Supporting Information

for

Bispyrene/Surfactant Assemblies as Fluorescent Sensor Platform: Detection and Identification of Cu^{2+} and Co^{2+} in Aqueous Solution

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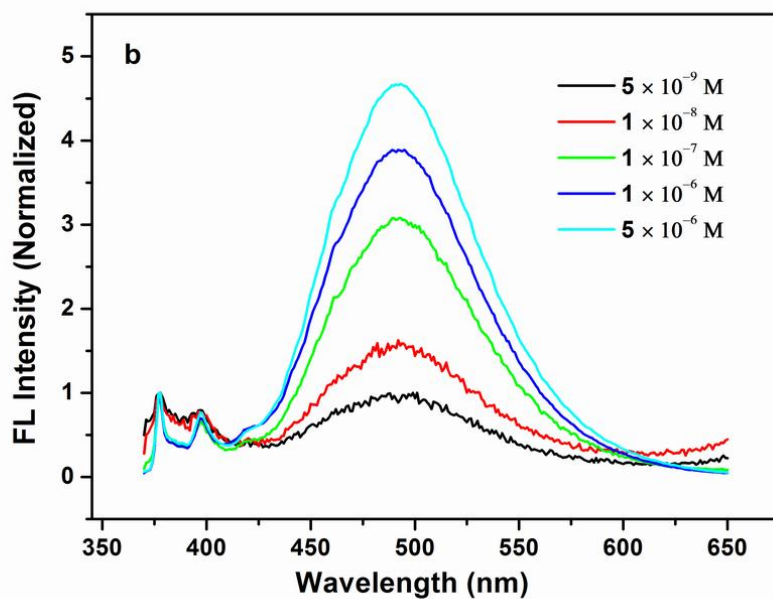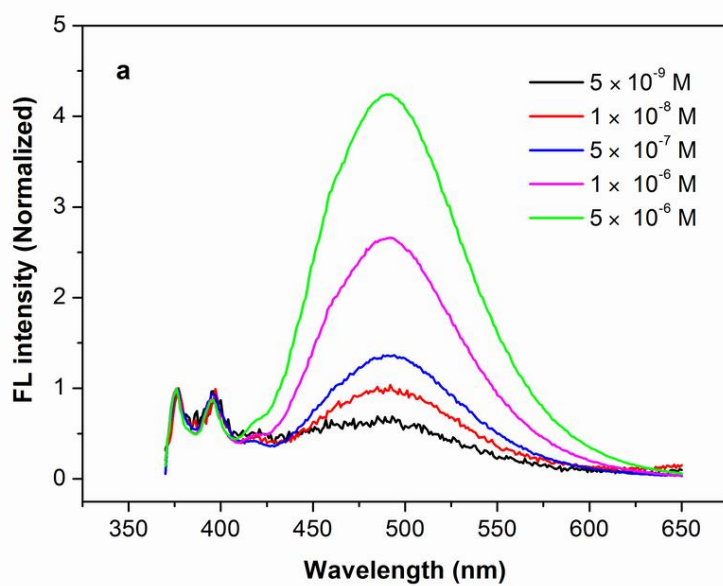
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Figure S1. Fluorescence emission spectra of Py-diIM-Py at various concentration in water (a) and in SDS aqueous solution (b, C_{SDS} = 4.0 mM) (normalized with respect to peak 1 of monomer emission at 380 nm, λex = 345 nm)

Figure S2a. Fluorescence spectra of Py-diIM-Py/SDS upon titration of copper ions in aqueous solution (C_{SDS} = 1.0 mM, λex = 345 nm). Inset: Fluorescence ratio, I_0/I, of the sensor system upon concentration of Cu^{2+} in aqueous solution. Note: I_0 and I represent fluorescence intensity in the absence and presence of Cu^{2+}, respectively.

