Supplementary material

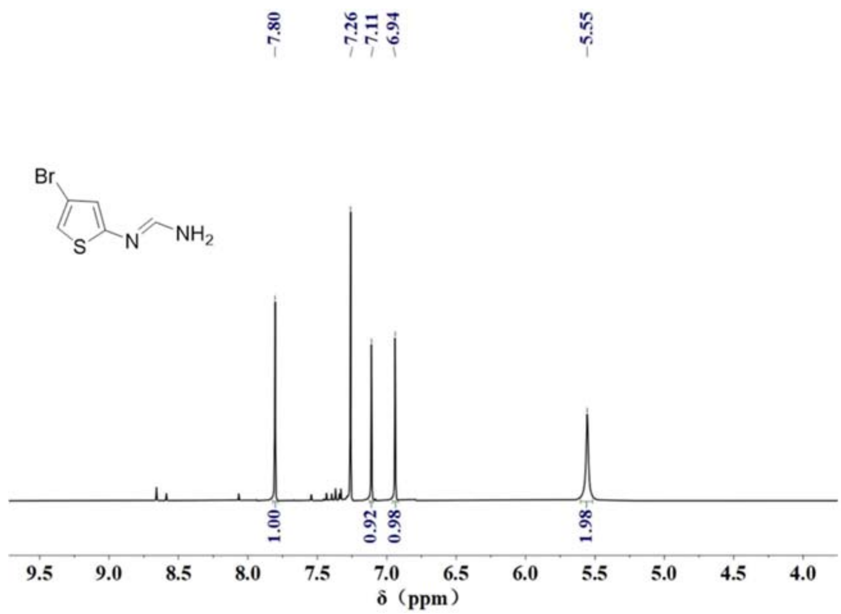

Figure S1: [1]H NMR spectrum of A2.

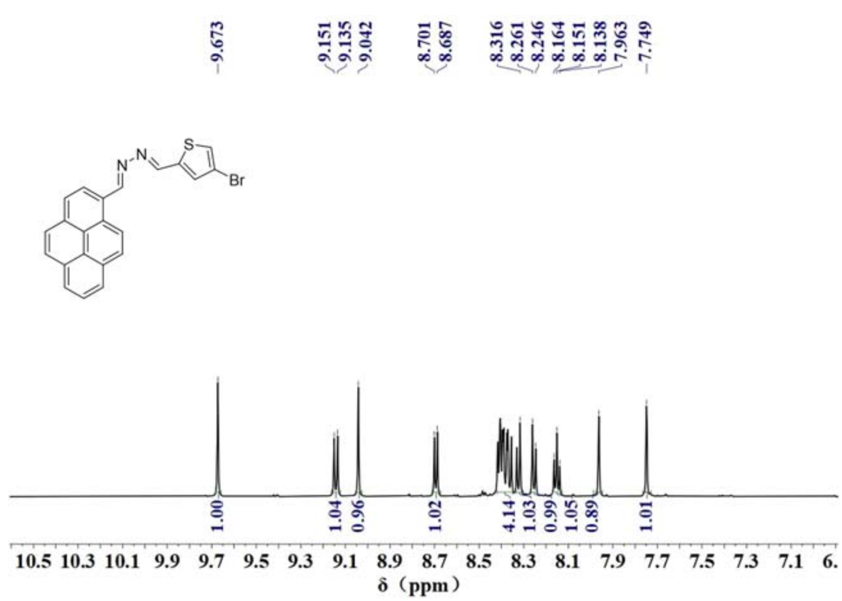

Figure S2: [1]H NMR spectrum of A4.

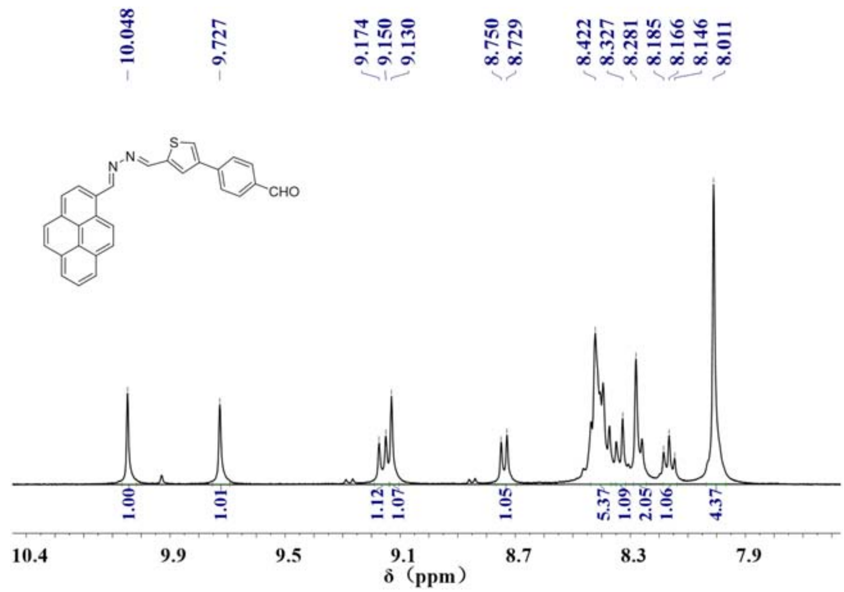

Figure S3: ^{1}H NMR spectrum of A6.

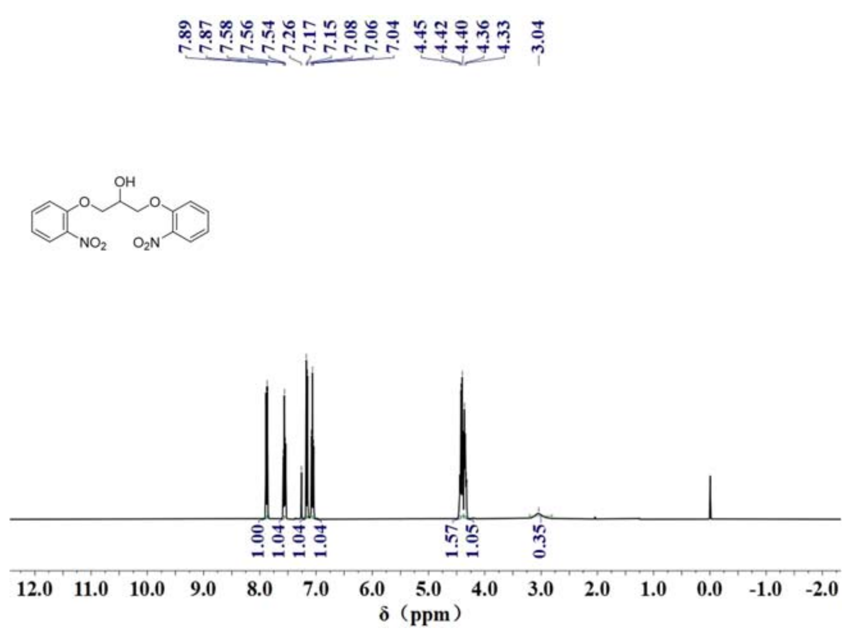

Figure S4: ^{1}H NMR spectrum of B3.

