Supporting Information

Fast, sensitive and selective ion-triggered disassembly and release based on tris(bipyridine)ruthenium(II) -functionalized metal-organic frameworks

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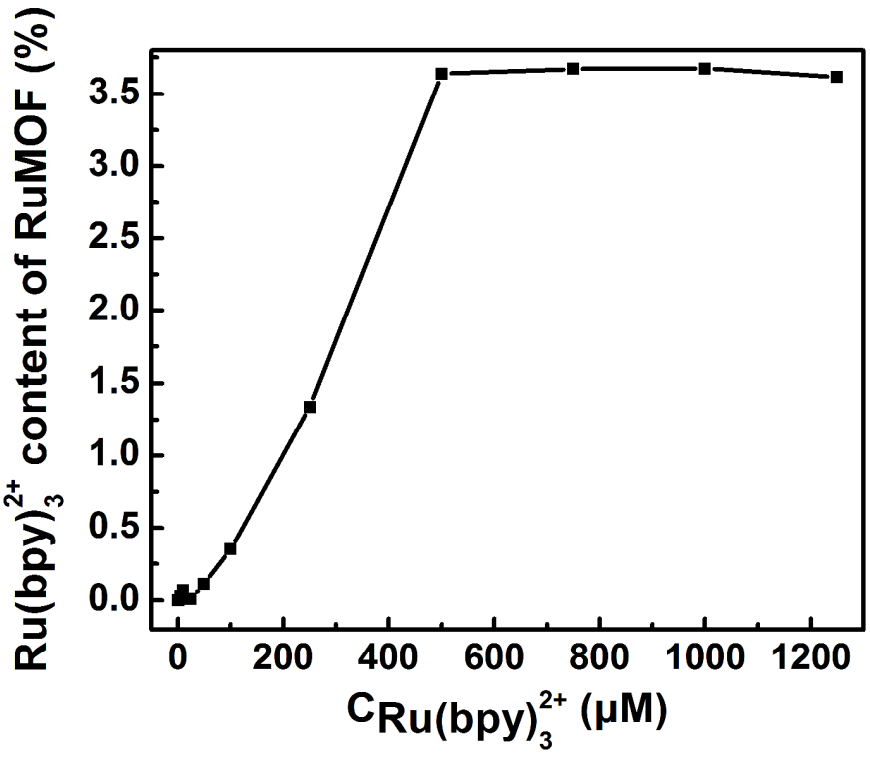

Figure S1. Dependence of $Ru(bpy)_3^{2+}$ content (weight percentage) in RuMOFs on the initial concentration of $Ru(bpy)_3^{2+}$ in the synthesis solution. The amounts of other reactants in the synthesis solution were: adenine (0.125 mmol), BPDC (0.25 mmol), zinc nitrate hexahydrate (0.375 mmol), in a mixed solvent of nitric acid (1 mmol), DMF (13.5 mL) and water (1 mL).