Figure S2b. Fluorescence spectra of Py-diIM-Py/SDS upon titration of copper ions in aqueous solution (C_{SDS} = 2.0 mM, λex = 345 nm). Inset: Fluorescence ratio, I_0/I, of the sensor system upon concentration of Cu^{2+} in aqueous solution. Note: I_0 and I represent fluorescence intensity in the absence and presence of Cu^{2+}, respectively.
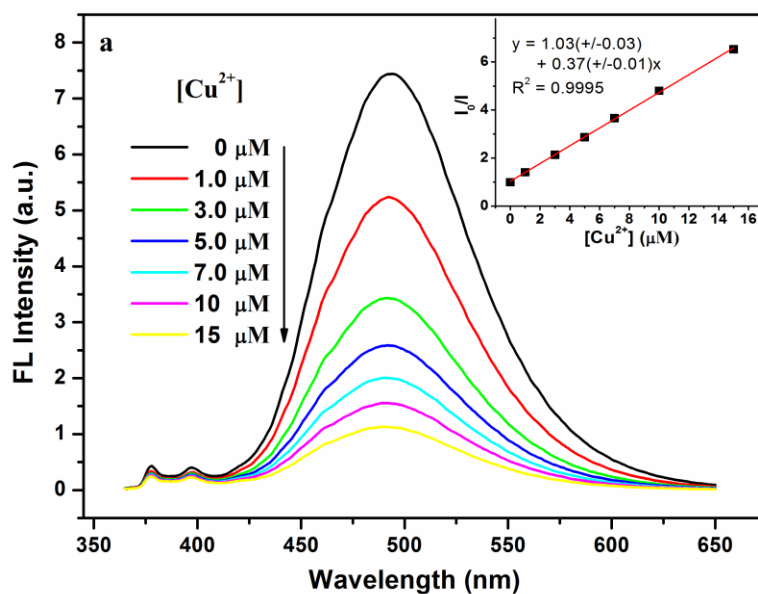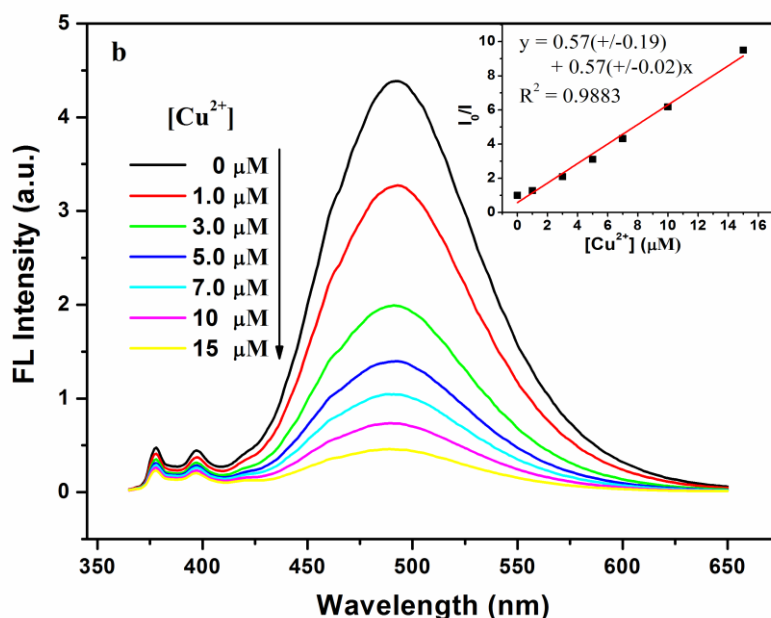
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Figure S2c. Fluorescence spectra of Py-diIM-Py/SDS upon titration of copper ions in aqueous solution (C_{SDS} = 3.0 mM, λex = 345 nm). Inset: Fluorescence ratio, I_0/I, of the sensor system upon concentration of Cu^{2+} in aqueous solution. Note: I_0 and I represent fluorescence intensity in the absence and presence of Cu^{2+}, respectively.
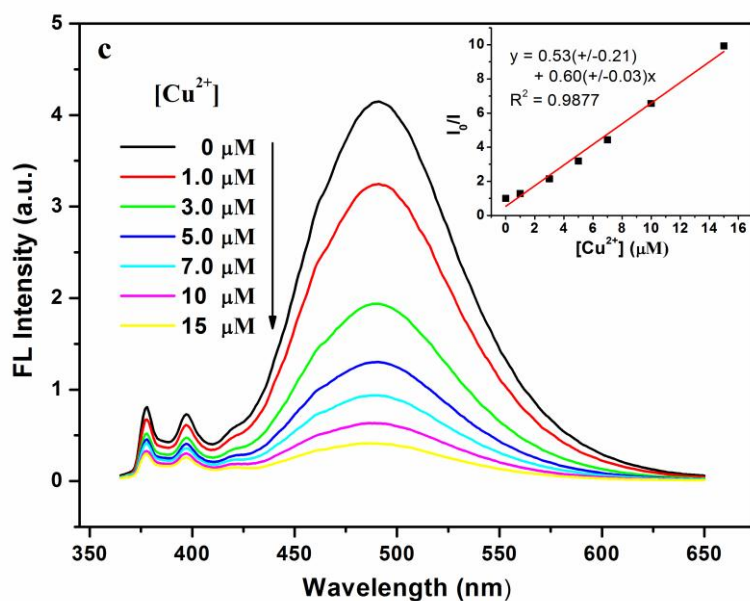

Figure S2d. Fluorescence spectra of Py-diIM-Py/SDS upon titration of copper ions in aqueous solution (C_{SDS} = 4.0 mM, λex = 345 nm). Inset: Fluorescence ratio, I_0/I, of the sensor system upon concentration of Cu^{2+} in aqueous solution. Note: I_0 and I represent fluorescence intensity in the absence and presence of Cu^{2+}, respectively.
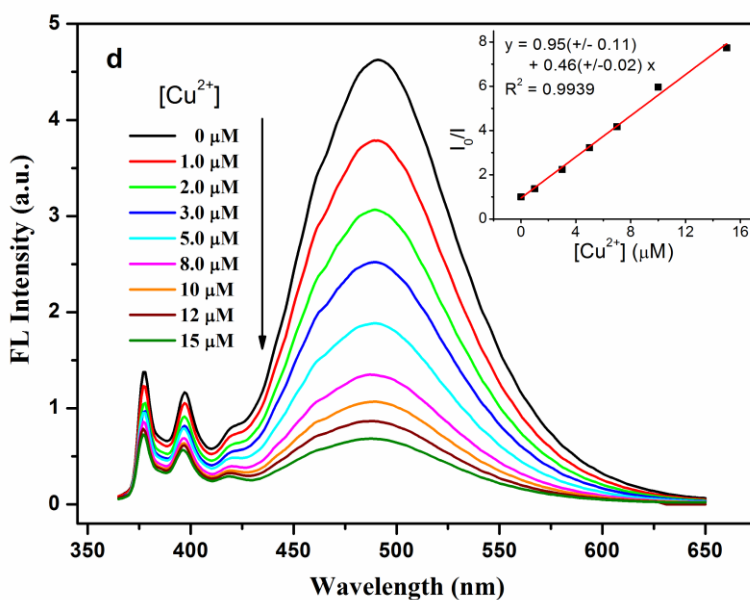
Figure S2e. Fluorescence spectra of Py-diIM-Py/SDS upon titration of copper ions in aqueous solution (C_{SDS} = 5.0 mM, λex = 345 nm). Inset: Fluorescence ratio, I_0/I, of the sensor system upon concentration of Cu^{2+} in aqueous solution. Note: I_0 and I represent fluorescence intensity in the absence and presence of Cu^{2+}, respectively.
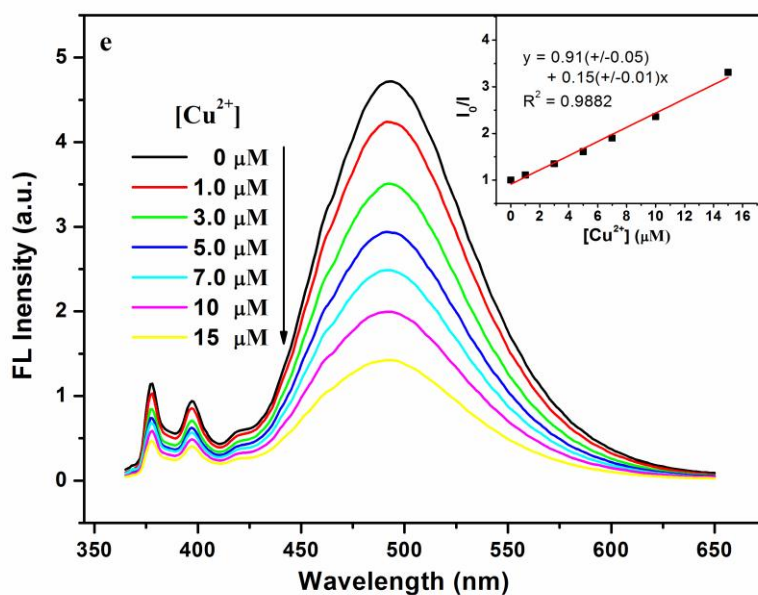