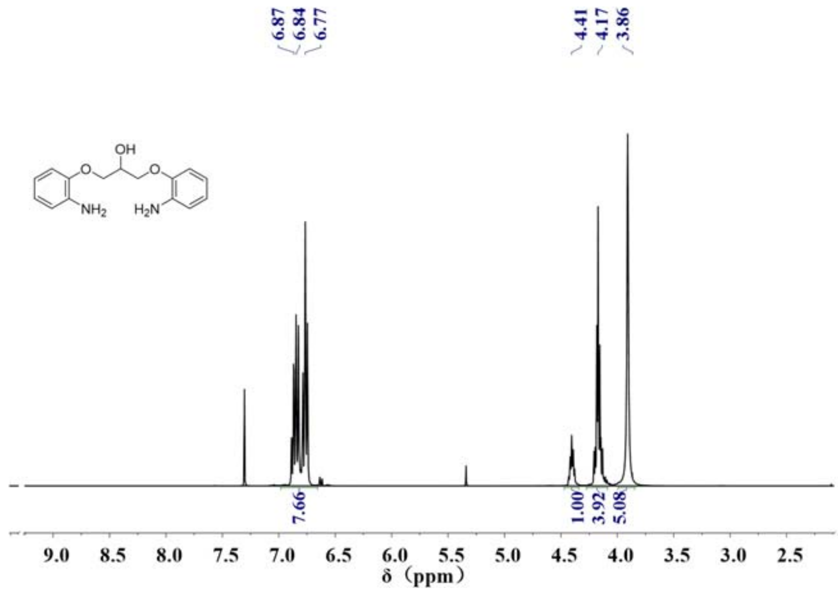

Figure S5: ^{1}H NMR spectrum of B4.

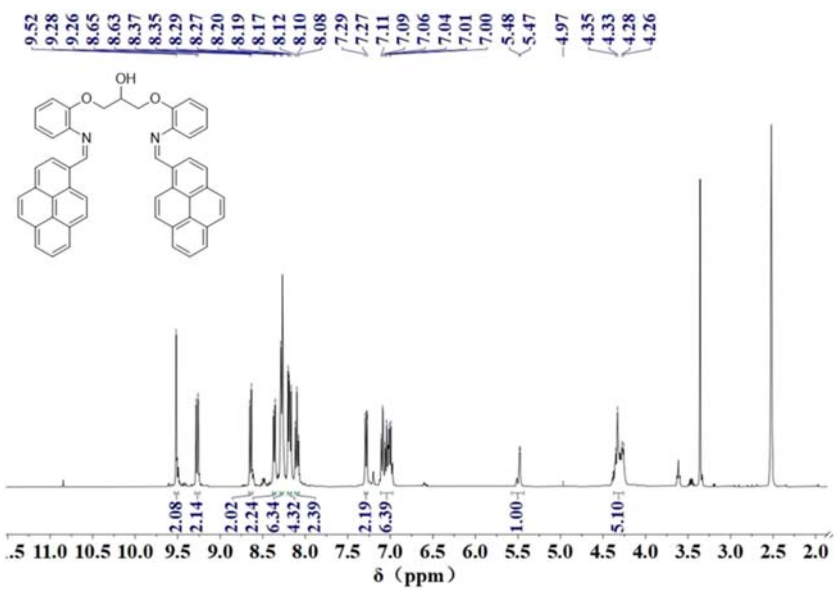

Figure S6: ^{1}H NMR spectrum of B5.

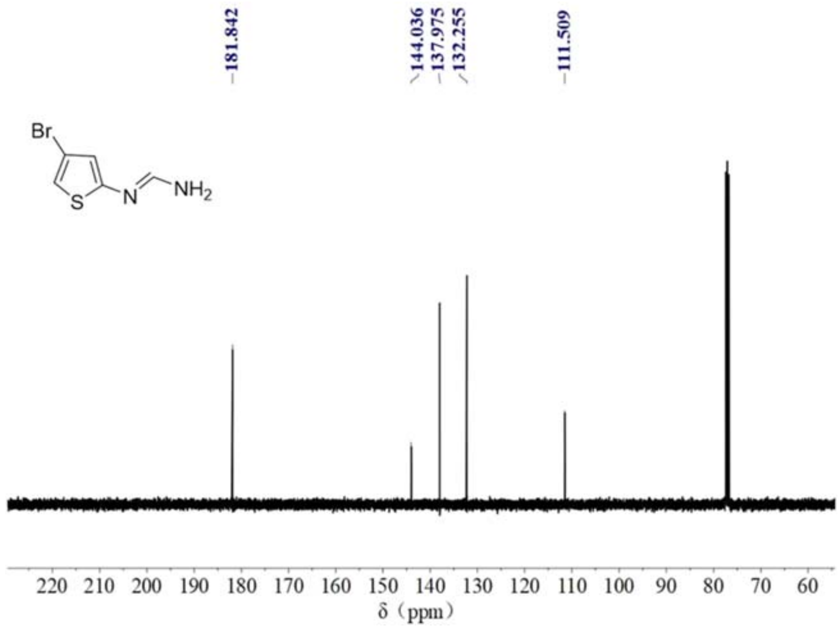

Figure S7: ^{13}C NMR spectrum of A2.