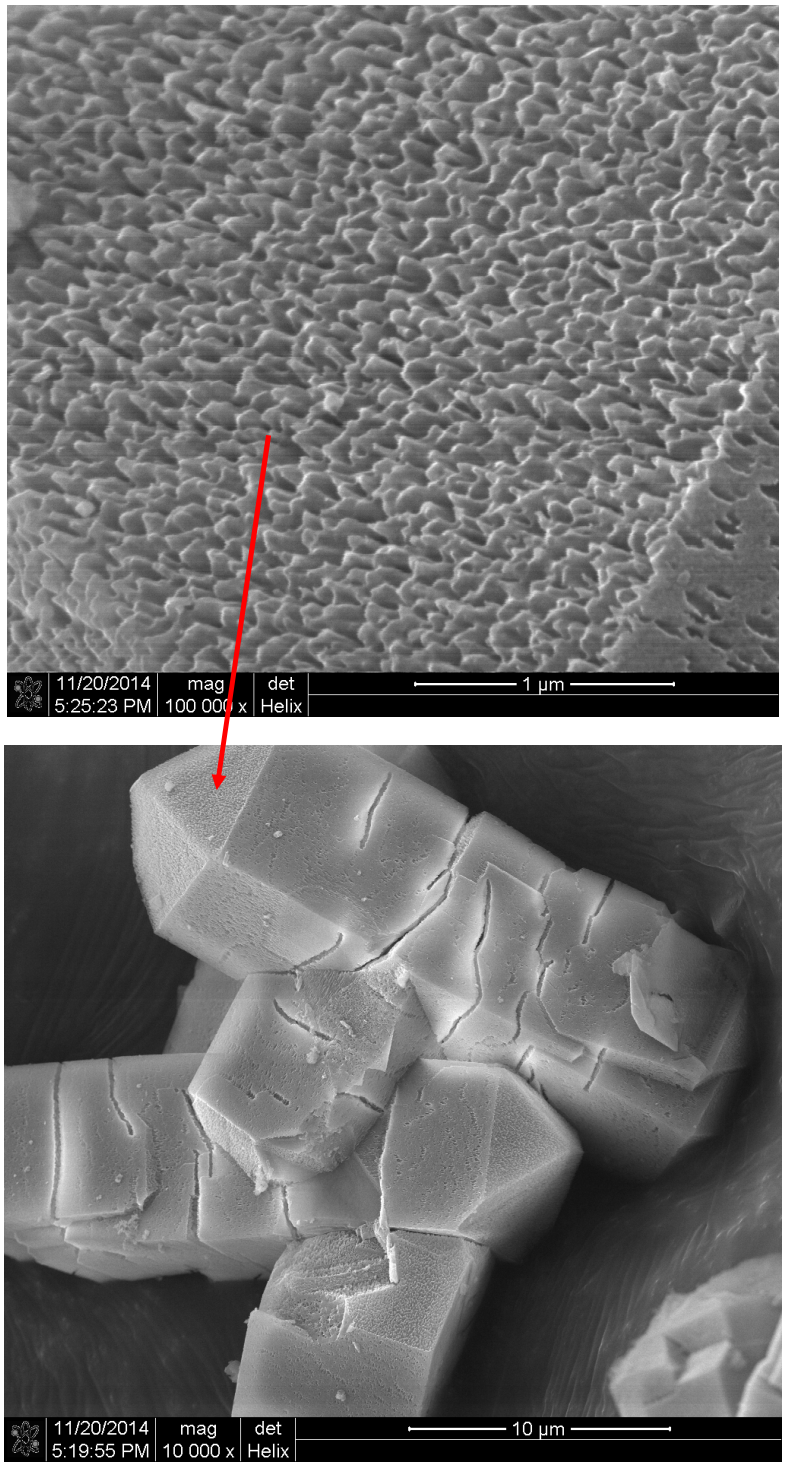

Figure S2. SEM images of RuMOFs

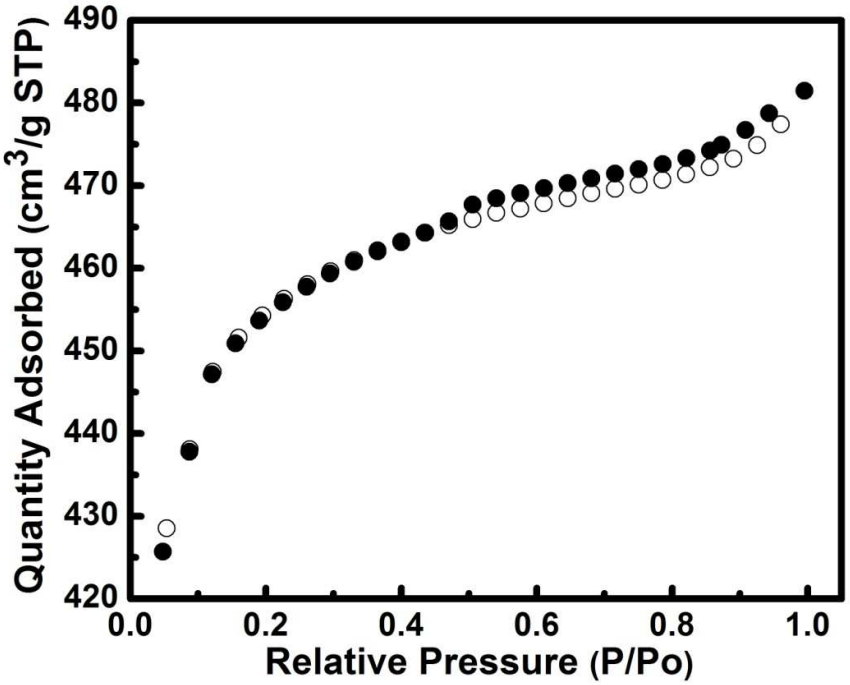

Figure S3. N_2 adsorption （empty circles） and desorption （filled circles） isotherms of bio-MOF-1.