Figure S2f. Fluorescence spectra of Py-diIM-Py/SDS upon titration of copper ions in aqueous solution (C_{SDS} = 6.0 mM, λex = 345 nm). Inset: Fluorescence ratio, I_0/I, of the sensor system upon concentration of Cu^{2+} in aqueous solution. Note: I_0 and I represent fluorescence intensity in the absence and presence of Cu^{2+}, respectively.
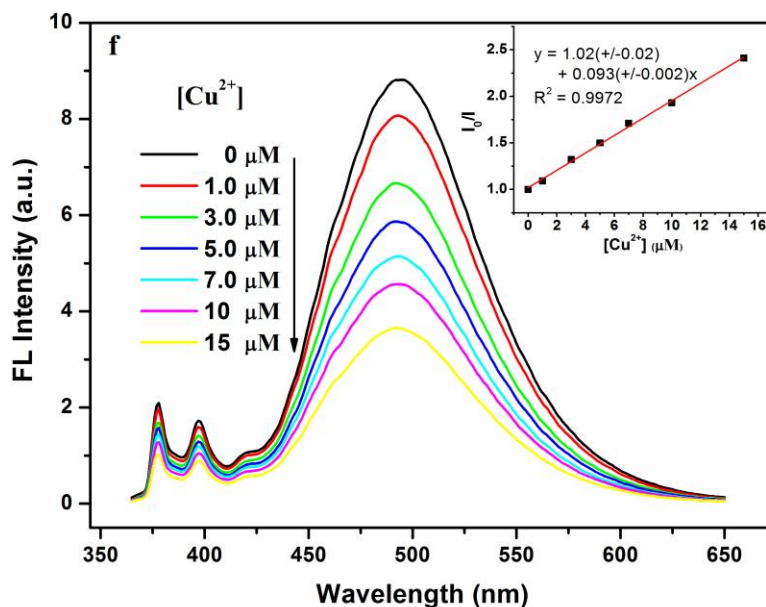
Figure S2g. Fluorescence spectra of Py-diIM-Py/SDS upon titration of copper ions in aqueous solution (C_{SDS} = 8.0 mM, λex = 345 nm). Inset: Fluorescence ratio, I_0/I, of the sensor system upon concentration of Cu^{2+} in aqueous solution. Note: I_0 and I represent fluorescence intensity in the absence and presence of Cu^{2+}, respectively.
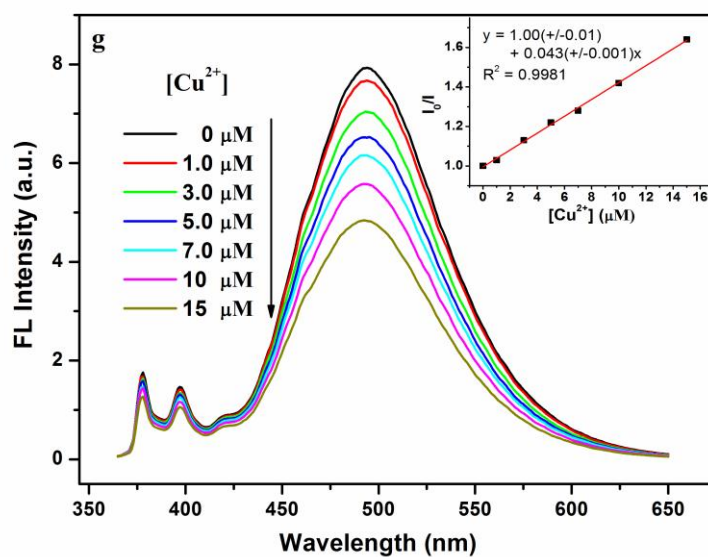