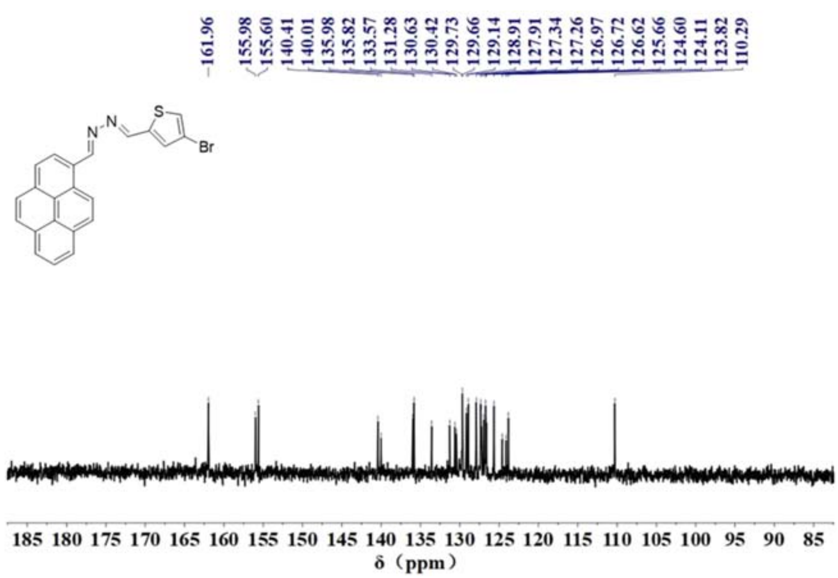

Figure S8: ^{13}C NMR spectrum of A4.

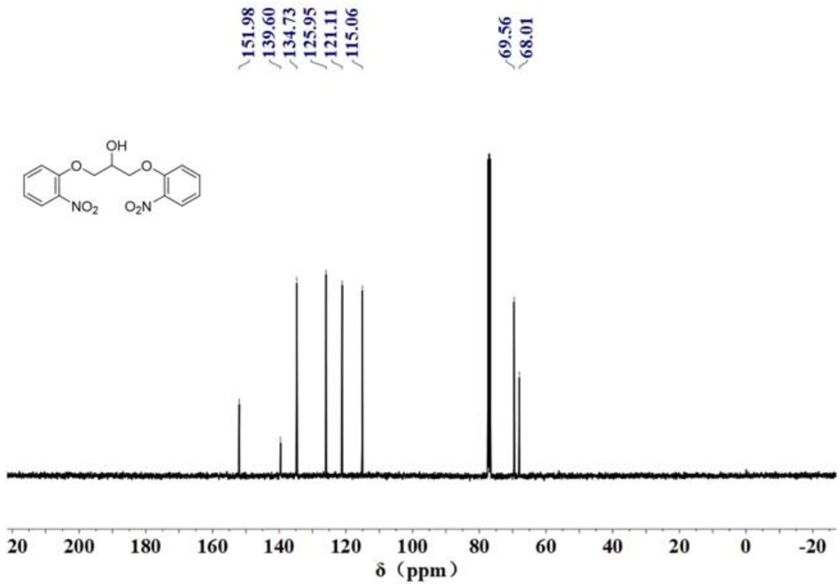

Figure S9: ^{13}C NMR spectrum of B3.

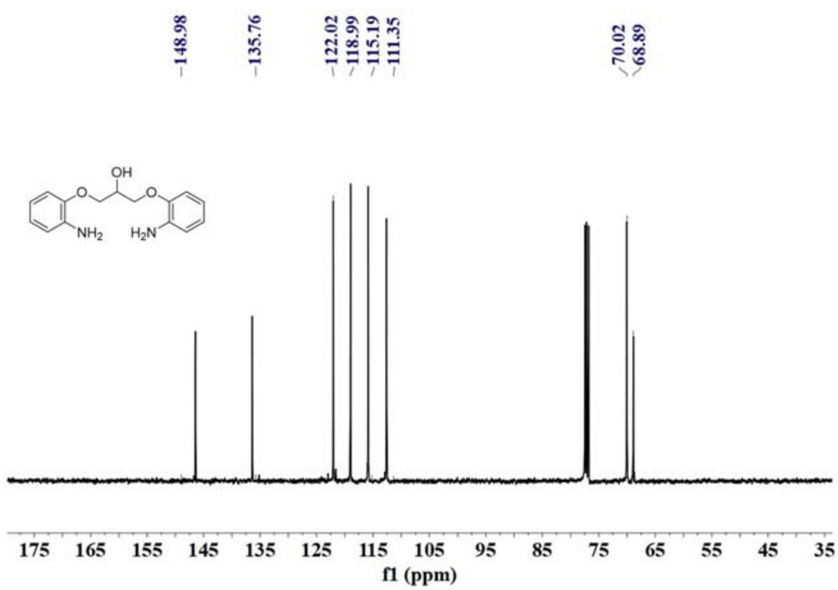

Figure S10: ^{13}C NMR spectrum of B4.

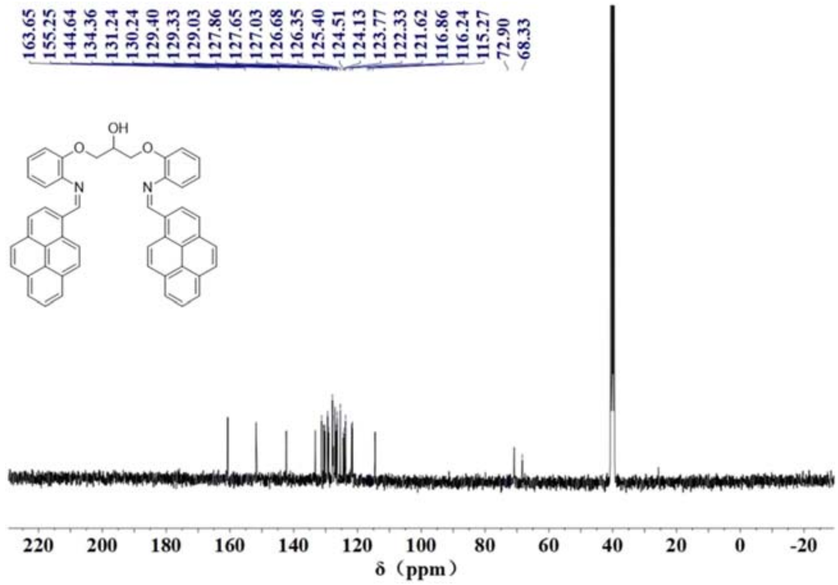

Figure S11: ^{13}C NMR spectrum of B5.

