Supplementary material

A Sensitive Metal-Organic Frameworks Nanosensor with Cation-Introduced Chirality for Enantioselective Recognition and Determination of Quinine and Quinidine in Human Urine

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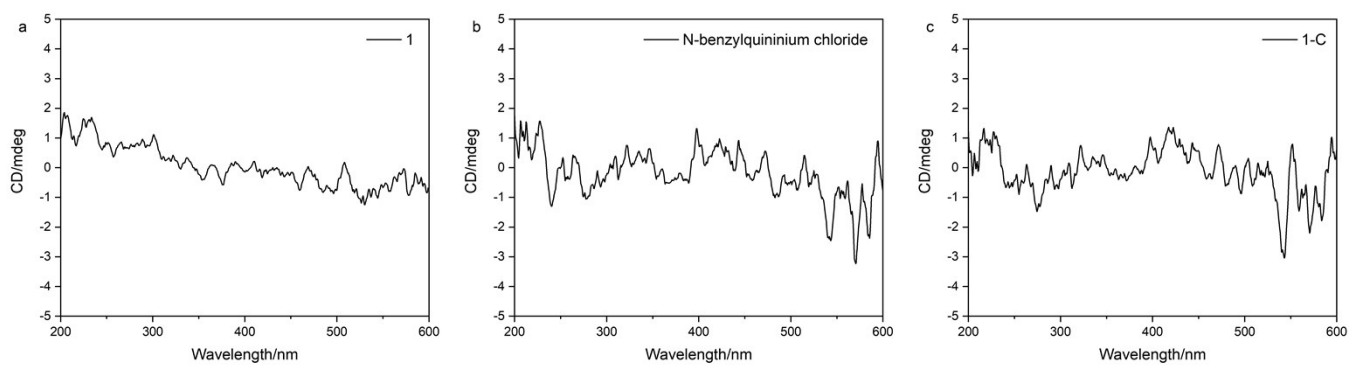* Corresponding author: Email address: byan@tongji.edu.cn (Bing Yan)

Figure S1 Solid-state circular dichroism (CD) spectra of (a) **1** (b) *N*-benzylquininium chloride and
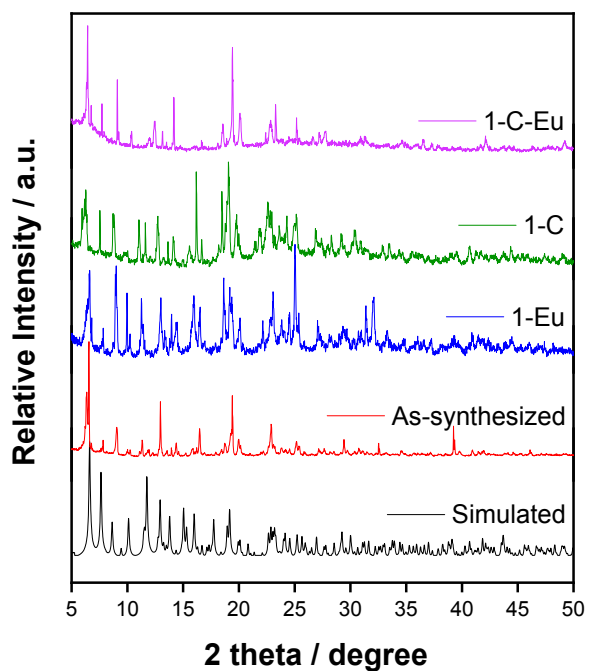
(c) **1**-C.

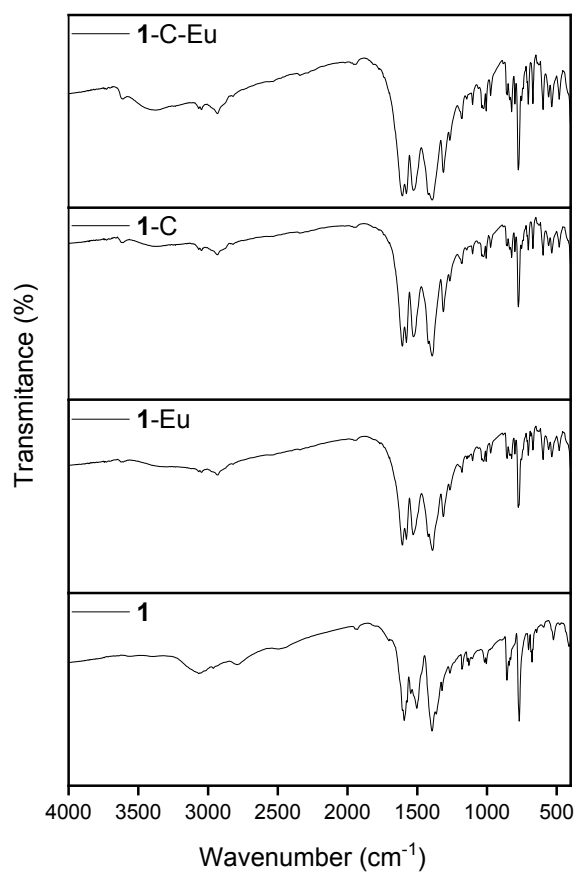**Figure S2** Powder X-ray diffraction (PXRD) patterns of **1**, **1**-Eu, **1**-C, and **1**-C-Eu.