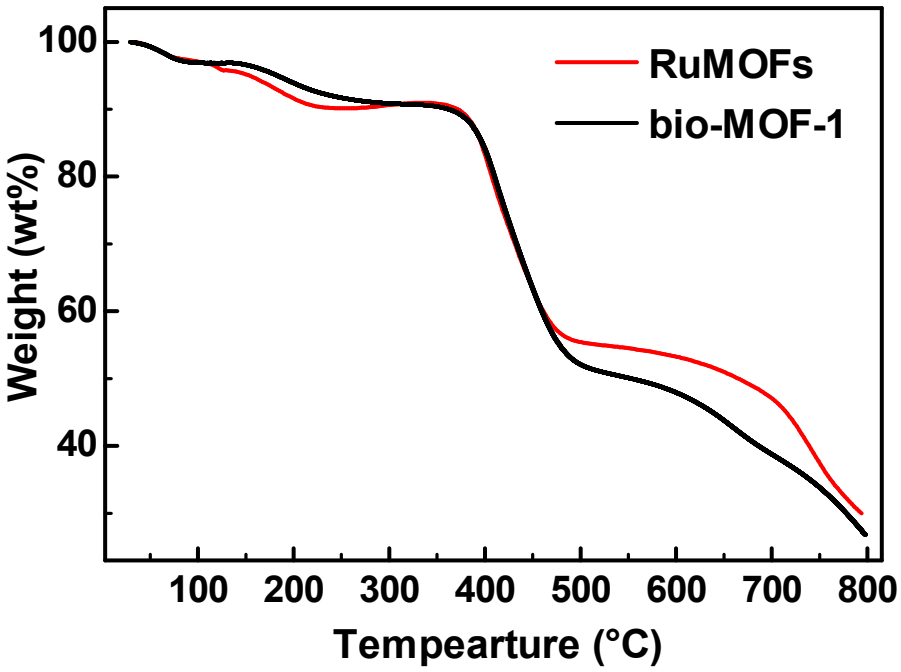

Figure S4. Thermogravimetric analysis of RuMOFs and bio-MOF-1

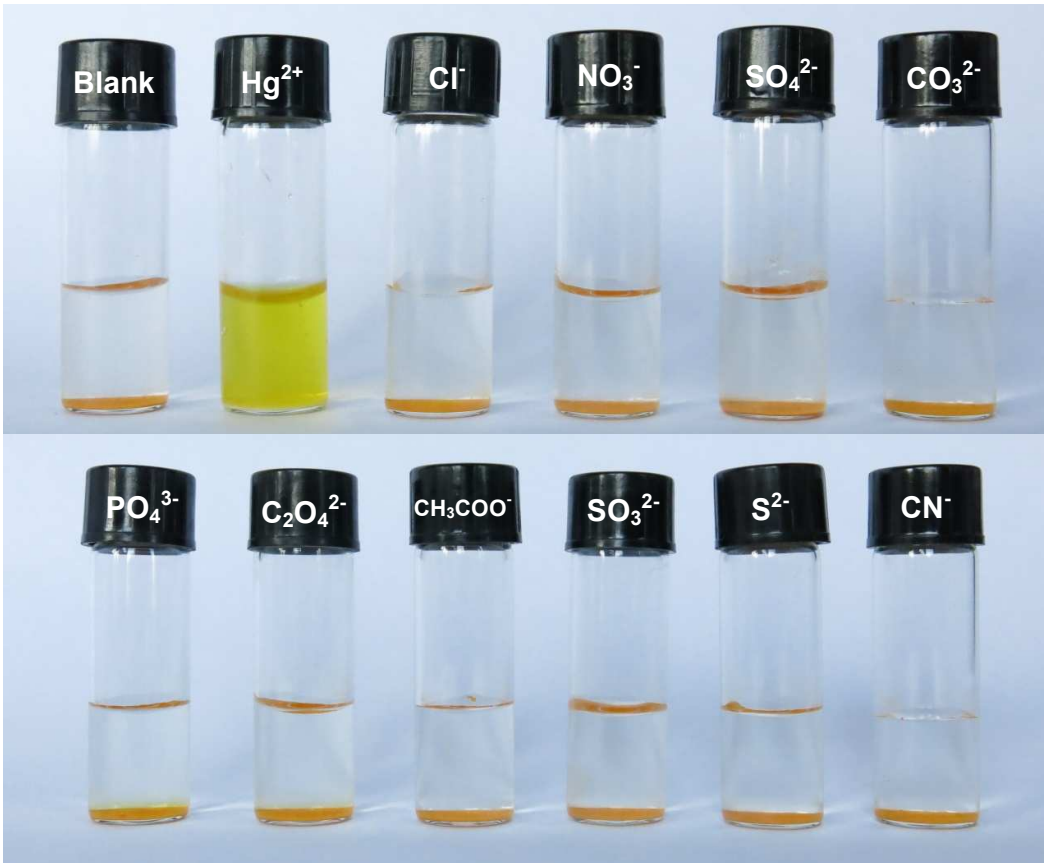

Figure S5. The photo taken for the interactions between RuMOFs and various anions in water. The concentration of each kind of anion was 100 μM, and the counter ions were all Na^+ ion. The blank sample (i.e. RuMOFs in pure water), and