Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.
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Electronic Supplementary Information (ESI)

1. Experimental

All reagents are purchased from commercial suppliers and used as received without further purification. The absorption spectra are recorded using a UV-2600 spectrophotometer (Shimadzu) with quartz cuvettes of 1 cm pathlength. Fluorescence spectra are obtained using a LS-55 Fluorescence spectrophotometer (PerkinElmer) at room temperature. The hydrodynamic size distribution and zeta potentials are tested using zetasizer nano series (Malvern) at room temperature. The BET surface areas of **DPAS** and **FAS** are measured by Micromeritics (ASAP 2020 HD88) under nitrogen. The SEM pictures of **DPAS** dots and **FAS** dots are taken by SU-70 scanning electron microscope (HITACHI).

In AIE property measurement, aliquot 50 μL stock solution (1mM) was added to a 5.0 mL flask with different amount of water and THF following our previous report. The aggregates of **FAS** and **DPAS** (AIE dots) were prepared by adding 25μL stock solution to 2.5 mL water in stirring at 1000 r/s for 30 seconds, when their fluorescence gave maximum emission intensity for measurement.

In metal ion sensor measurement, all the ClO_4^- salts of respective ions were dissolved in 5 mL aqueous solution (1 mmol). The spectra of AIE dots without any ions were defined as "Blank" in 2.5 mL water containing 25 μL stock solution, and the different metal ion (about 50 μL) was added to the "Blank" for investigating the selectivity and anti-interference ability. Herein, the concentration of anion is 5 times of that of probe. In fluorescence titration experiment, the concentration of ion was diluted to a specified concentration and added to the mixture gradually in proportion. To the composite probe, the excessive of Cu^{2+} (5 eq) was added to AIE dots above, and the specified concentration of Hg^{2+}injected to the mixture gradually in proportion. Herein, $Cu(ClO_4)_2$, $Hg(ClO_4)_2$, $AgClO_4$, $Fe(ClO_4)_3$, $Zn(ClO_4)_2$, $Co(ClO_4)_2$, $Pb(ClO_4)_2$, $Mn(ClO_4)_2$, $Ni(ClO_4)_2$, $Ba(ClO_4)_2$, $Cd(ClO_4)_2$, $Mg(ClO_4)_2$, $Al(ClO_4)_3$ and $Ca(ClO_4)_2$ were chosen.

2. AIE property and application in fluorescence imaging

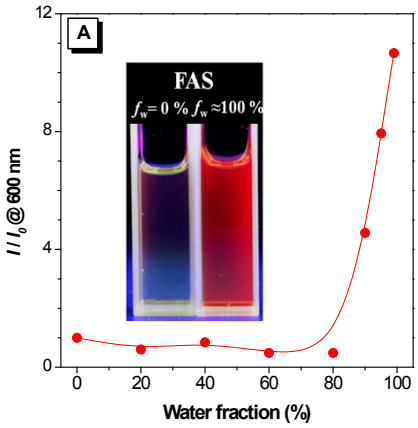

Fig. S1 (A) the plot of I/I_0*versus* water fractions of **FAS**, where I_0 is the PL intensity in pure THF solution (Inset: fluorescence image atf_w= 0% and f_w≈ 100%)

