Supporting Information

Construction of salicylaldehyde analogues as turn-on fluorescence probes and their electronic effect on sensitive and selective detection of As(V) in groundwater

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Figure captions:

Figure S1 Infrared spectra of HBHP (a), HBBP (b), HMBP (c) and HNBP (d).

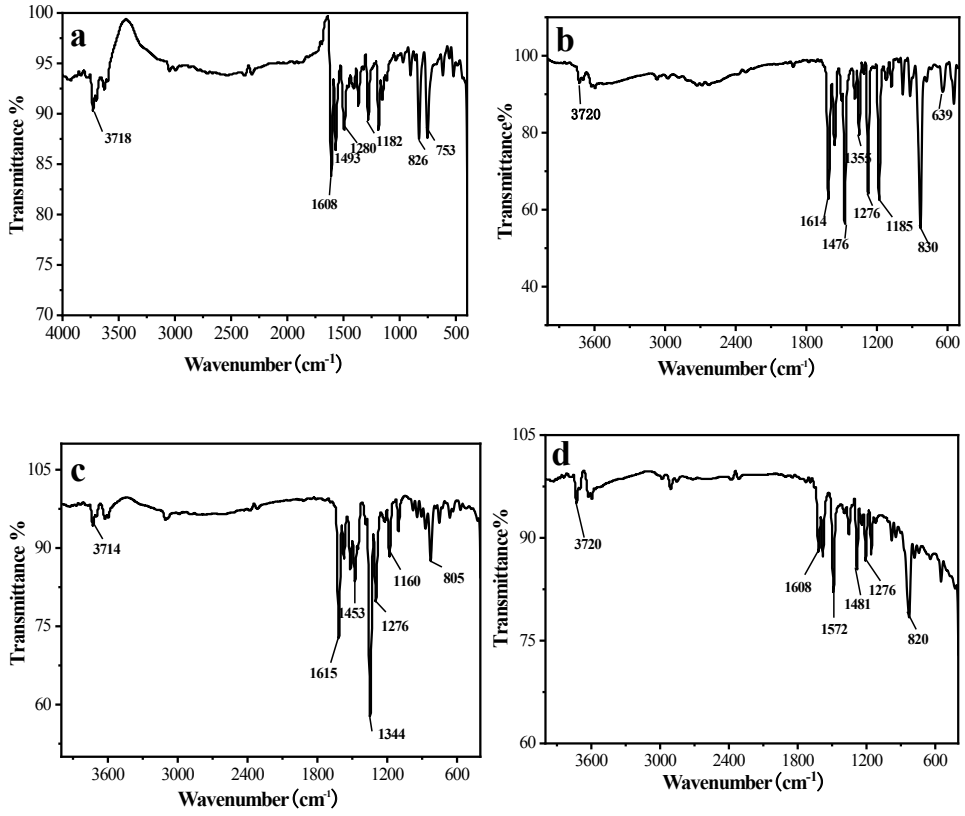

Figure S2 Mass spectra of HBHP (a), HBBP (b), HMBP (c) and HNBP (d).