Figure S2h. Fluorescence spectra of Py-diIM-Py/SDS upon titration of copper ions in aqueous solution (C_{SDS} = 10 mM, λex = 345 nm). Inset: Fluorescence ratio, I_0/I, of the sensor system upon concentration of Cu^{2+} in aqueous solution. Note: I_0 and I represent fluorescence intensity in the absence and presence of Cu^{2+}, respectively.
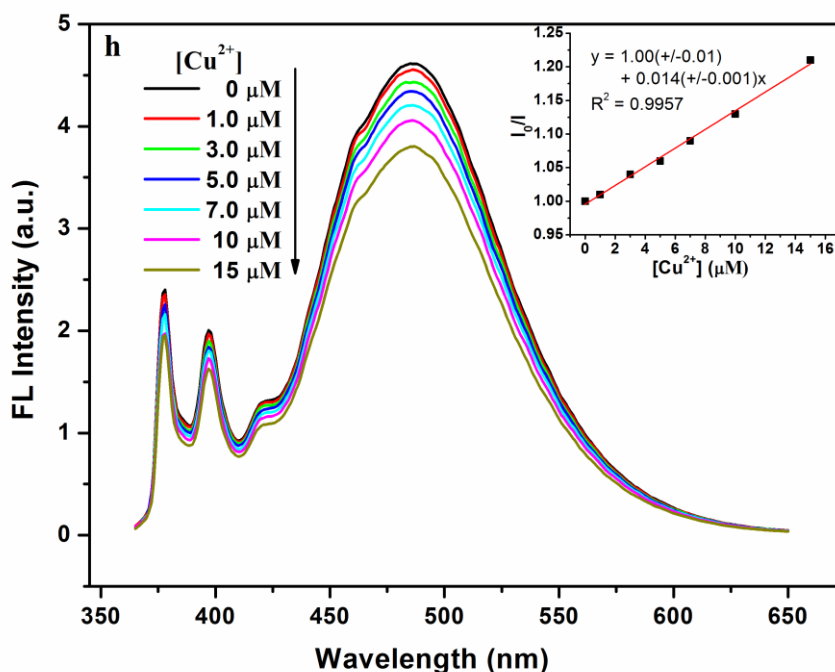
Figure S2i. Fluorescence spectra of Py-diIM-Py/SDS upon titration of copper ions in aqueous solution (C_{SDS} = 12 mM, λex = 345 nm). Inset: Fluorescence ratio, I_0/I, of the sensor system upon concentration of Cu^{2+} in aqueous solution. Note: I_0 and I represent fluorescence intensity in the absence and presence of Cu^{2+}, respectively.
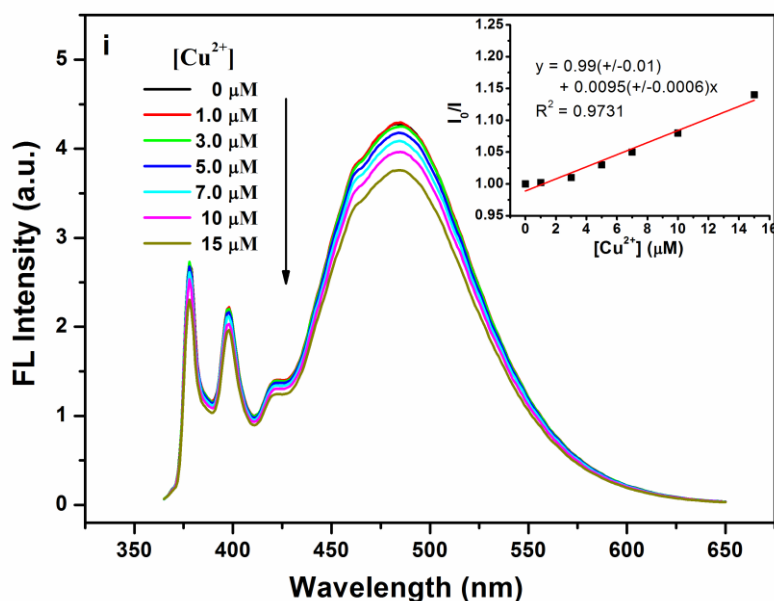