3. The hydrodynamic size distribution and zeta potentials of two AIE dots and them with metal ions

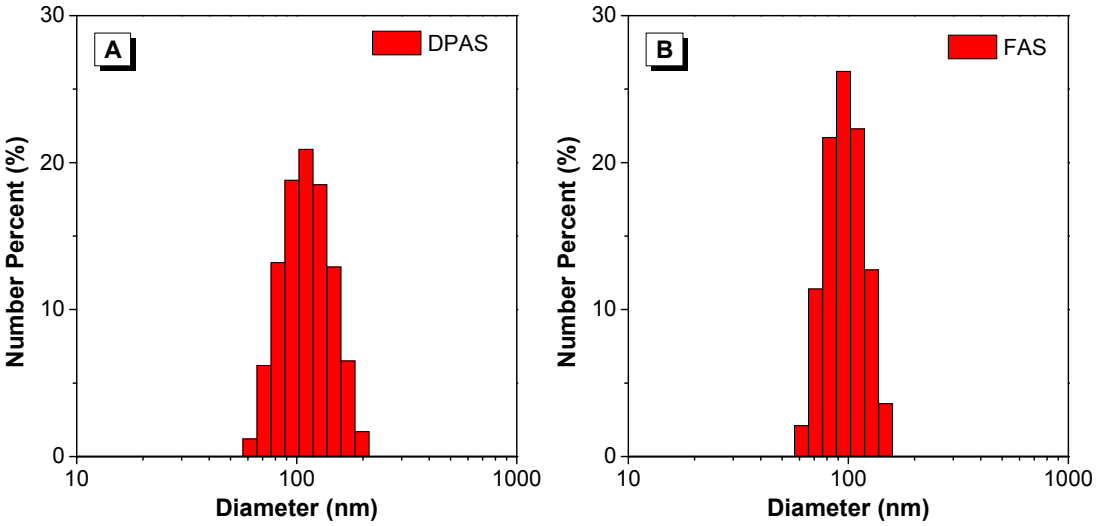

Fig. S2 The diameter distributions of (A) **DPAS** dots and (B) **FAS** dots in aqueous solution.

Table S1. The diameters and zeta potentials of two AIE dots

Samples	**DPAS**	**FAS**
Size (nm)	197.6	204.2
Zeta (mV)	-31.2	-24.9

4. Crystal structures of FAS and DPAS

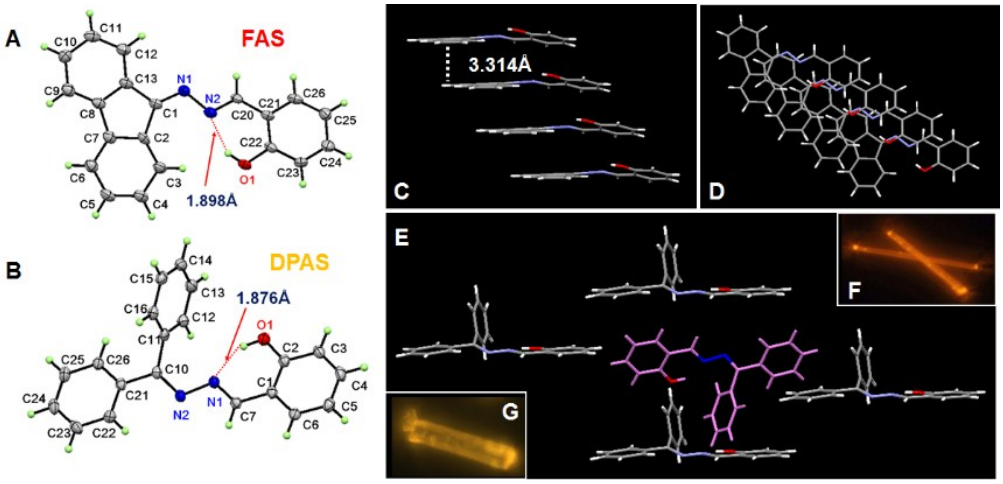

Fig. S3 The ORTEP drawings of single crystal structures of(A) **FAS** (CCDC 1432238) and (B) **DPAS** (CCDC 1432239). Molecular packing patterns of **FAS** (C: side view, D: top view) and **DPAS** (E: side view) in the crystalline state. The fluorescence images of crystals (F) **FAS** and (G) **DPAS**. (Copyright 2016 American Chemical Society)