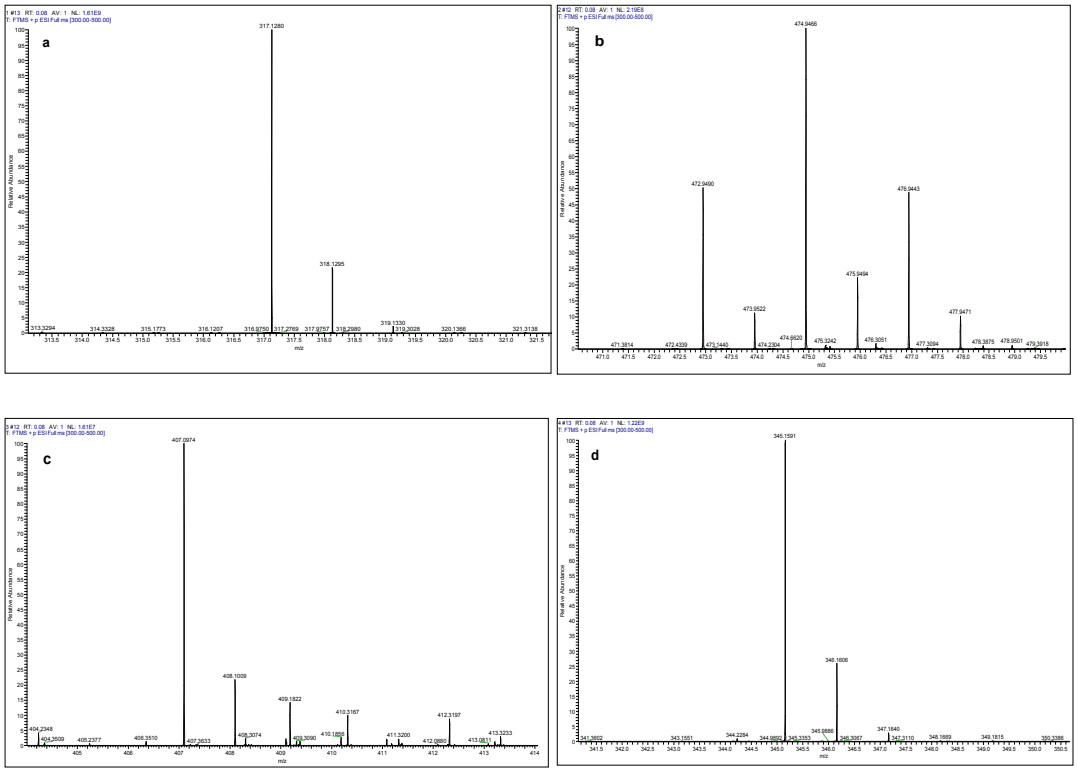

Figure S3 Absorption spectra of HBHP (a), HBBP (b), HMBP (c) and HNBP (d).

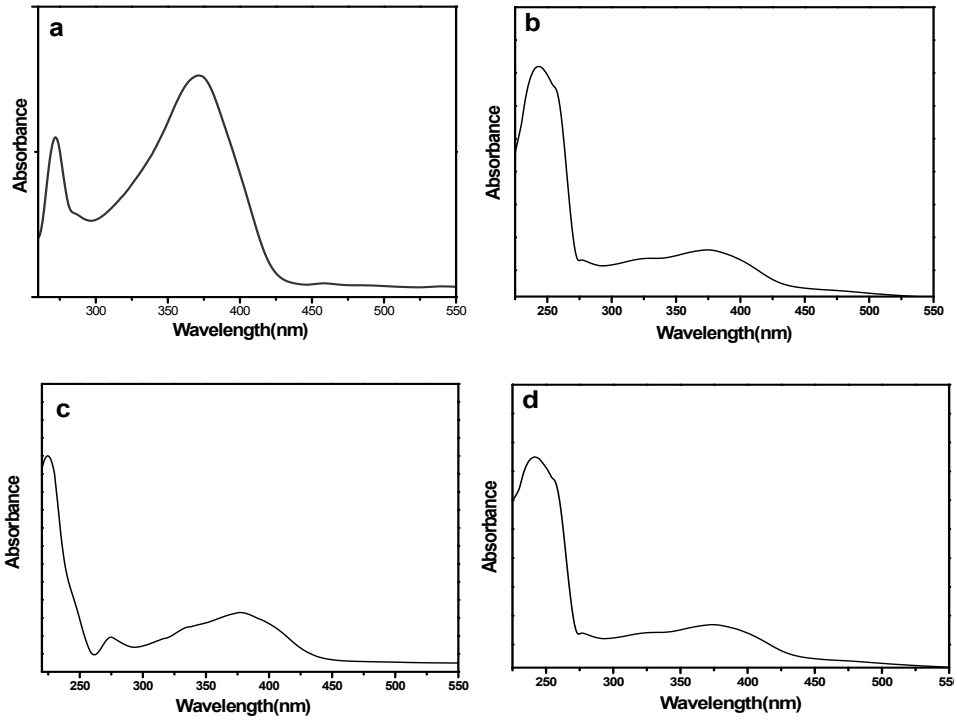

Figure S4 ^{1}H NMR spectra of HBHP (a), HBBP (b), HMBP (c) and HNBP (d).