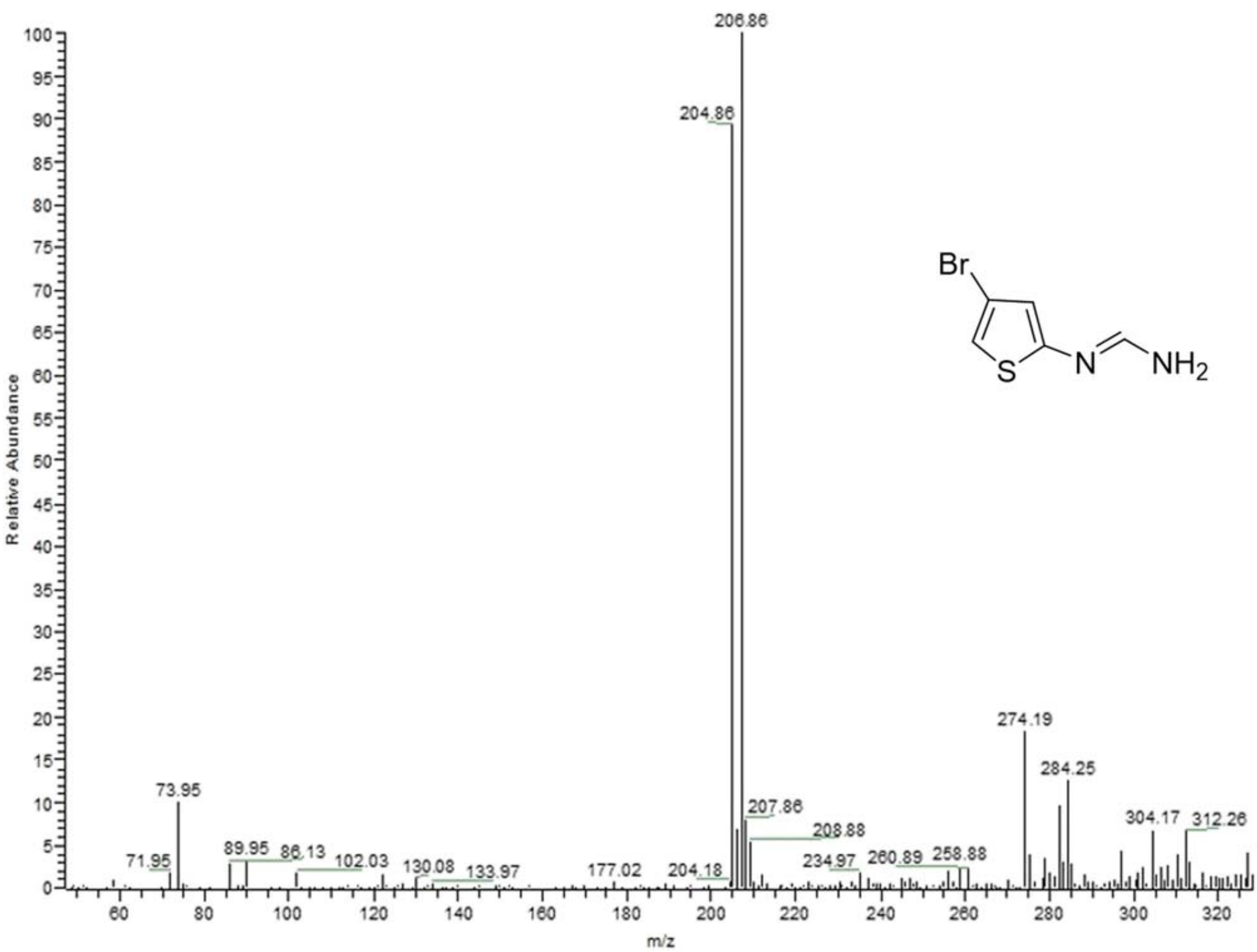

Figure S12: MS spectrum of A2.