5. The SEM pictures of DPAS dots and FAS dots

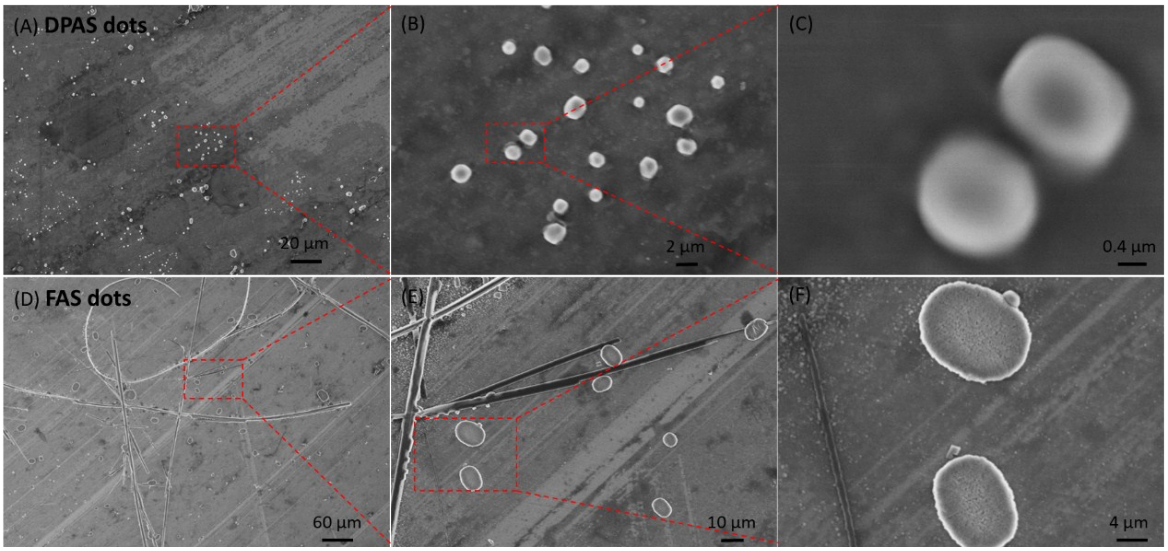

Fig. S4 The SEM pictures of (A) **DPAS** dots and (B, C) the enlarged images; (D) **FAS** dots and (E, F) the enlarged images in aqueous solution.