Figure S3 Fourier transform infrared (FT-IR) spectra of **1**, **1**-Eu, **1**-C, and **1**-C-Eu.
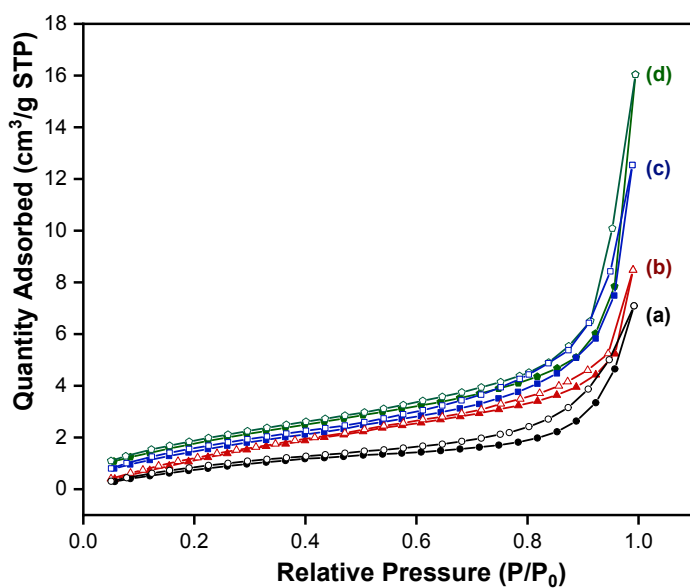

Figure S4 N$_2$ adsorption (solid symbols) and desorption (hollow symbols) isotherms of (a) **1**, (b) **1**-Eu, (c) **1**-C, and (d) **1**-C-Eu.
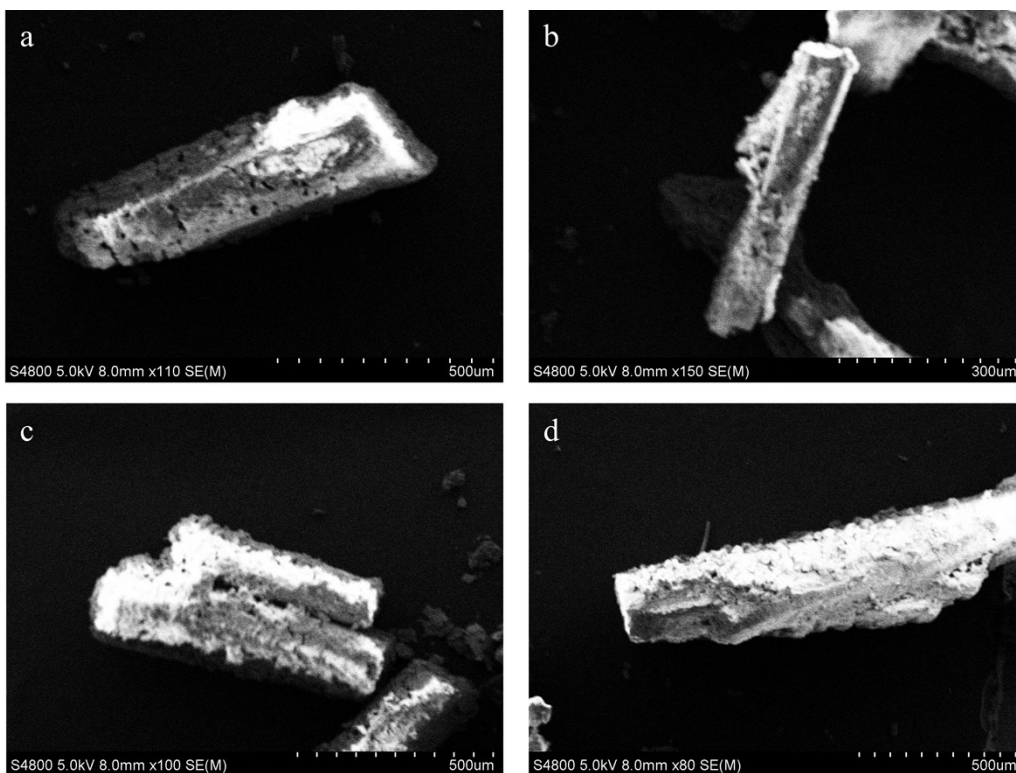
Figure S5 Scanning electron microscope (SEM) images of (a) **1**, (b) **1**-Eu, (c) **1**-C, and (d) **1**-C-Eu.
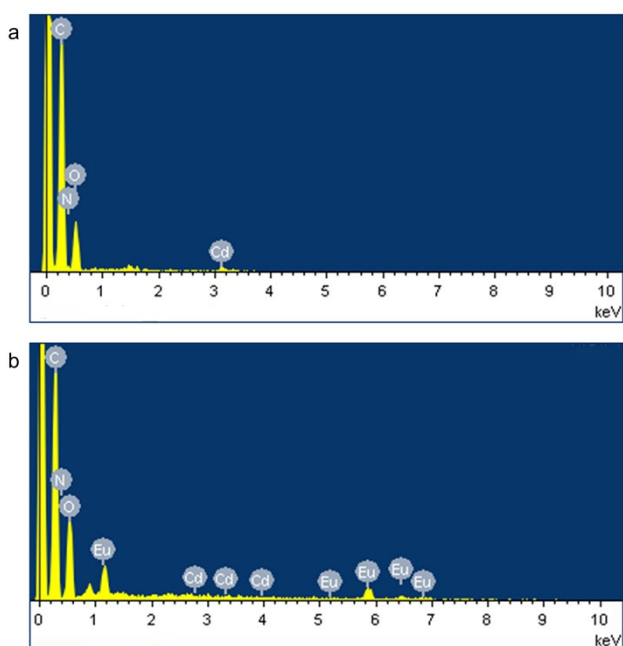