Hg^{2+} sample (i.e. RuMOFs in 100 μM $HgCl_2$ solution) were provided for comparison.

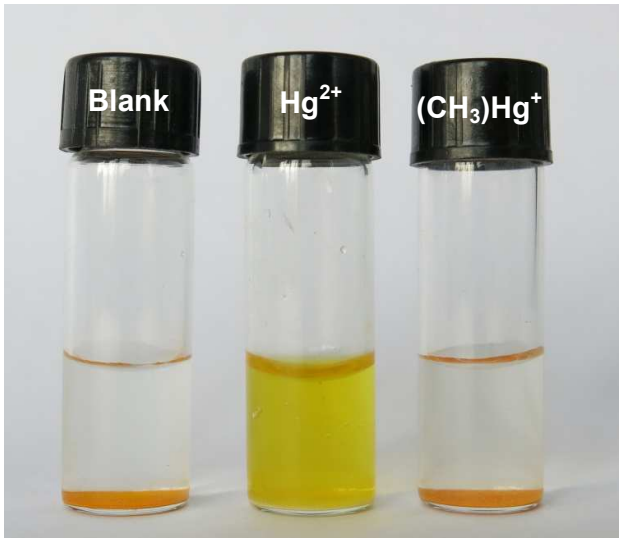

Figure S6. The photos comparing the interactions between RuMOFs and mercury species: inorganic mercury ion (Hg^{2+}) and methylmercury ion (CH_3Hg^+). The concentrations of $HgCl_2$ and CH_3HgCl were all 100 μM. The blank sample: RuMOFs in pure water.