6. The effects of pH buffered conditions

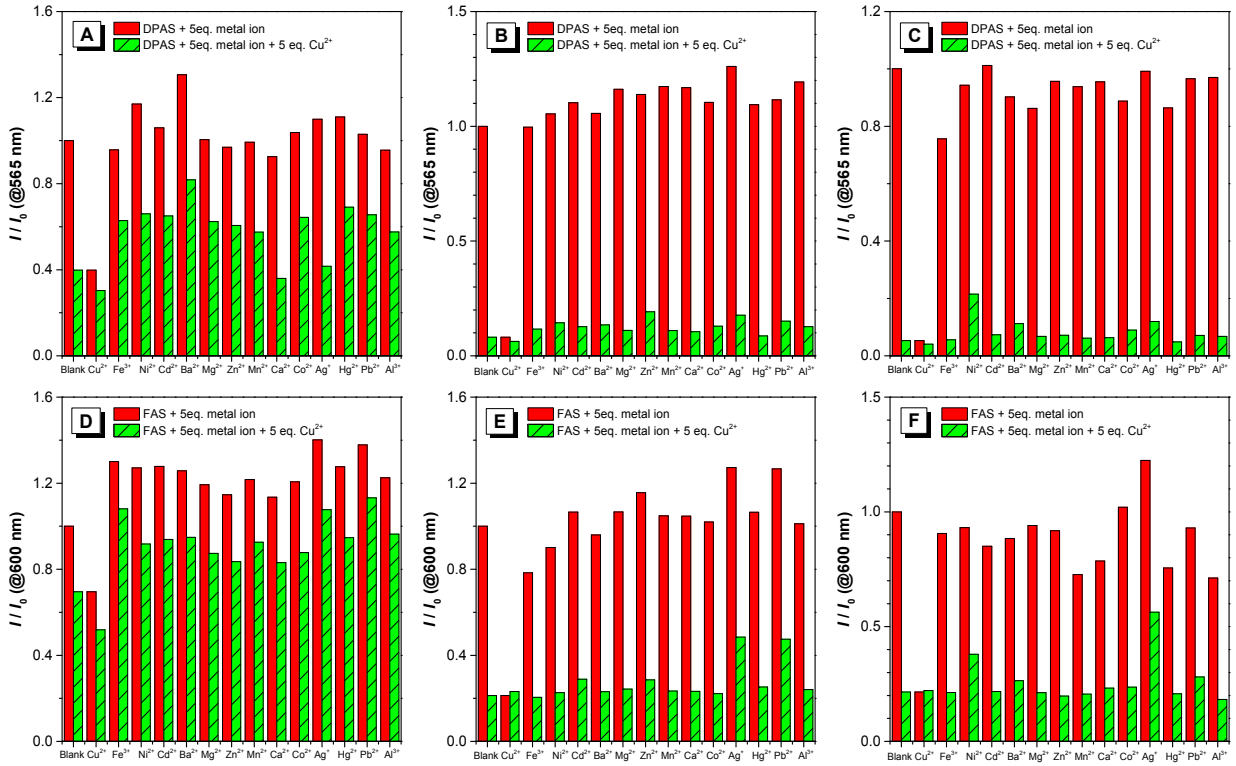

Fig. S5 The histogram analysis of DPAS (A-C) and FAS (D-F) dots upon addition of the single anion or the mixture of Cu^{2+} and other interfering ions (5 eq.) at varied pH values of 4.86 (A, D), 7.4 (B, E) and 9.3 (C, F), where I_0 is the PL intensity of the naked probe at 565 nm for **DPAS** or 600 nm for **FAS** (defined as "Blank").