Figure S6 Energy dispersive analysis by X-rays (EDX) spectra of (a) **1** and (b) **1**-C-Eu.
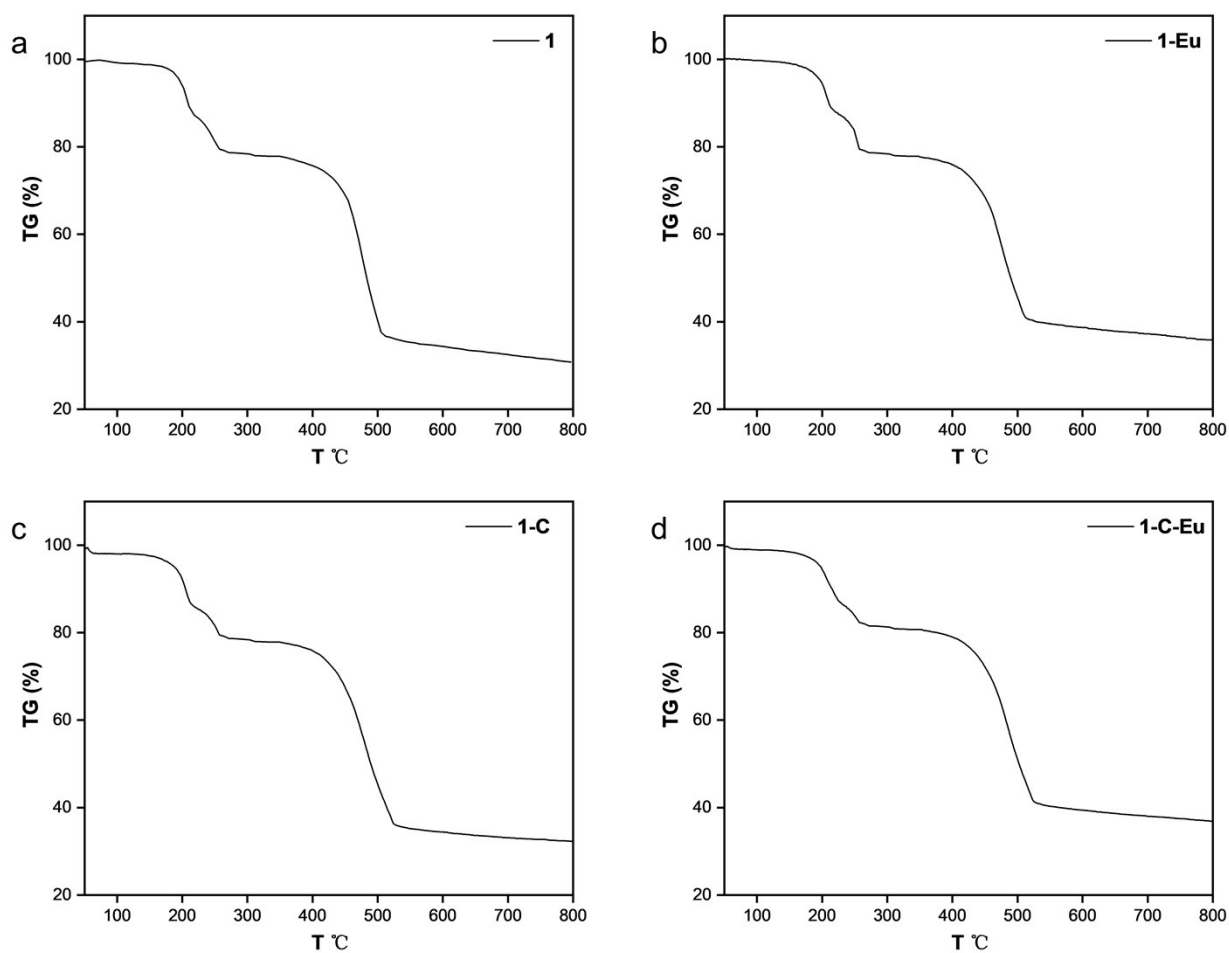
Figure S7 Thermogravimetric analyses curves of (a) **1**, (b) **1**-Eu, (c) **1**-C, and (d) **1**-C-Eu.
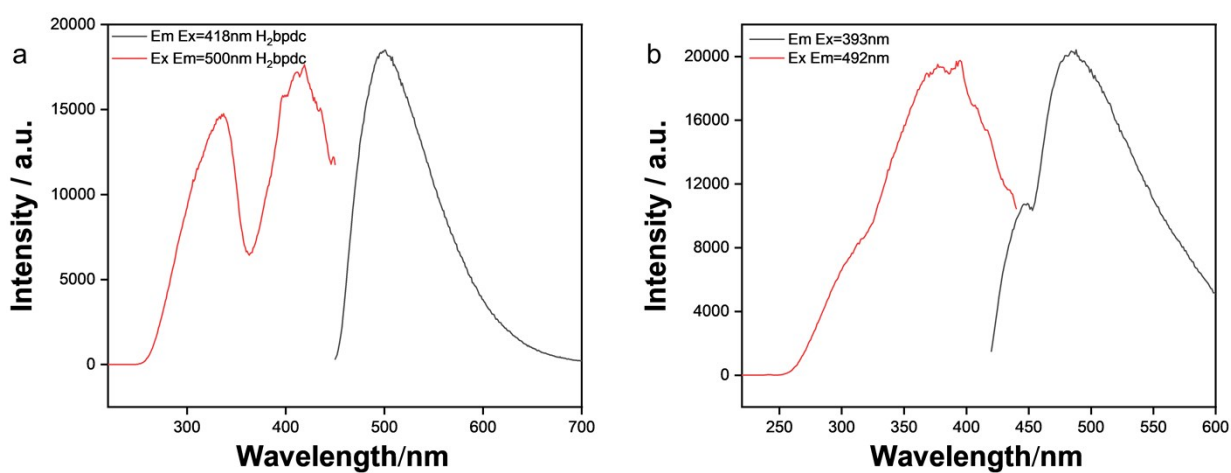