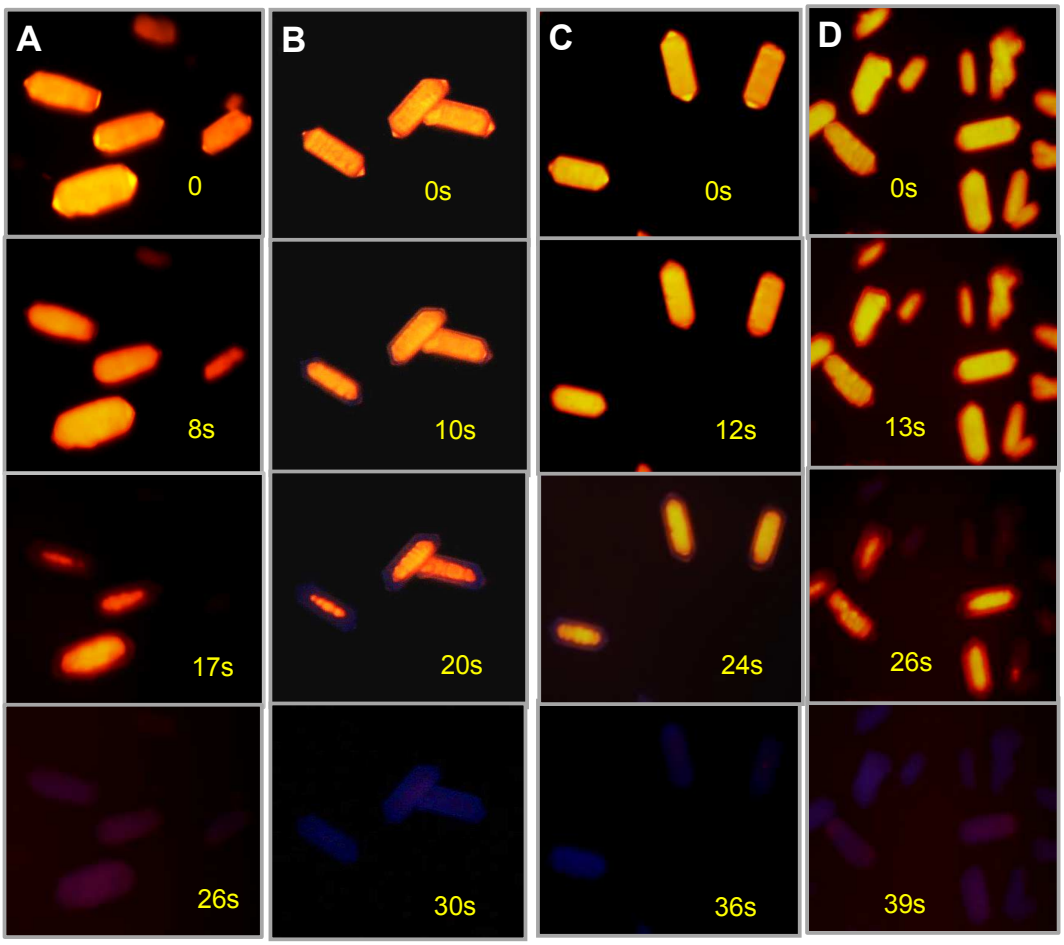

Figure S7. Fluorescence microscopic images obtained during $Ru(bpy)_3^{2+}$ release from RuMOFs at different Hg^{2+} concentrations: (A) 200 μM; (B) 100 μM; (C) 25 μM; (D) 10 μM.

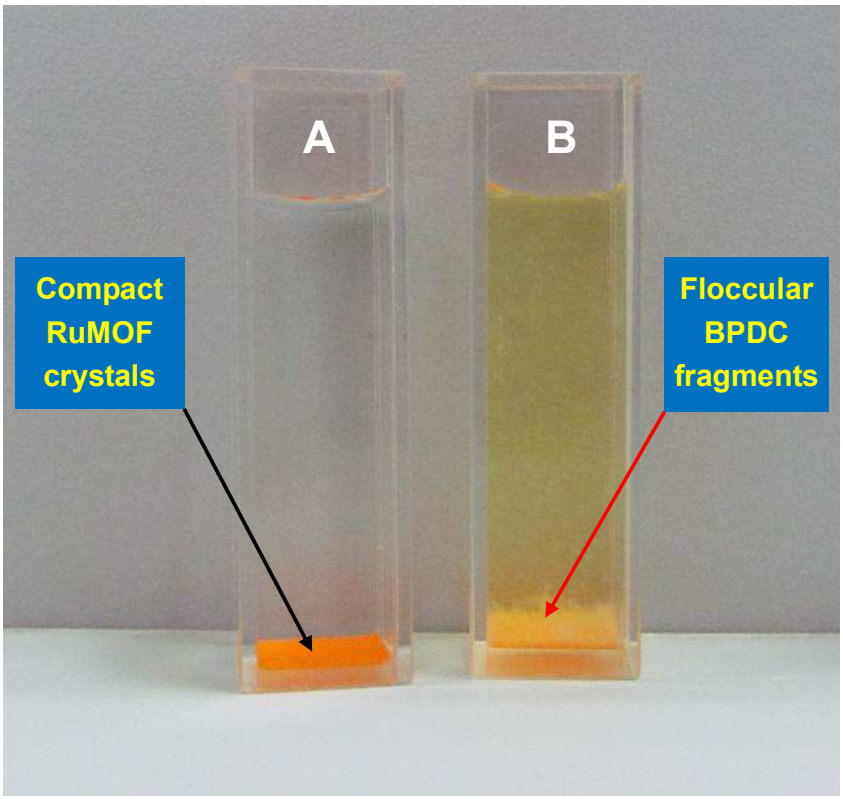

Figure S8. Photos taken for RuMOFs 12 hours after adding: (A) pure water; (B) Hg^{2+} solution.

Table S1. The amounts of $Ru(bpy)_3^{2+}$ released from RuMOFs in the presence of various concentrations of Hg^{2+} and induced release efficiencies (molar ratio of $Ru(bpy)_3^{2+}$ to Hg^{2+})

C_{Hg}^{2+} (pM)	$C_{Ru(bpy)3}^{2+}$ (μM)	$R_{Ru/Hg} = C_{Ru(bpy)3}^{2+}/C_{Hg}^{2+}$
1	*5.47*	*5470000*
2.5	*6.11*	*2440000*
10	*7.58*	*758000*
25	*10.0*	*400000*
50	*16.0*	*320000*
75	*19.7*	*263000*
100	*25.6*	*256000*
250	*32.2*	*128000*
500	*38.9*	*77800*
2500	*48.3*	*19300*
5000	*56.3*	*11300*
10000	*62.1*	*6210*
50000	*72.2*	*1440*