7. Metal ions sensing properties of FAS

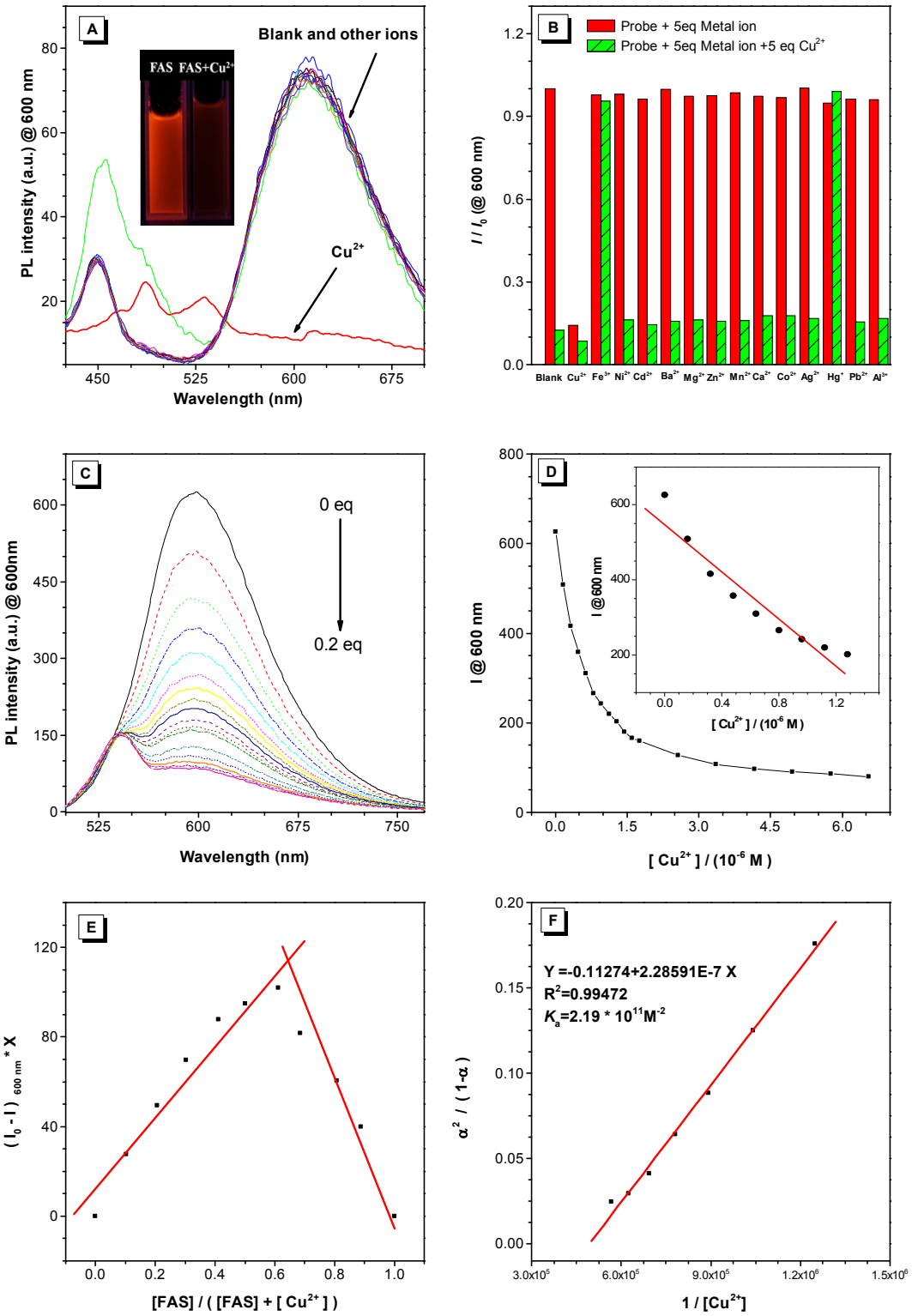

Fig. S6. (A) The changes of PL spectra of **FAS** in the mixture (f_w≈100 %) upon addition of 5 eq respective ions (as their ClO_4^- salts); (B) The histogram analysis of receptor **FAS** upon addition of the single anion or the mixture of Cu^{2+} and other interfering ions (5 eq), where I_0 is the PL intensity of the naked probe at 600 nm (defined as "Blank"); (C) The changes in PL spectra of **FAS** upon addittion of various of Cu^{2+} (from 0 eq to 0.2 eq); (D) The curve of PL change as a function of Cu^{2+} concentrations; (E) The job plot of **FAS-Cu^{2+}** complexes, where the emission intensity at 600 nm is plotted against mole fraction of **FAS**; (F) The plot of **FAS** with Cu^{2+} in f_w ≈100 % mixture solution. (Inset: A, the fluorescence images of **FAS** soltuons with and without excess Cu^{2+}; D, the linear range of PL change).