Figure S8 Solid-state photoluminescent spectra of (a) H$_2$bpdc and (b) **1**. (Red line: the excitation spectra, black line: the emission spectra)
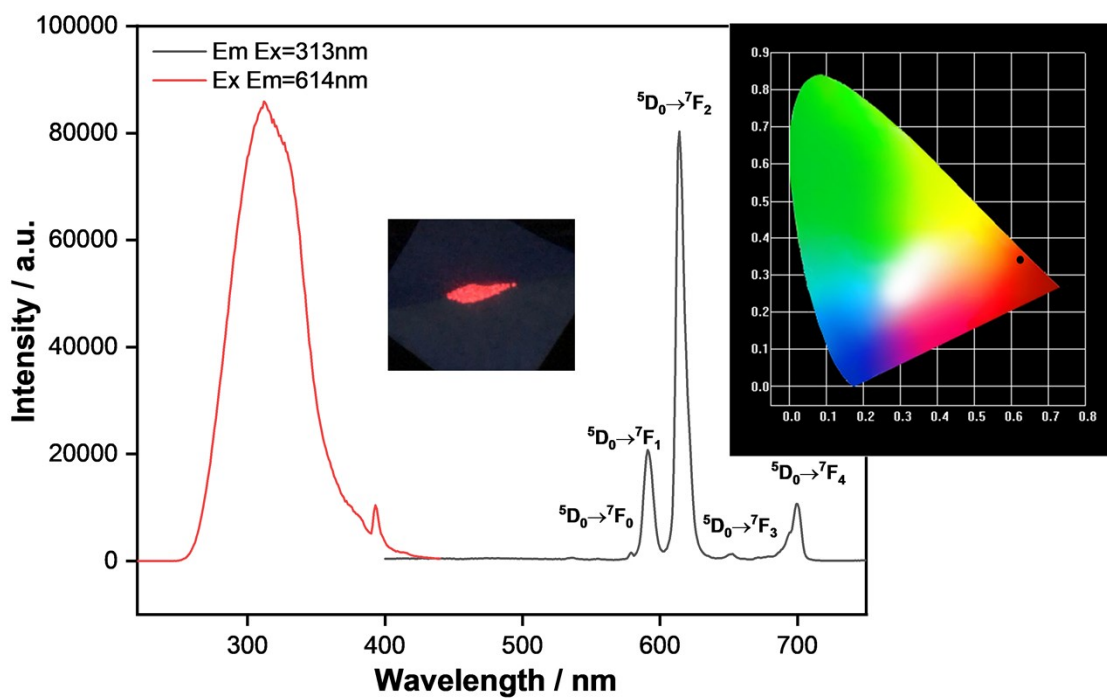
Figure S9 Solid-state photoluminescent spectra of **1-**Eu. (Red line: the excitation spectra, black line: the emission spectra) The inserts are the photograph and CIE chromaticity diagram of **1-**Eu excited with 365 nm laboratory UV light.
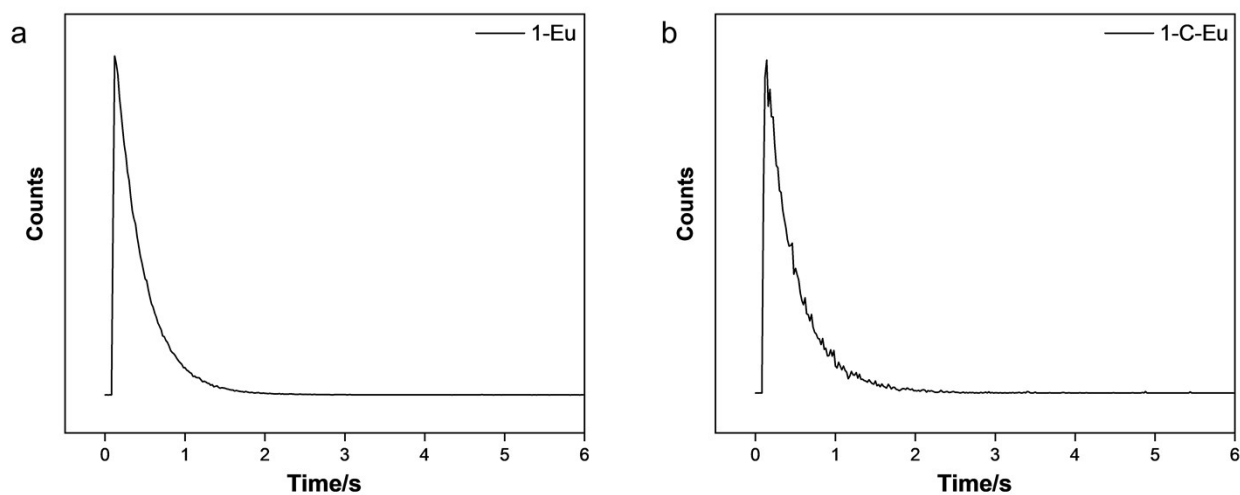