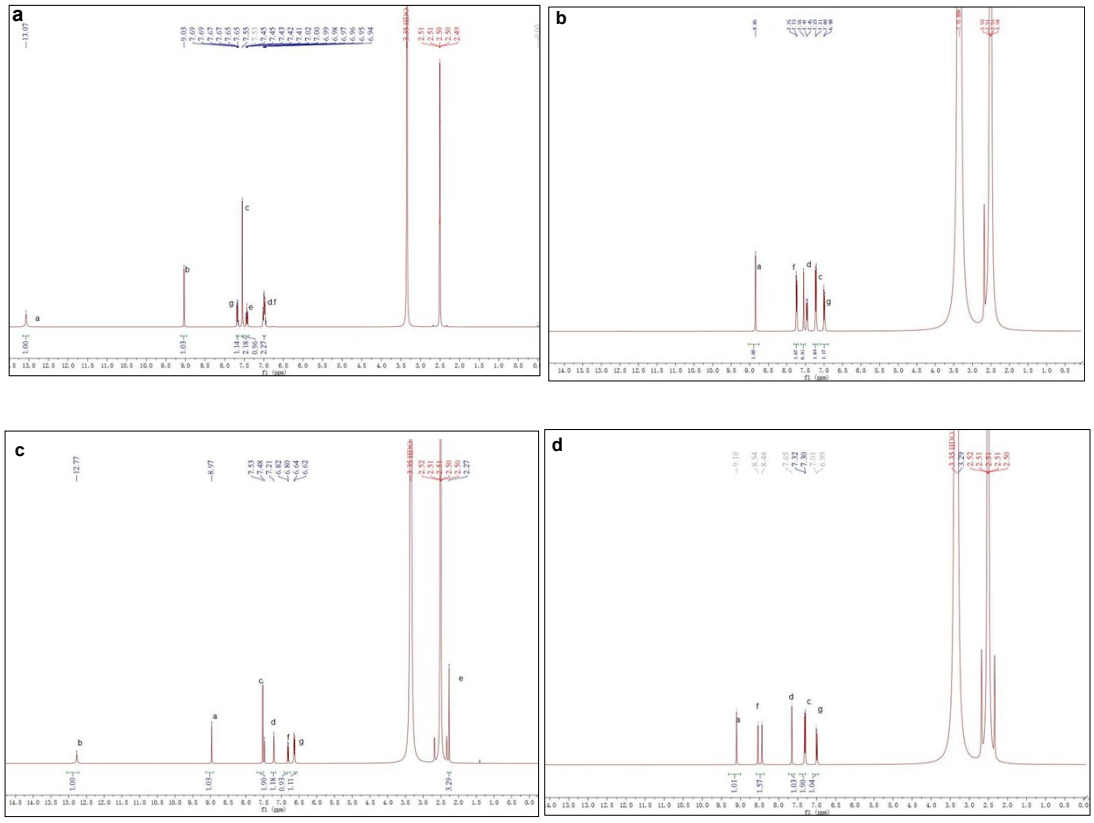

Figure S5 ^{13}C NMR spectra of HBHP

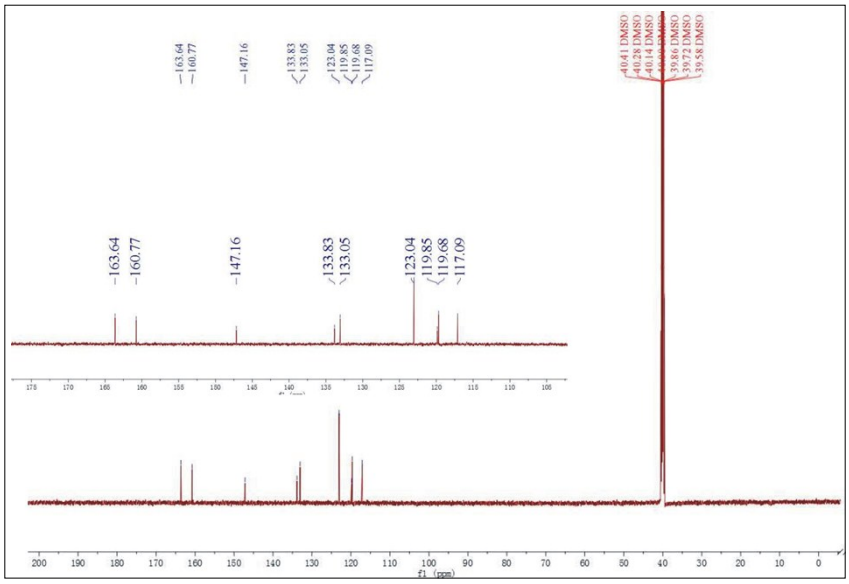

Figure S6 (a) Fluorescence spectra of HBBP with the gradual addition water in DMF, (b) Fluorescence intensity response of HBBP with the water fraction changes.