Figure S3. Fluorescence spectra of Py-diIM-Py/SDS upon titration of cobalt ions in aqueous solution (C_{SDS} = 4 mM, λex = 345 nm). Inset: Fluorescence ratio, I_0/I, of the sensor system upon concentration of Co^{2+} in aqueous solution. Note: I_0 and I represent fluorescence intensity in the absence and presence of Co^{2+}, respectively.
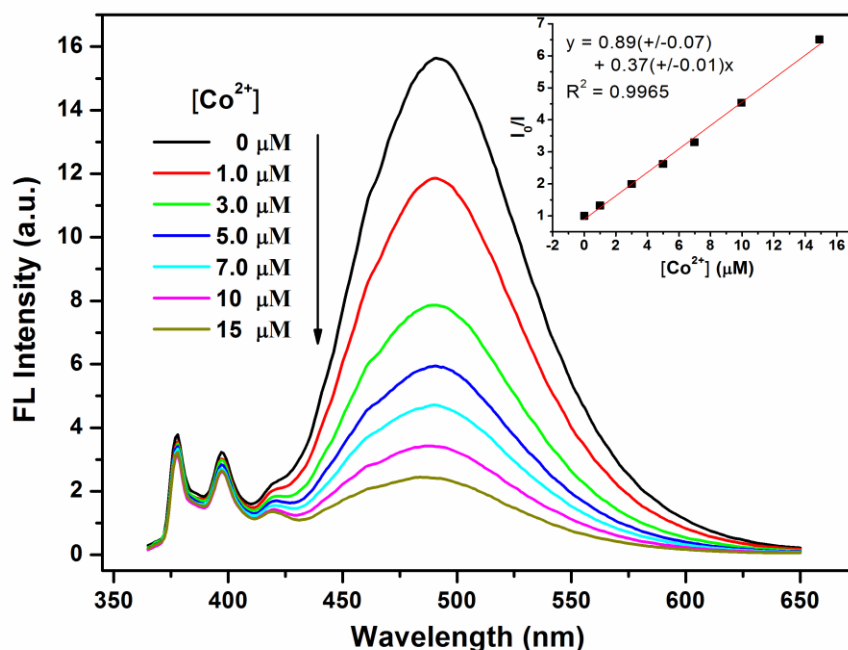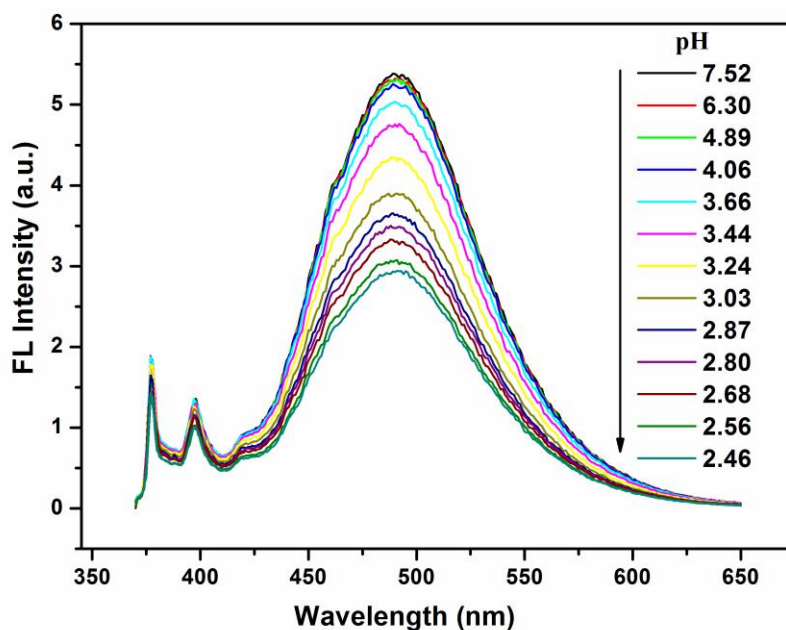
Fig. S4 pH effect on the fluorescence emission of Py-diIM-Py/SDS assemblies ([Py-diIM-Py] = 1.0 μM; [SDS] = 4.0 mM).
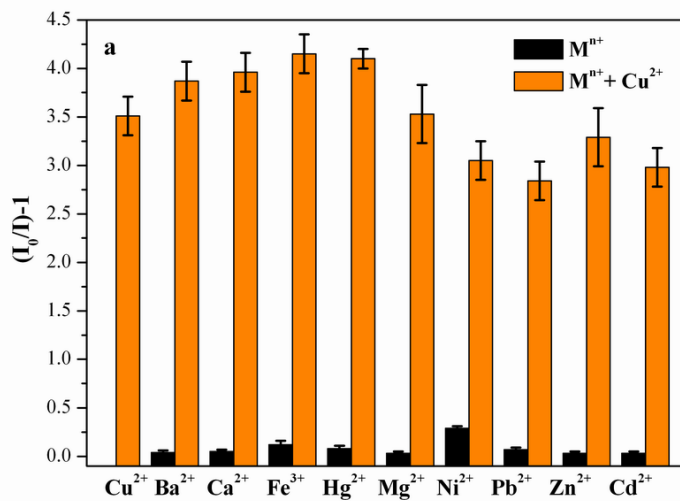

Fig. S5a Fluorescence responses of Py-diIM-Py/SDS to competing metal ions (10 μM, black bars,) and to Cu^{2+} (10 μM, orange bars) in the presence of each competing metal ion (10 μM) in water ([Py-diIM-Py] = 1.0 μM; [SDS] = 4.0 mM, λ_{ex} = 345 nm).
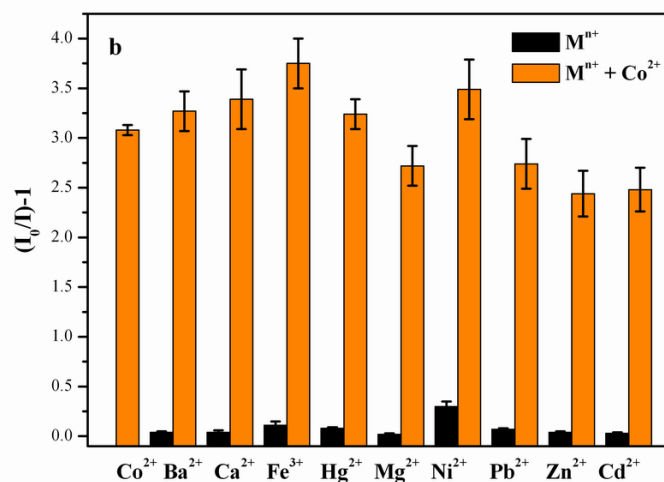
Fig. S5b Fluorescence responses of Py-diIM-Py/SDS to competing metal ions (10 µM, black bars,) and to Co^{2+} (10 µM, orange bars) in the presence of each competing metal ion (10 µM) in water ([Py-diIM-Py] = 1.0 µM; [SDS] = 4.0 mM, λ_{ex} = 345 nm).
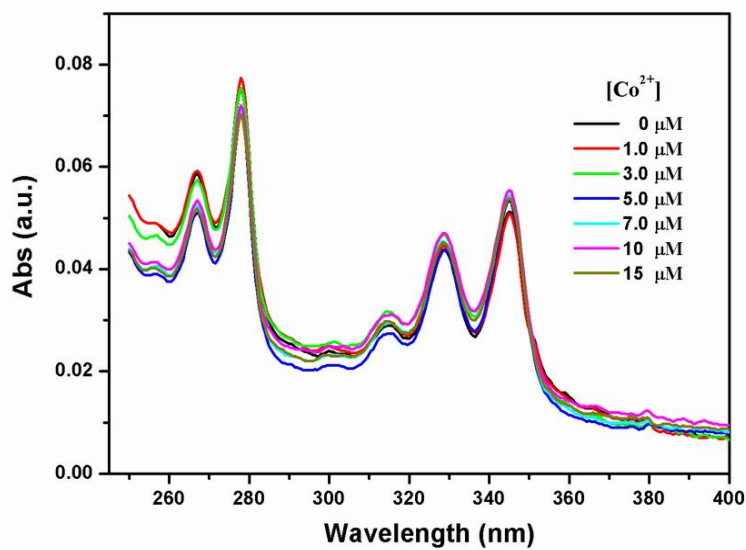

