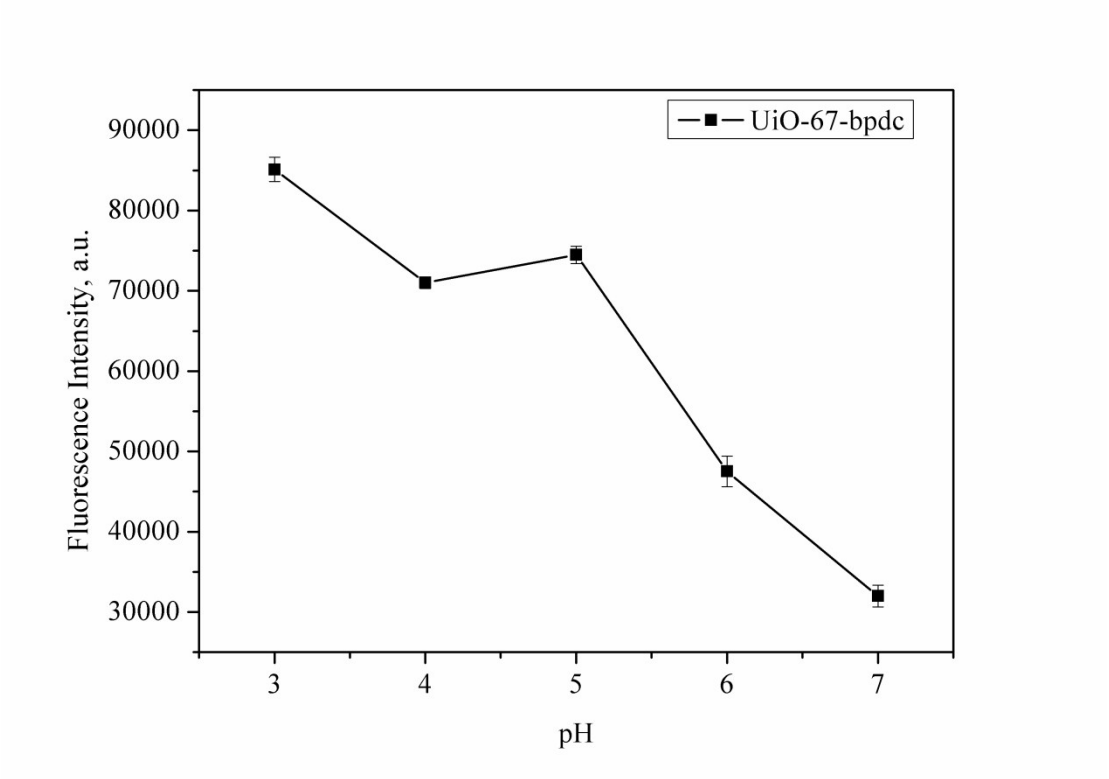

Fig. S8 Relationship between the fluorescence intensity of UiO-67-bpdc (at 396 nm) and pH value from 3 to 7 measured under excitation of 295 nm.

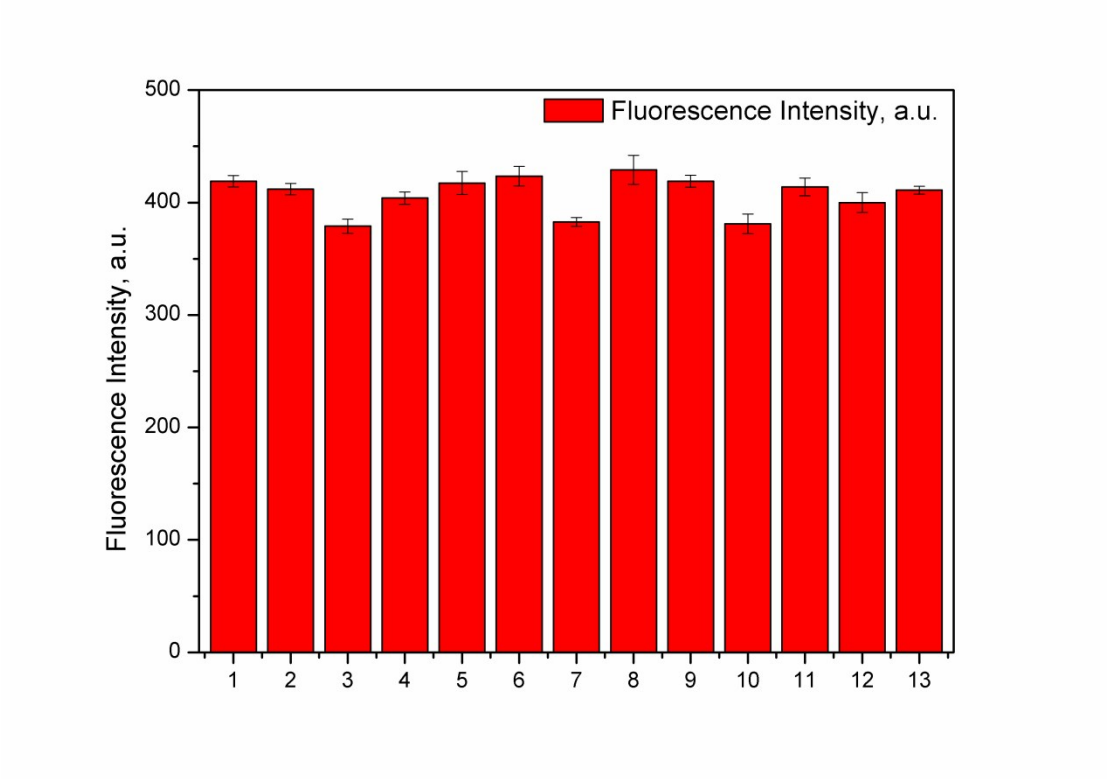

Fig. S9 Effects of various interferents of body fluids on the fluorescence intensity of UiO-67-bpydc at 365 nm in HAc-NaAc buffer. (1) Blank, (2)3 mM NH_4^+, (3) 3 mM Na^+, (4) 3 mM Mg^{2+}, (5) 3 mM K^+, (6) 3 mM Ca^{2+}, (7) 3 mM $H_2PO_4^-$, (8) 3 mM Cre, (9) 3 mM Urea, (10) Saturated Uric acid, (11) 0.1 mM Zn^{2+}, (12) 0.01 mM Cu^{2+}, (13) 0.01 mM Fe^{3+}.

Calculation of Detection Limit.

For calculating detection limit, the HAc-NaAc buffer solutions with pH value from 4 to 6.5 (1 mL, 1 mM) was added to UiO-67-bpydc suspension (0.6 mg/ml) and fluorescent intensity was recorded. By plotting fluorescence intensity with increasing pH of buffer solutions, slope (K) of graph Was found to be 145.1971 pH^{-1}. Standard deviation (Sb) were calculated from five blank measurements of 1 (Table S1). Detection limit is calculated according to the formula: LOD = 3Sb/K = 0.044 pH

Table S1. Standard deviation for UiO-67-bpydc.

Blank Readings	Fluorescence intensity (a.u.)
1	434
2	433
3	430
4	430
5	434
Standard Deviation (Sb)	2.17

$$LOD = 3Sb/K = 0.044\ pH$$