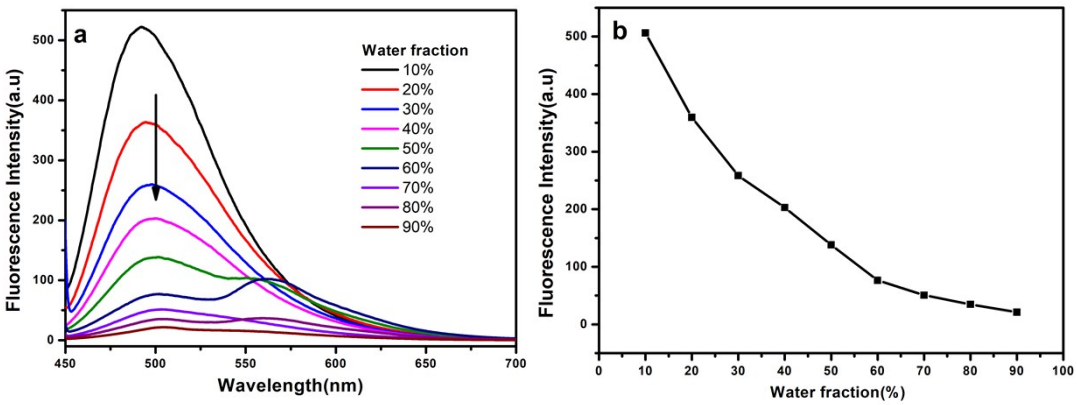

Figure S7 (a) Fluorescence spectra of HNBP with the gradual addition of water in DMF, (b) Fluorescence intensity response of HNBP with the water fraction changes.

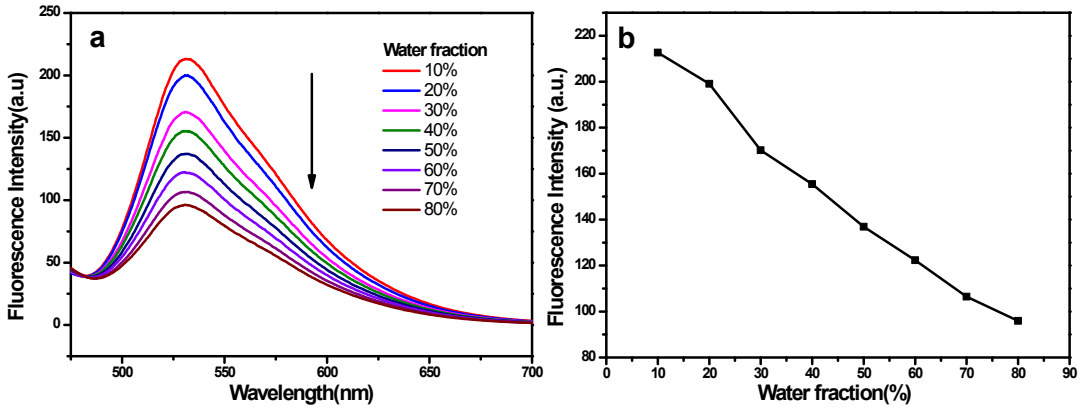

Figure S8 (a) Fluorescence spectra of HMBP with the gradual addition water in DMF, (b) Fluorescence intensity response of HMBP with the water fraction changes.

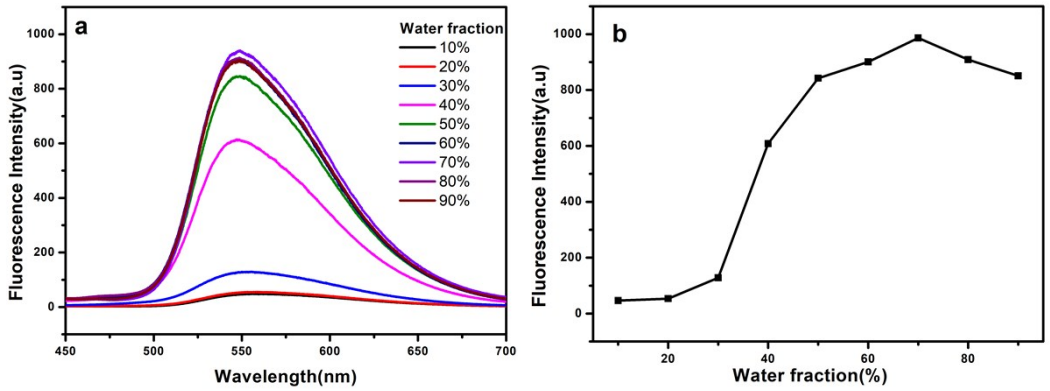

Figure S9 Fluorescence intensity response of HBBP (a) and HMBP (b) in the presence and absence of As(V) with time from 0 to 65 min.