Figure S6. UV-vis absorption spectra of Py-diIM-Py/SDS upon titration of Co^{2+} ions in aqueous solution ([Py-diIM-Py] = 1.0 µM, [SDS] = 4.0 mM)
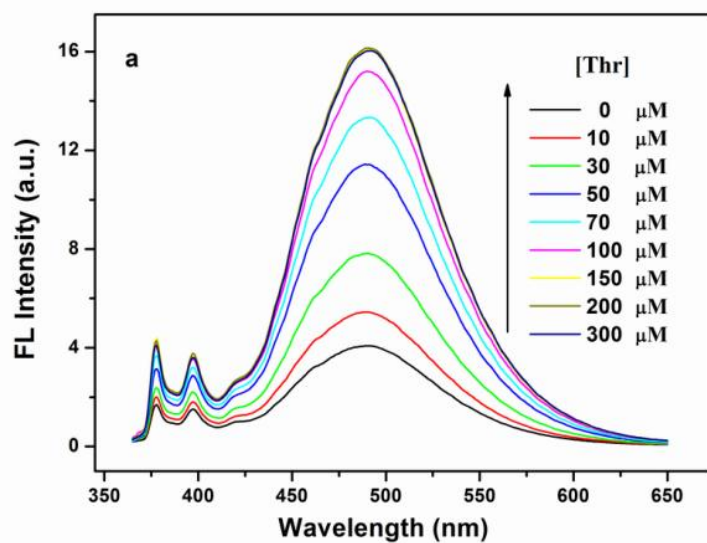
Figure S7a. Fluorescence spectra of Py-diIM-Py/SDS/Cu^{2+} upon addition of threonine in aqueous solution ([Py-diIM-Py] = 1.0 μM, [SDS] = 4.0 mM, [Cu^{2+}] = 15 μM, λex = 345 nm).

Figure S7b. Fluorescence spectra of Py-diIM-Py/SDS/Cu^{2+} upon addition of serine in aqueous solution ([Py-diIM-Py] = 1.0 μM, [SDS] = 4.0 mM, [Cu^{2+}] = 15 μM, λex = 345 nm).

Figure S7c. Fluorescence spectra of Py-diIM-Py/SDS/Cu^{2+} upon addition of arginine in aqueous solution ([Py-diIM-Py] = 1.0 μM, [SDS] = 4.0 mM, [Cu^{2+}] = 15 μM, λex = 345 nm).
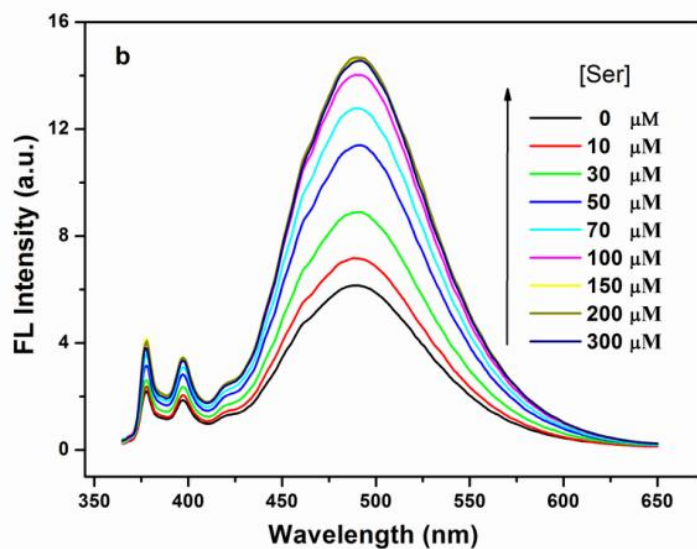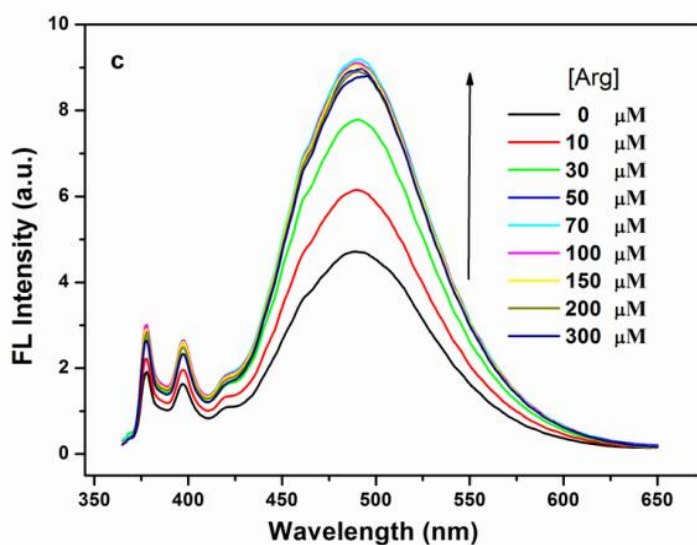

Figure S7d. Fluorescence spectra of Py-diIM-Py/SDS/Cu^{2+} upon addition of lysine in aqueous solution ([Py-diIM-Py] = 1.0 μM, [SDS] = 4.0 mM, [Cu^{2+}] = 15 μM, λex = 345 nm).