8. Absorption of fluorescent probes and their complexes

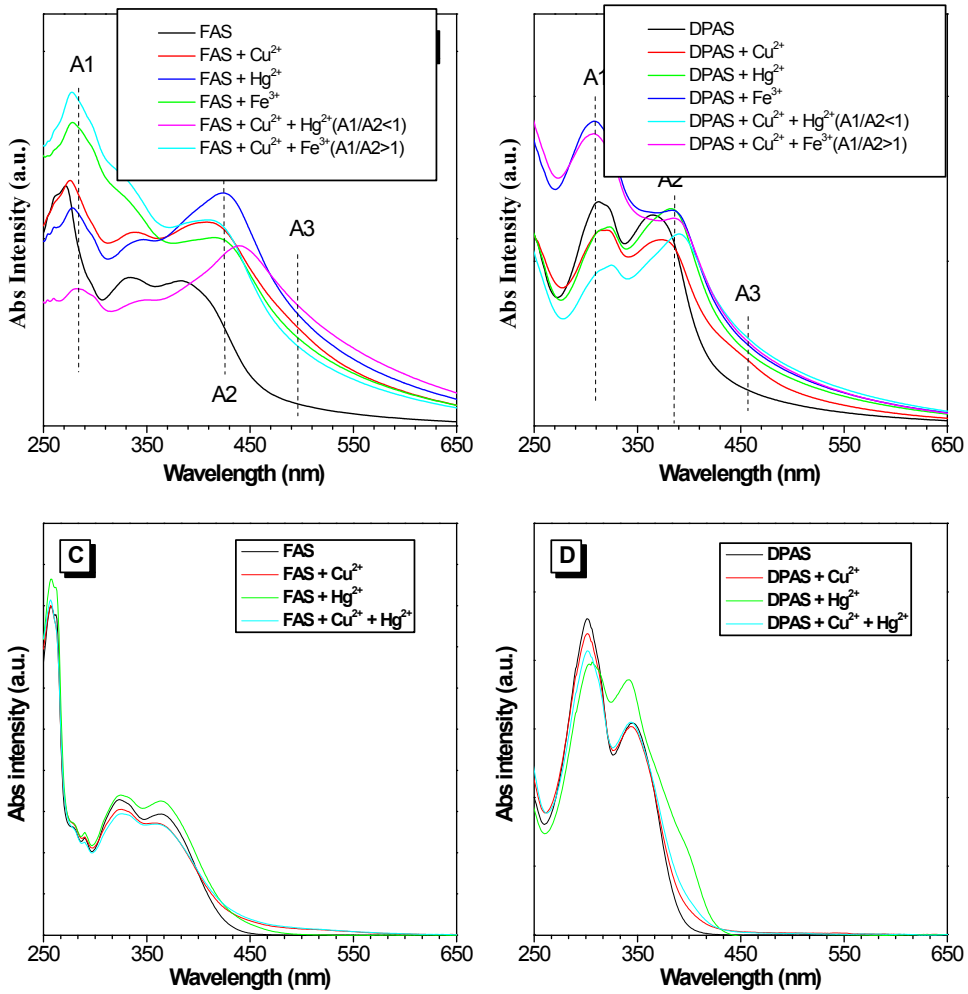

Fig. S7 The absorption spectra of FAS (A) and DPAS (B) dots in aqueous solution, and the absorption spectra of FAS (C) and DPAS (D) dots in CH_3CN solution (upon addition of Cu^{2+} and Hg^{2+}).

9. Hg^{2+} sensing properties of FAS

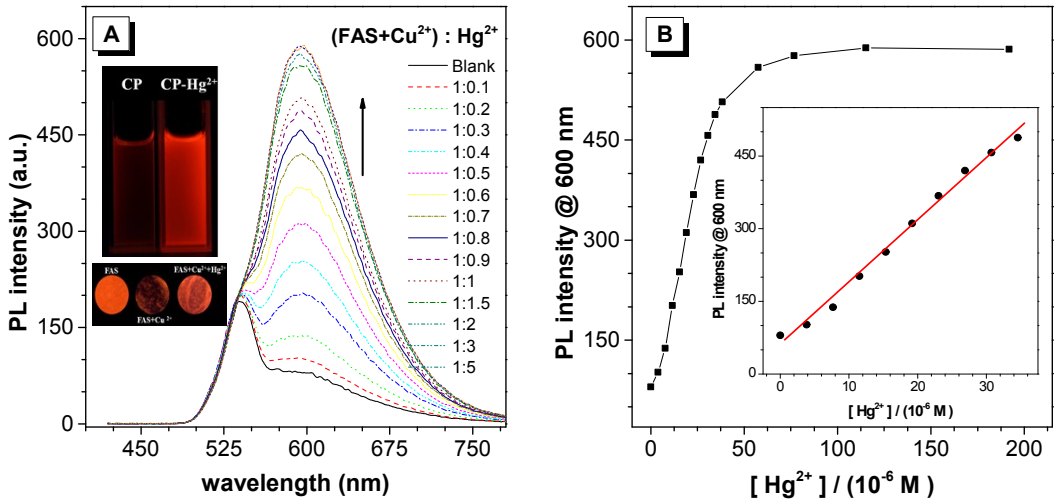

Fig. S8 (A) The changes in PL spectra of **FAS-Cu^{2+}** upon addittion of various of Hg^{2+} (from 0.1 eq to 1.5 eq); (B) The curve of PL change as a function of Hg^{2+} concentrations. (Inset: A, the fluorescence images of **FAS-Cu^{2+}** solution with and without excess Hg^{2+}; solid-state fluorescence response in test paper of **FAS** (1 mM), **FAS-Cu^{2+}** (1:5) and **FAS-Cu^{2+}-Hg^{2+}** (1:5:5) under UV light).