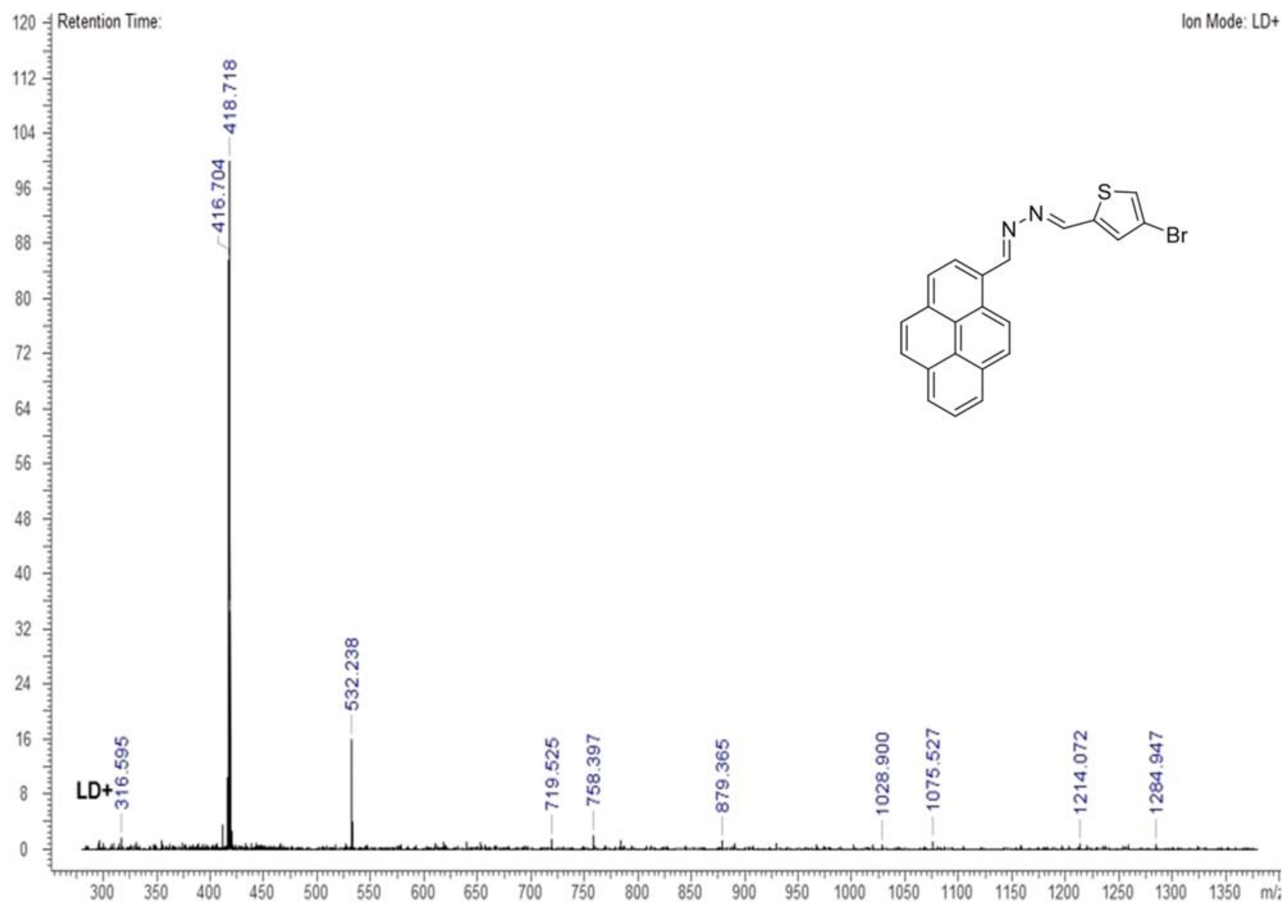

Figure S13: MS spectrum of A4.

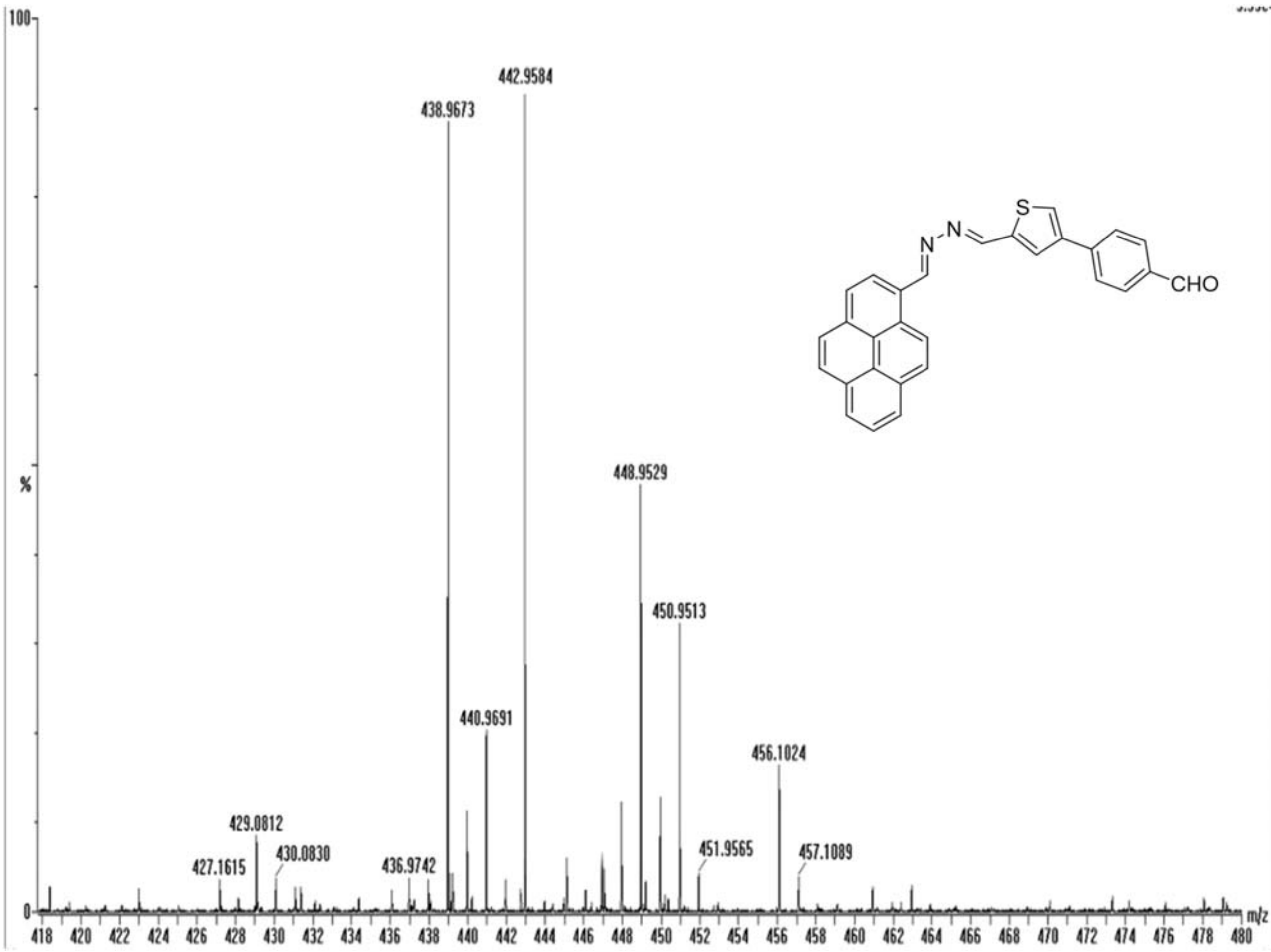

Figure S14: MS spectrum of A6.