Figure S7e. Fluorescence spectra of Py-diIM-Py/SDS/Cu^{2+} upon addition of aspartic acid in aqueous solution ([Py-diIM-Py] = 1.0 μM, [SDS] = 4.0 mM, [Cu^{2+}] = 15 μM, λex = 345 nm).

Figure S7f. Fluorescence spectra of Py-diIM-Py/SDS/Cu^{2+} upon addition of glutamic acid in aqueous solution ([Py-diIM-Py] = 1.0 μM, [SDS] = 4.0 mM, [Cu^{2+}] = 15 μM, λex = 345 nm).
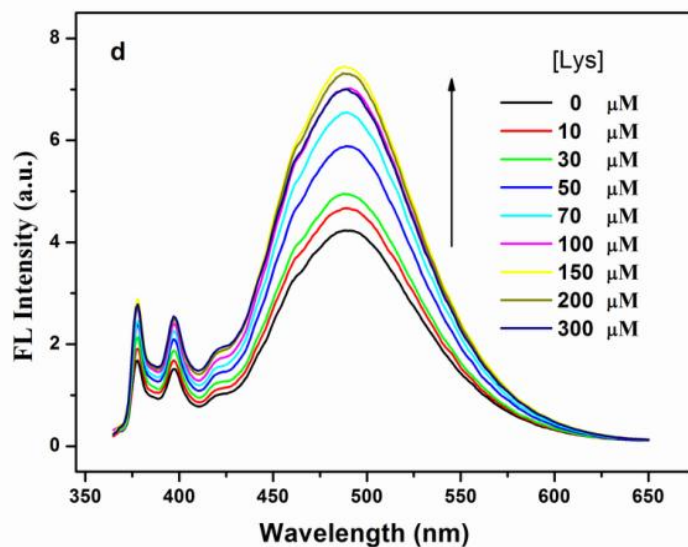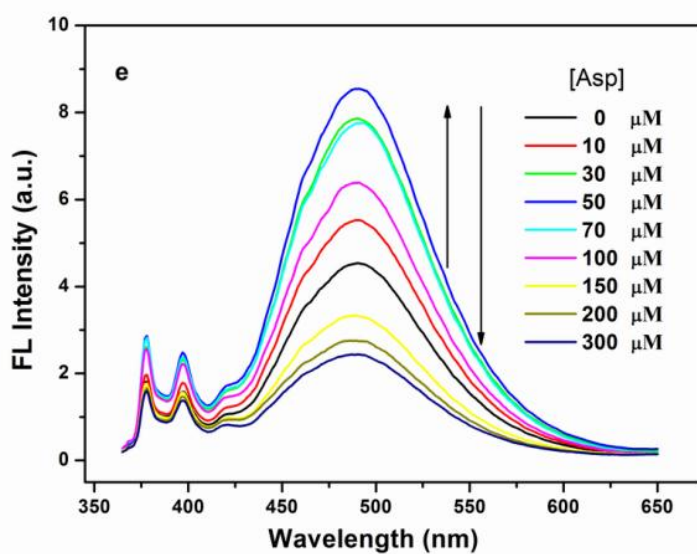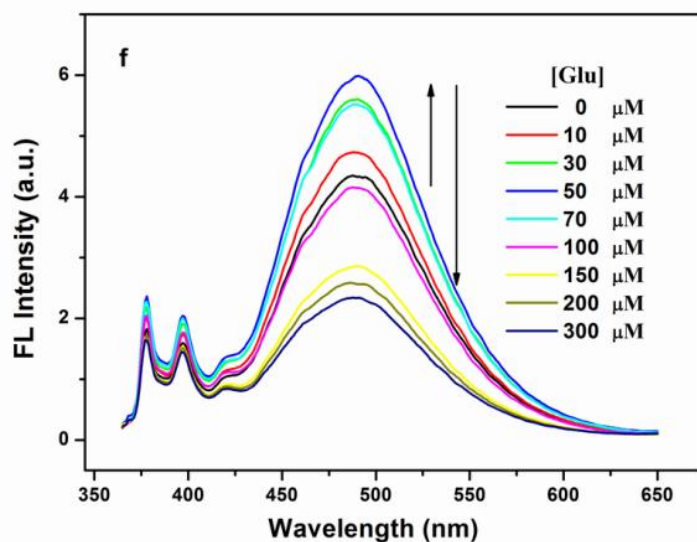
Figure S7g. Fluorescence spectra of Py-diIM-Py/SDS/Cu^{2+} upon addition of leucine in aqueous solution ([Py-diIM-Py] = 1.0 μM, [SDS] = 4.0 mM, [Cu^{2+}] = 15 μM, λex = 345 nm).

Figure S7h. Fluorescence spectra of Py-diIM-Py/SDS/Cu^{2+} upon addition of proline in aqueous solution ([Py-diIM-Py] = 1.0 μM, [SDS] = 4.0 mM, [Cu^{2+}] = 15 μM, λex = 345 nm).