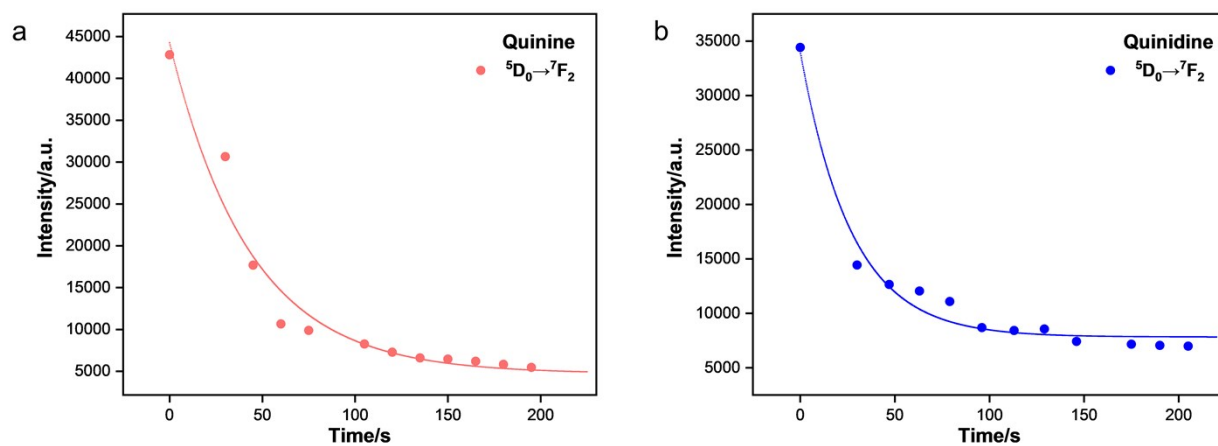**Figure S10** Fluorescence lifetime patterns of $^5D_0$ in the solid powder of (a) **1**-Eu and (b) **1**-C-Eu.

Figure S11 Time-response emission intensities at 613 nm (λ_{ex} = 313 nm) of the DMA suspensions of **1**-C-Eu upon the addition of (a) Quinine and (b) Quinidine (0.2mg·mL^{-1}).
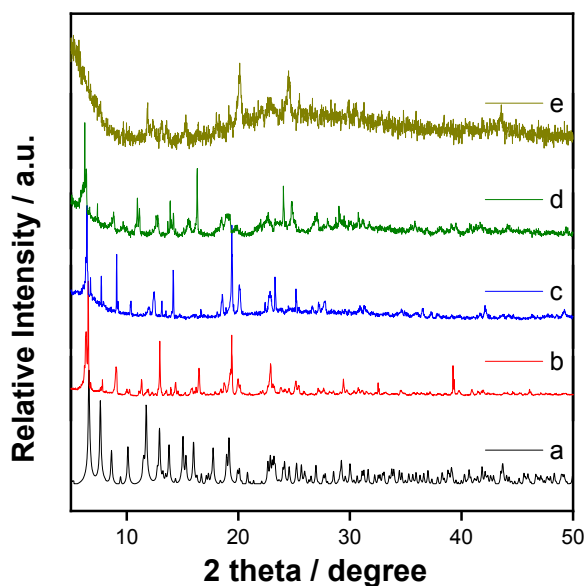

Figure S12 PXRD patterns of **1**-C-Eu after immersed in different solvents for 4 hrs: (a) simulated. (b) As-synthesized **1**. (c) As-synthesized **1**-C-Eu. (d) **1**-C-Eu immersed in the mixed-solvent of DMA and aqueous solutions (v/v =2/1). (e) **1**-C-Eu immersed in aqueous solutions.
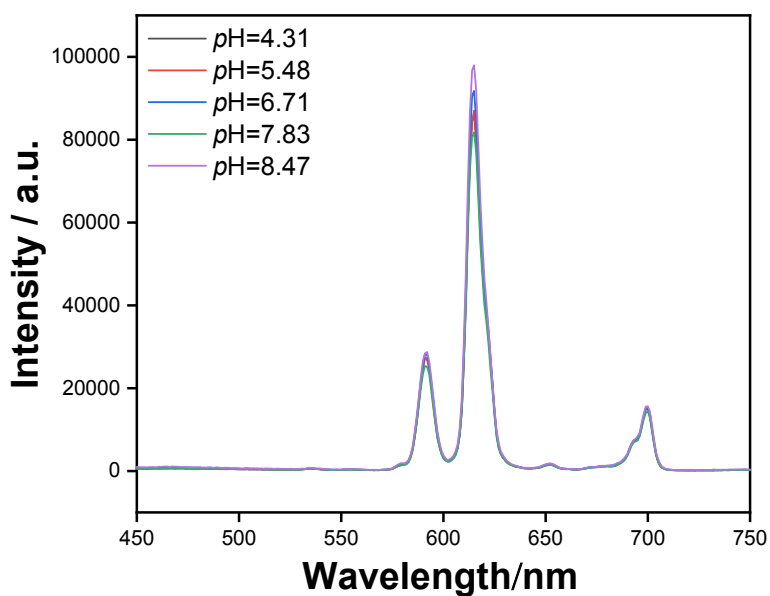
Figure S13 Emission spectra of **1**-Eu-C at 613 nm (λ_{ex} = 313 nm) immersed in the mixed-solvent
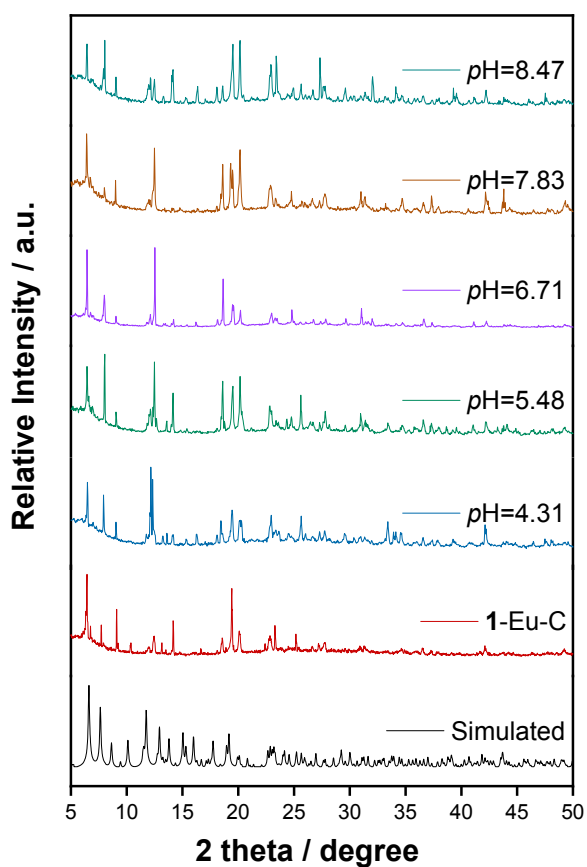
of DMA and aqueous solutions of different pH (v/v =2/1).