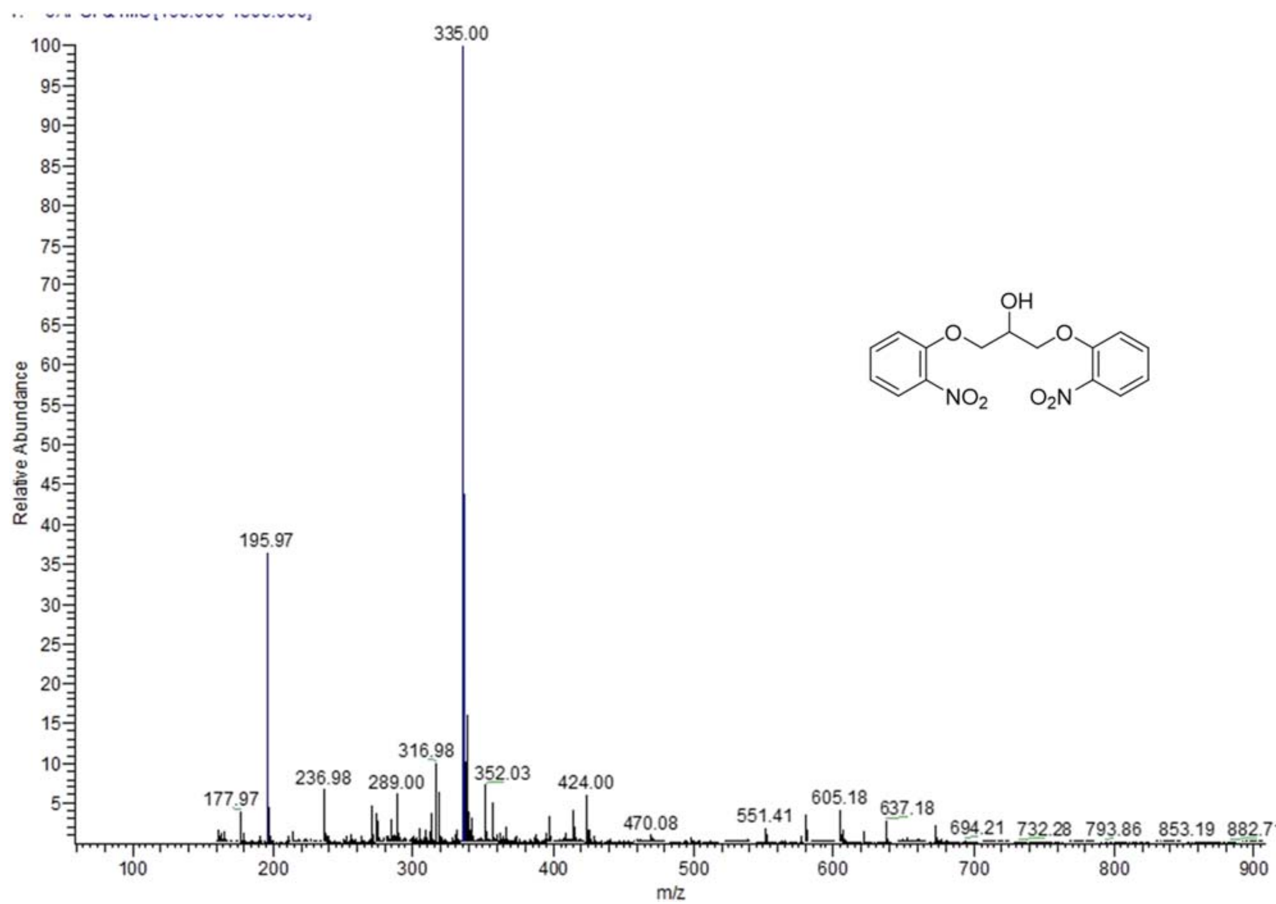

Figure S15: MS spectrum of B3.

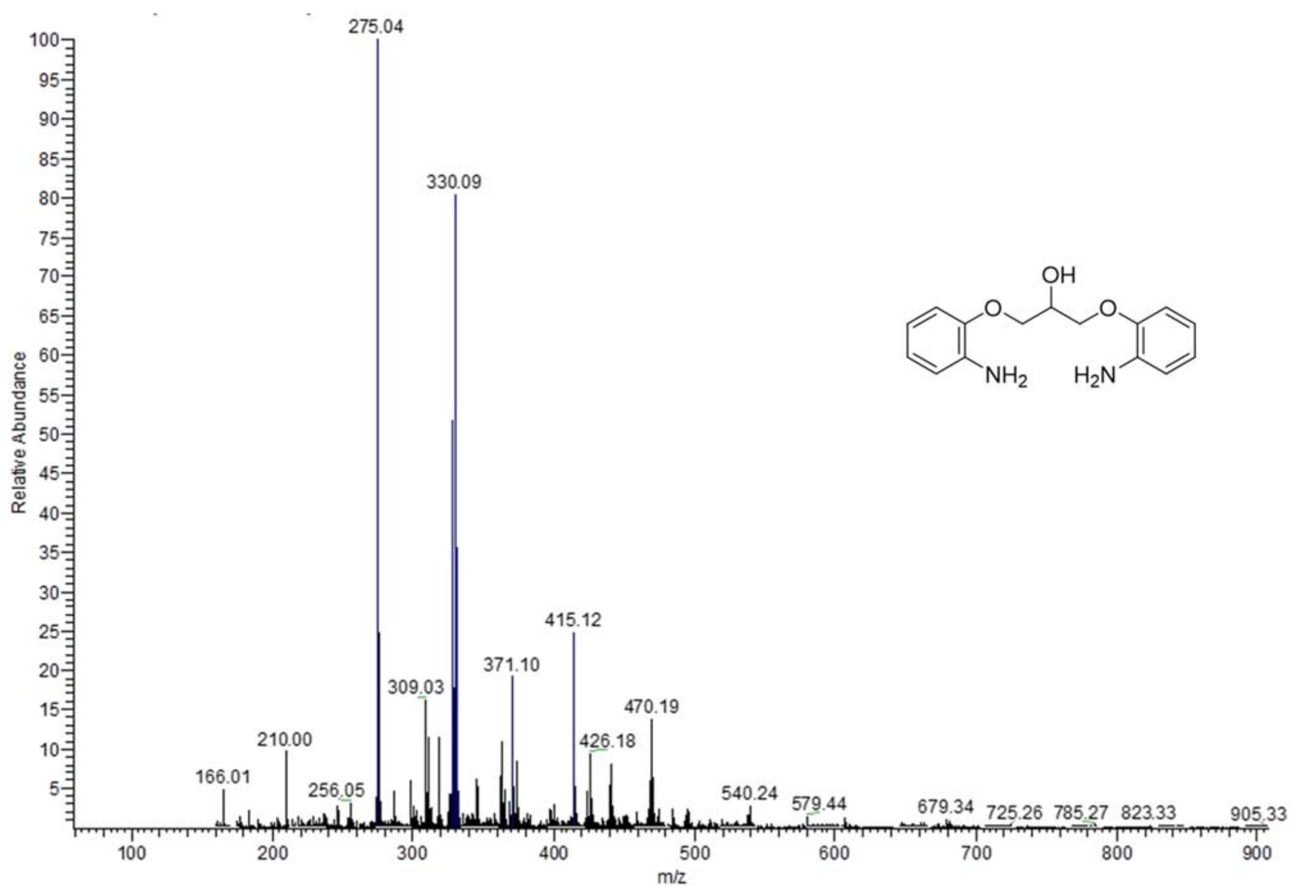

Figure S16: MS spectrum of B4.