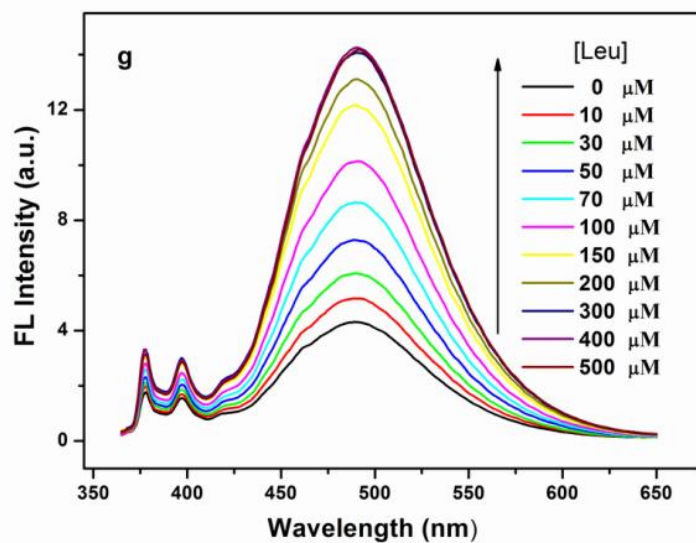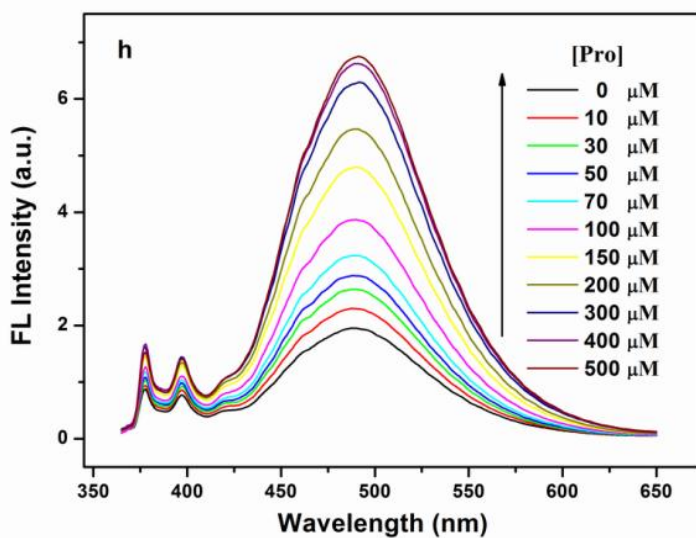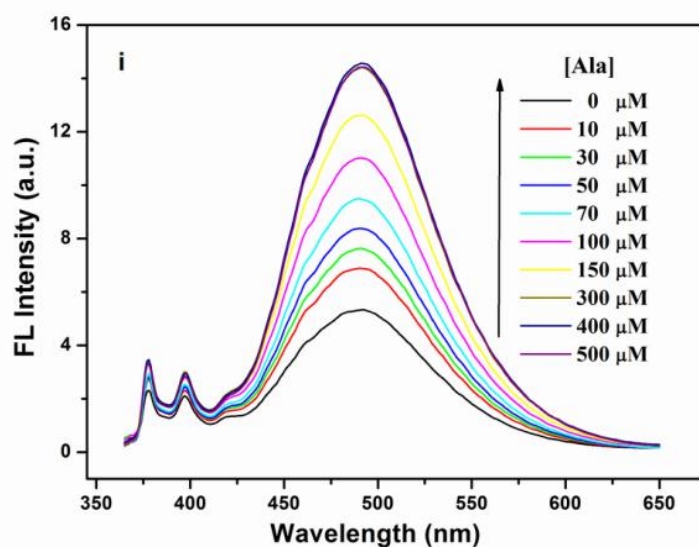**Figure S7i**. Fluorescence spectra of Py-diIM-Py/SDS/Cu^{2+} upon addition of alamine in aqueous solution ([Py-diIM-Py] = 1.0 μM, [SDS] = 4.0 mM, [Cu^{2+}] = 15 μM, λex = 345 nm).
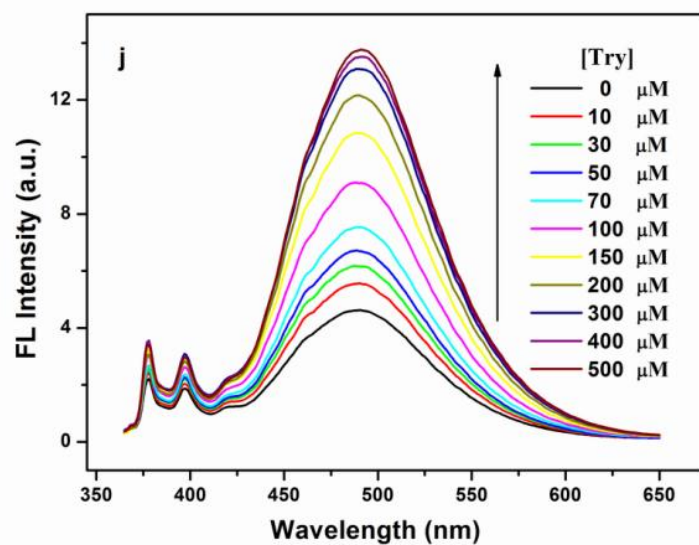

Figure S7j. Fluorescence spectra of Py-diIM-Py/SDS/Cu^{2+} upon addition of tryptophan in aqueous solution ([Py-diIM-Py] = 1.0 μM, [SDS] = 4.0 mM, [Cu^{2+}] = 15 μM, λex = 345 nm).

Table S1 pH values of Py-diIM-Py/SDS assemblies in the absence and presence of metal ions at different concentration

	Cu^{2+}	Co^{2+}	Ba^{2+}	Ca^{2+}	Fe^{3+}	Hg^{2+}	Mg^{2+}	Ni^{2+}	Pb^{2+}	Zn^{2+}	Cd^{2+}
0 μM	7.51	7.49	7.42	7.51	7.46	7.42	7.42	7.52	7.52	7.49	7.51
5 μM	7.24	7.46	7.40	7.41	7.32	7.30	7.40	7.50	7.41	7.50	7.51
10 μM	7.13	7.38	7.32	7.38	7.21	7.22	7.38	7.48	7.33	7.47	7.50
15 μM	7.10	7.26	7.21	7.21	7.17	7.18	7.30	7.41	7.21	7.45	7.40