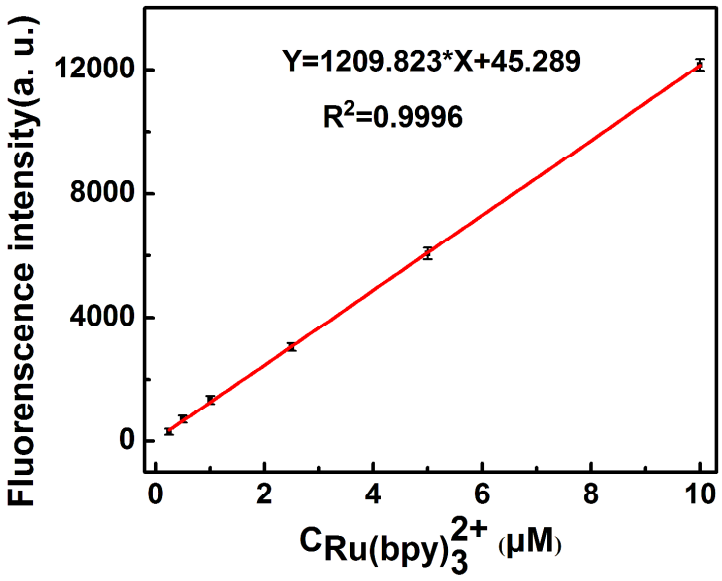

Figure S9. The standard working curve for FL determination of $Ru(bpy)_3^{2+}$ in aqueous solution.

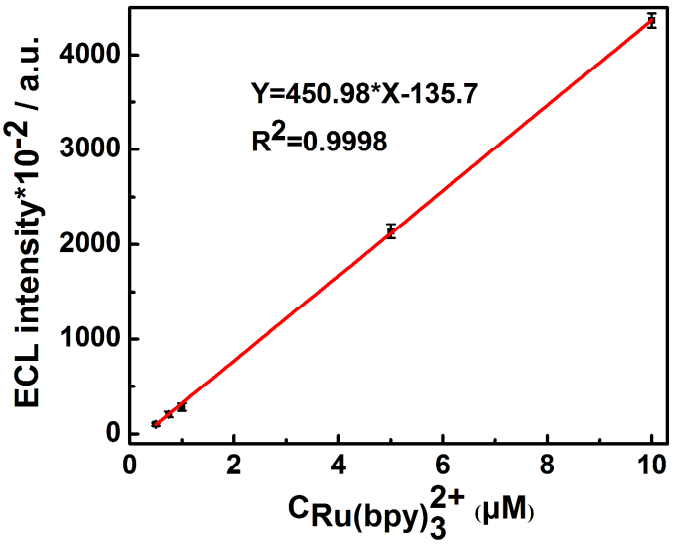

Figure S10. The standard working curve ECL determination of $Ru(bpy)_3^{2+}$ in aqueous solution.

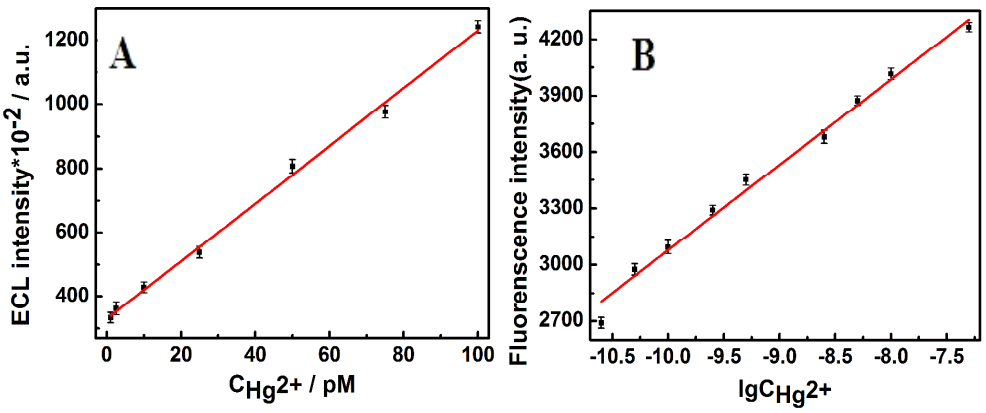

Figure S11. (A) The calibration plots of ECL intensity vs Hg^{2+} concentration (A) and FL intensity vs Hg^{2+} concentration (B)