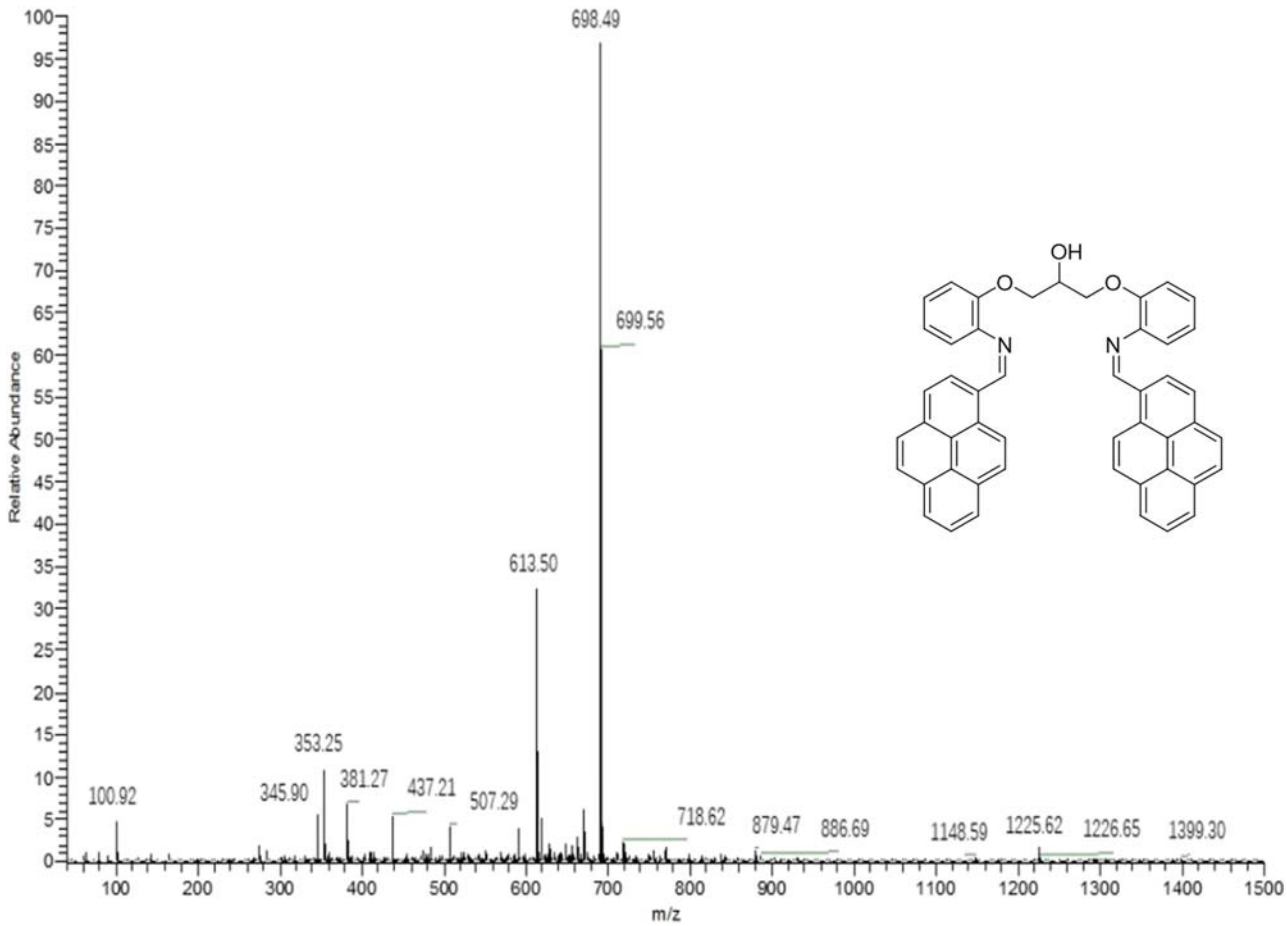

Figure S17: MS spectrum of B5.

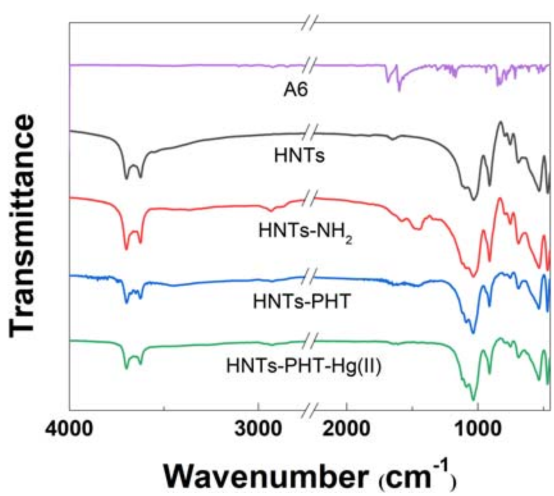

Figure S18: FTIR spectra of A6, HNTs, HNTs-NH_2, HNTs-PHT and HNTs-PHT-Hg(II).

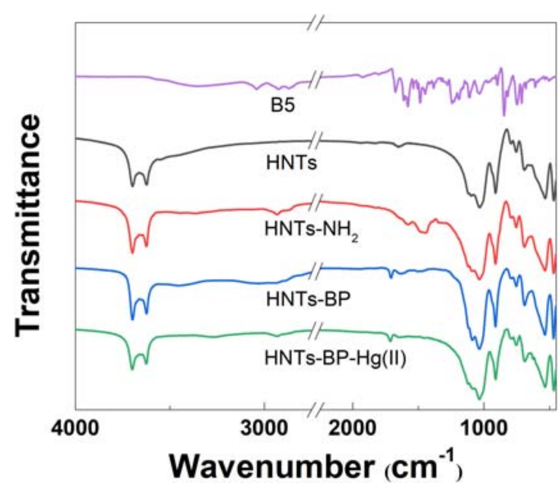

Figure S19: FTIR spectra of B5, HNTs, HNTs-NH_2, HNTs-BP and HNTs-BP-Hg(II).