Figure S14 PXRD patterns of **1**-C-Eu after immersed in the mixed-solvent of DMA and aqueous

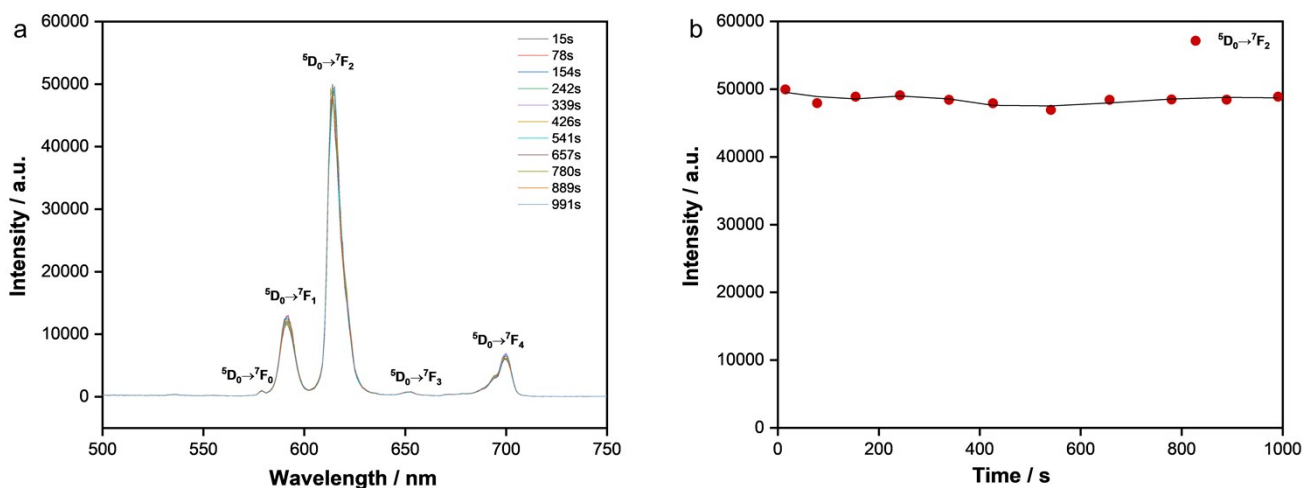solutions of different pH for 4 hrs.

Figure S15 Time dependence of (a) emission spectra and (b) emission intensities at 613 nm of **1**-C-Eu in the mixed-solvent of DMA and aqueous solutions (λ_{ex} = 313 nm).
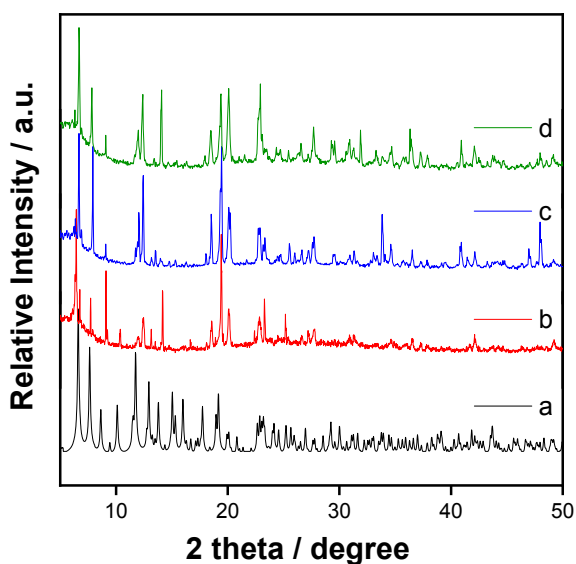