10. *Job plots* of FAS-Cu^{2+} and DPAS-Cu^{2+} to Hg^{2+}

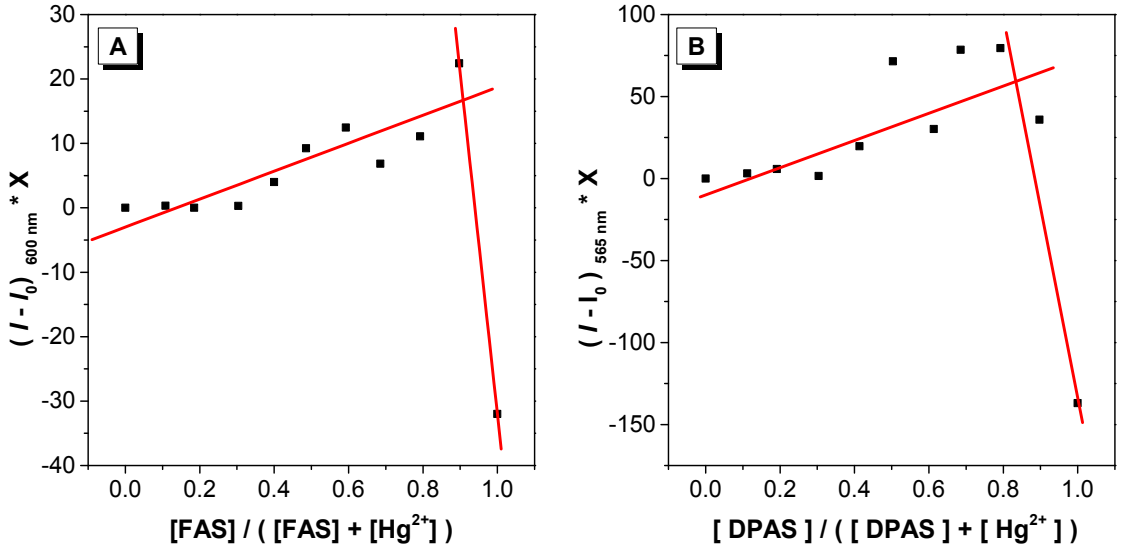

Fig. S9 The *job plots* of **FAS+Cu^{2+}**/Hg^{2+} (A) and **FAS+Cu^{2+}**/Hg^{2+} (B) complexes, where the emission intensity at 600 nm or 565 nm is plotted against mole fraction of **FAS** or **DPAS**.

11. NMR spectra of DPAS and its complexes

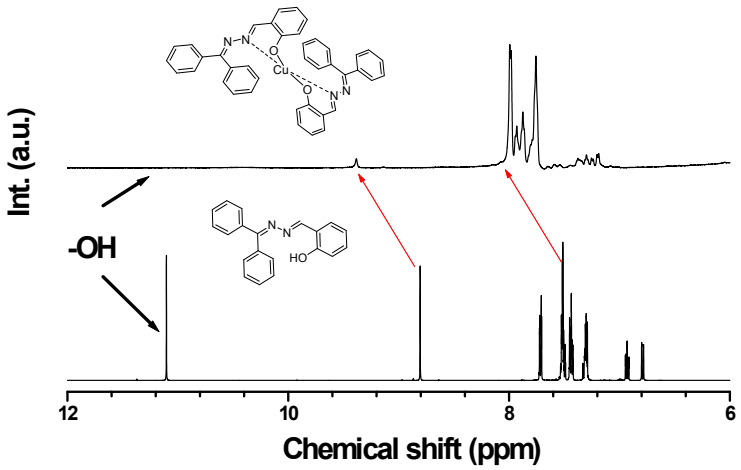

Fig. S10 ^{1}H NMR spectra of **DPAS** and its possible structure binding with Cu^{2+} (adding 5 eq. of Cu^{2+} in CD_3CN) in CD_3CN

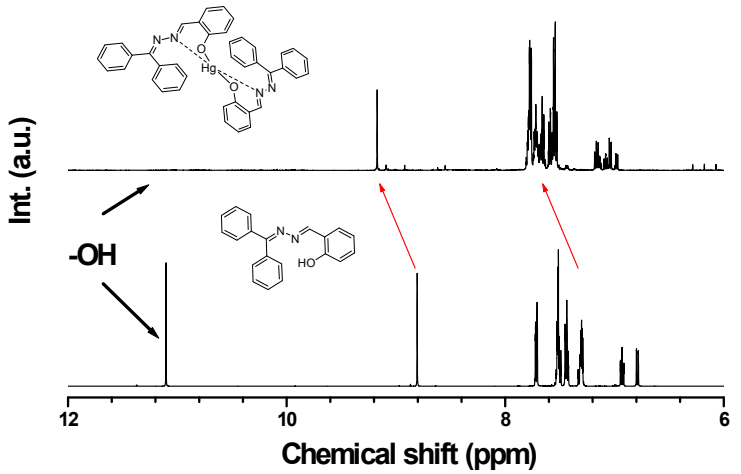

Fig. S11 ^{1}H NMR spectra of **DPAS** and its possible structure binding withHg^{2+} (adding 5 eq. of Hg^{2+} in CD_3CN) in CD_3CN.