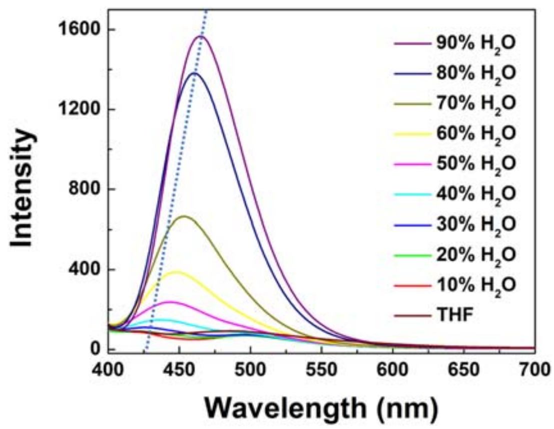

Figure S20: Fluorescence spectra of HNTs-PB as a function of increasing water content (0–90%).

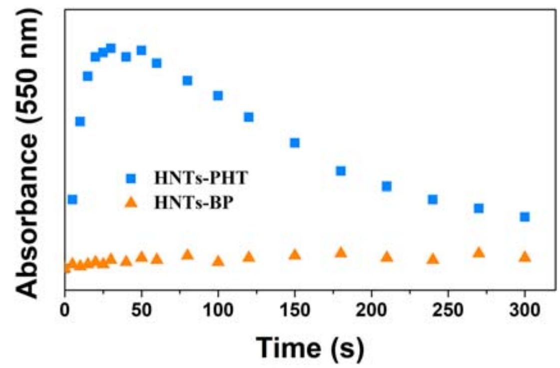

Figure S22: Absorbance at 550 nm vs time of the interaction between Hg(II) with HNTs-PHT or HNTs-BP.

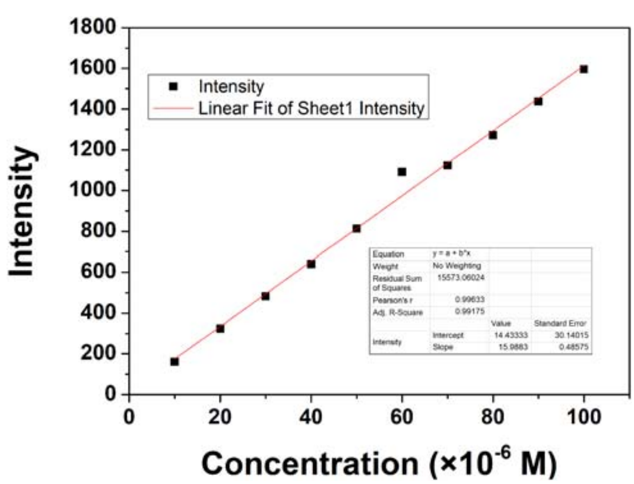

Figure S21: Linear regression for fluorescence intensity and concentration of Hg(II).

Table S1: Comparison on the detection and separation of Hg(II) methods in literature

Ref. no.	Detection method	Separation method	Interfering ions	Specificity over other ions
[1]	UV lamp and color change	Adsorption by silicate derivatives	Cu^{2+}	Na^+, K^+, Ca^{2+}, Mg^{2+}, Co^{2+}, Ni^{2+}, Cu^{2+}, Zn^{2+}, Al^{3+}, Fe^{2+}, Fe^{3+}, Pb^{2+}, Ag^+, Cd^{2+}
[2]	Addition of active additive and UV analysis	Cloud point extraction	Not find	Not evaluated
[3]	Resonance light scattering spectrometry	Adsorption by gold nanoparticles	Not find	Ba^{2+}, Zn^{2+}, Na^+, and Fe^{3+}
[4]	Bio-inspired colorimetric detection	Adsorption by magnetic particles	Pb^{2+}	Not evaluated
[5]	Heterogeneous colorimetric and spectrophotometric chemosensor	Adsorption by FMS-1	Not find	Not evaluated
[6]	Membrane material adsorption	Adsorption by mesoporous silica	Ag^+	Not evaluated
[7]	Atomic absorption spectroscopy	Gold-nanoparticle-based graphite furnace	Cu^{2+}	Not evaluated
[8]	Fluorescence chemosensor	Adsorption by Fe_3O_4@SiO_2-Au@$PSiO_2$	Not find	Ni^{2+}, Cd^{2+}, Ca^{2+}, Ba^{2+}, Pb^{2+}, Cu^{2+}, Zn^{2+}, Co^{2+}, Mg^{2+}, Ag^+, Na^+, K^+, Li^+
[9]	FT-IR	Adsorption by Bioinspired supramolecular fibers	Not find	Co^{2+}, Zn^{2+}, Cu^{2+}, Cd^{2+}, Ca^{2+}, Mg^{2+}, Pb^{2+}
[10]	Fluorescence change (“turn on”)	Adsorption by Silica Microsphere	Cd^{2+}, Pb^{2+}	Not evaluated
[11]	X-ray photoelectron spectroscopy	poly(acrylic acid) hydrogel coatin	Not find	Not evaluated
[12]	X-ray photoelectron spectroscopy	Adsorption by organic frameworks	Cu^{2+}, Cd^{2+} and Pb^{2+}	Na^+, Cd^{2+}, Zn^{2+}, Ni^{2+}, Pb^{2+}, Mg^{2+}, Cr^{3+}
[13]	Fluorescence change (“turn on”)	Absorption by functionalized Fe_3O_4@SiO_2	Not find	Cu^{2+}, Ag^+, Cd^{2+}, Sr^{2+}, Pb^{2+}, Co^{2+}, Fe^{2+}, Fe^{3+}, Mg^{2+}, Mn^{2+}, Na^+, Ni^{2+}, Zn^{2+}, Ba^{2+}, Al^{3+}
[14]	Color change	Absorption by mesoporous silica probes	Fe^{3+}	Na^+, Mg^{2+}, Al^{3+}, K^+, Ca^{2+}, Cr^{3+}, Mn^{2+}, Fe^{3+}, Co^{2+}, Ni^{2+}, Cu^{2+}, Zn^{2+}, As^{3+}, Cd^{2+}, Pb^{2+}
[15]	Fluorescence change (“turn on”)	Precipitation separation	Not find	Fe^{3+}, Co^{2+}, Ni^{2+}, Cu^{2+}, Zn^{2+}, Pb^{2+}, Cd^{2+}

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