Figure S16 PXRD patterns of **1**-C-Eu after soaking in different solutions for about 2 hrs: (a) simulated. (b) As-synthesized **1**-C-Eu. (c) **1**-C-Eu after soaked in the DMA solutions of Quinine (10^{-2} M). (d) **1**-C-Eu after soaked in the DMA solutions of Quinidine (10^{-2} M).
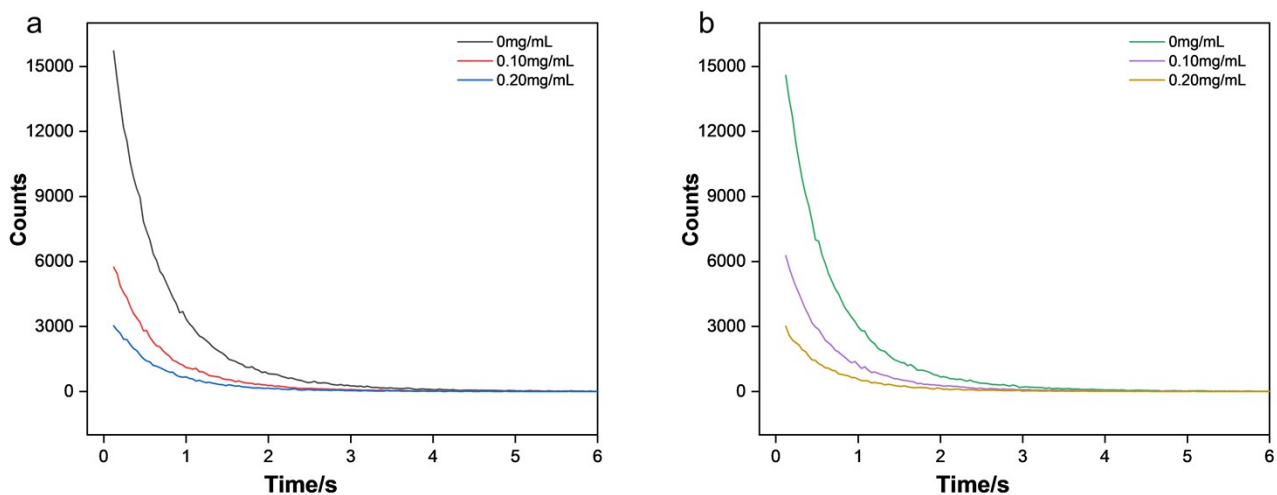
Figure S17 Luminescence lifetime patterns of $^5D_0$ in **1**-Eu-C with the presence of (a) Quinine and (b) Quinidine in DMA solutions.
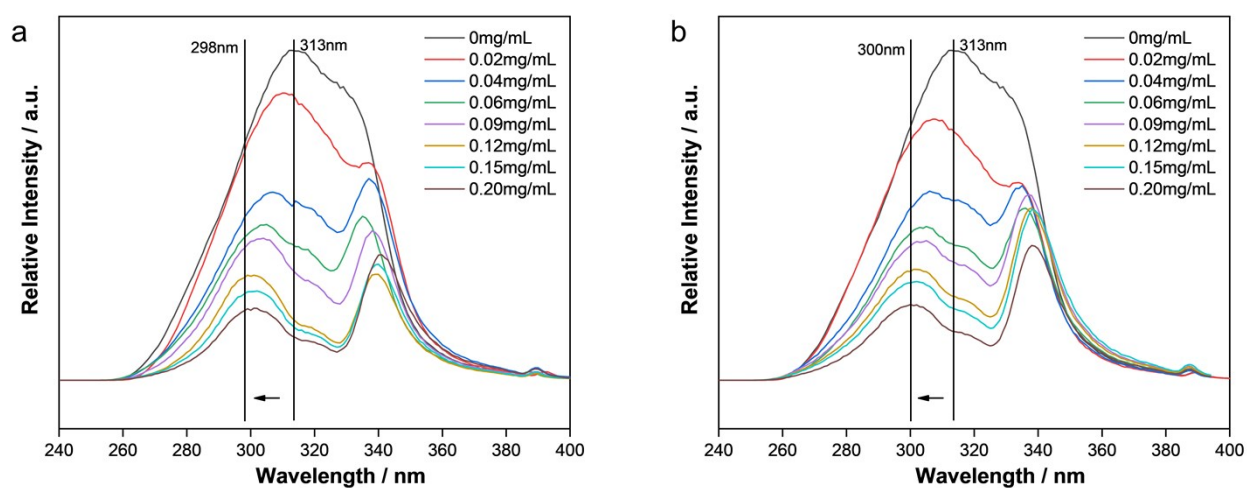

Figure S18 Excitation spectra of **1**-Eu-C suspensions with different concentrations of (a) Quinine and (b) Quinidine (λ_{em} = 613 nm).
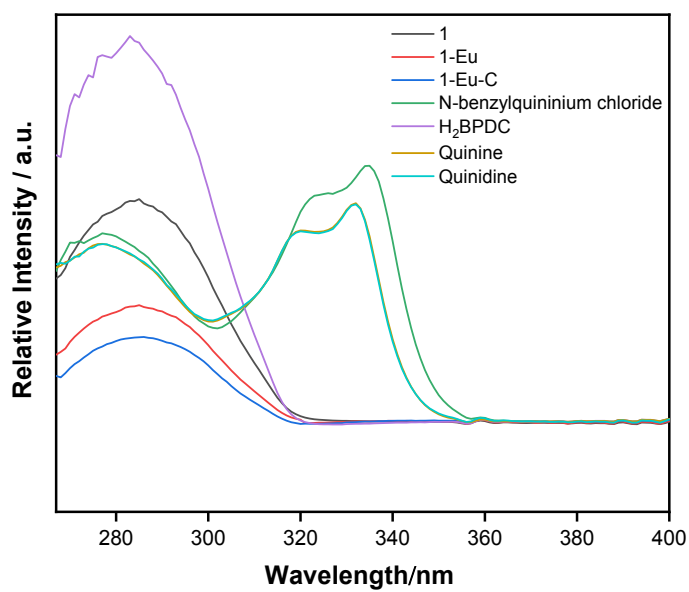
Figure S19 UV-Vis absorption spectra of **1**, **1**-Eu, **1**-C-Eu, *N*-benzylquininium chloride, H$_2$BPDC,
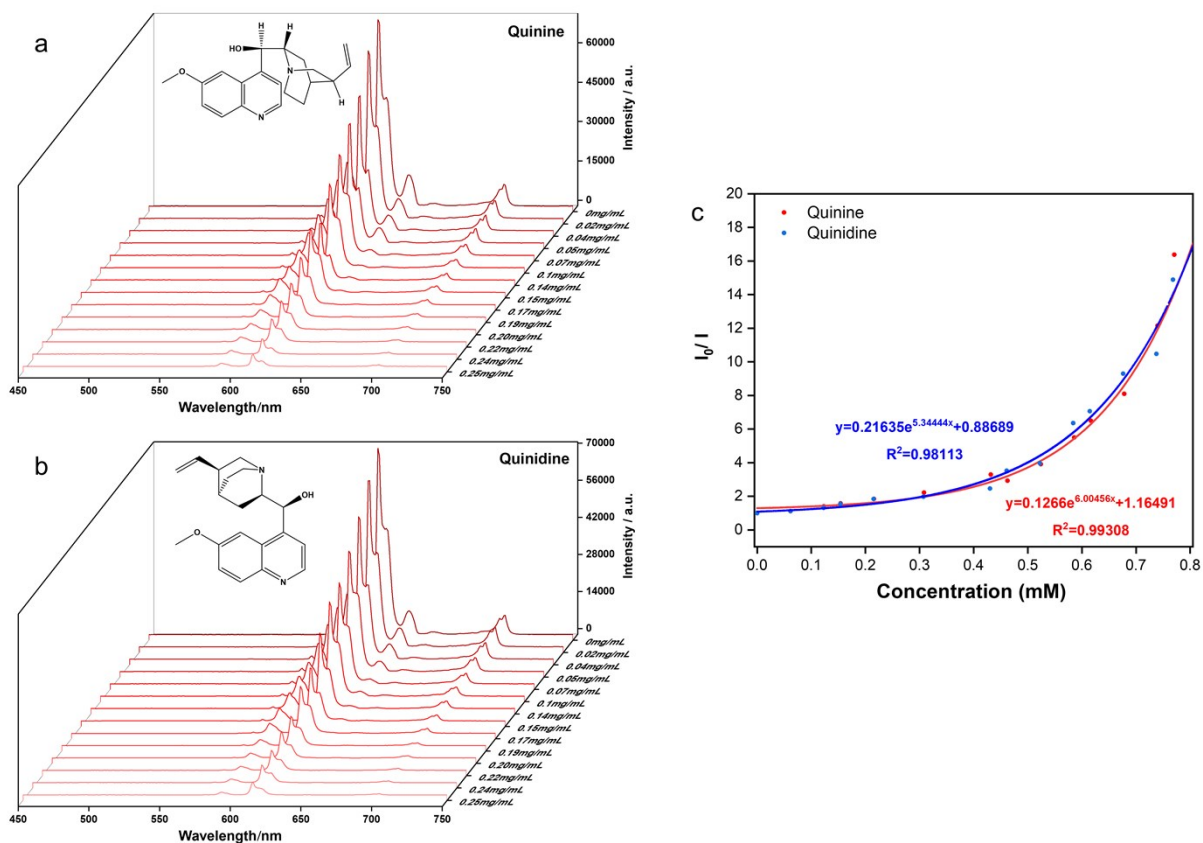
Quinine and Quinidine in DMA.

Figure S20 Emission spectra of **1**-Eu dispersed in in DMA solutions of (a) Quinine and (b) Quinidine at different concentrations ranging from 0 to 0.25 mg·mL^{-1} (λ_{ex} = 313 nm). (c) The fitting curve of I_0/I versus concentration of Quinine and Quinidine.
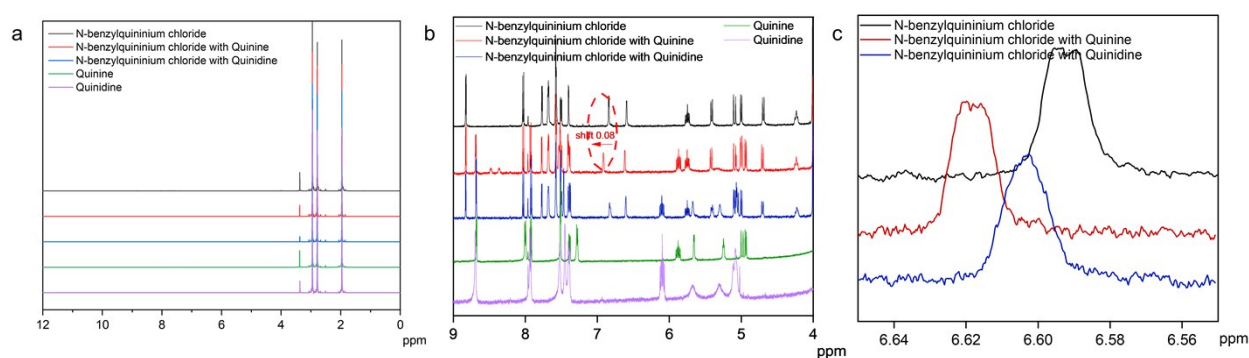

Figure S21 Liquid ^{1}H NMR spectra of the analytes and *N*-benzylquininium chloride. (a) Chemical shift between 12 and 0 ppm. (b) Chemical shift between 9 and 4 ppm. (c) Chemical shift between 6.65 and 6.55 ppm.

Table S1 Weight percentages of all elements in **1** and **1**-C-Eu determined by Energy dispersive

analysis by X-rays (EDX).

Element	Weight percentages	
	1	**1-C-Eu**
C	62.49	57.31
N	3.07	1.59
O	31.50	28.69
Cd	2.94	1.42
Eu	-----	10.99

Table S2 Responses of luminescence lifetimes of **1**-C-Eu towards Quinine and Quinidine of various

concentrations in DMA solutions.

Analytes	Concentrations	τ (μs)
Quinine	0 mg·mL^{-1}	706.07
	0.1 mg·mL^{-1}	667.29
	0.2 mg·mL^{-1}	642.46
Quinidine	0 mg·mL^{-1}	700.23
	0.1 mg·mL^{-1}	672.77
	0.2 mg·mL^{-1}	650.60