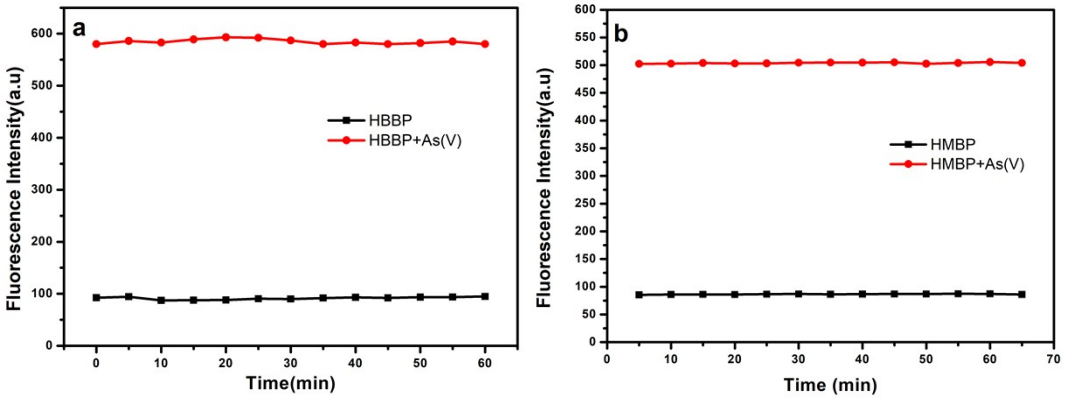

Figure S10 Electronic absorption spectra response of HBBP (a) and HMBP (b) with increasing amounts of As(V) (0-200μM).

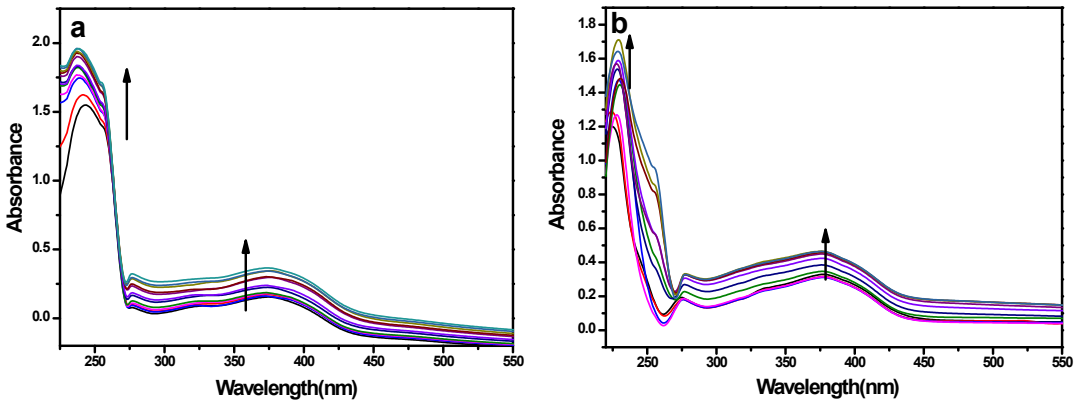

Figure S11 Fluorescence spectra of HBBP (a) and HMBP (b) upon the gradual addition of As(V) in DMF.

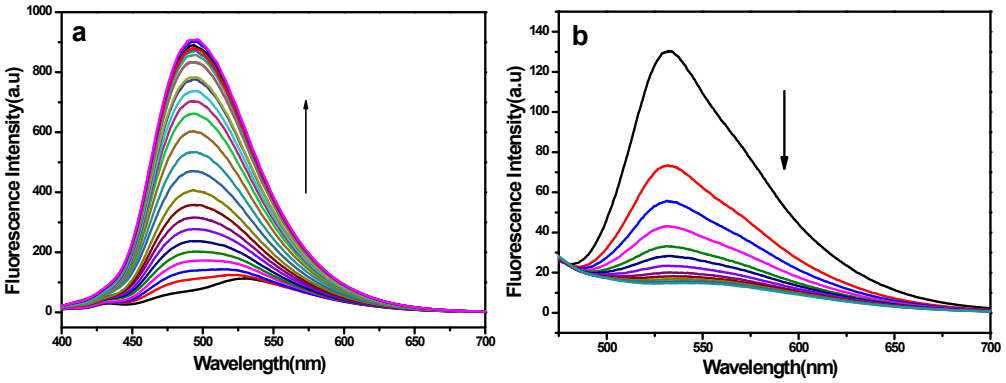

Figure S12 (a) The fluorescence intensity of HBBP under As(V) concentration from 0-130 μM; *Inset*: The linear relationship between fluorescence intensities changes and As(V) concentration from 0-80 μM. (b) The fluorescence intensity of HMBP under As(V) concentration from 0-400 μM; *Inset*: The linear relationship between fluorescence intensities changes and As(V) concentration from 0-200 μM.

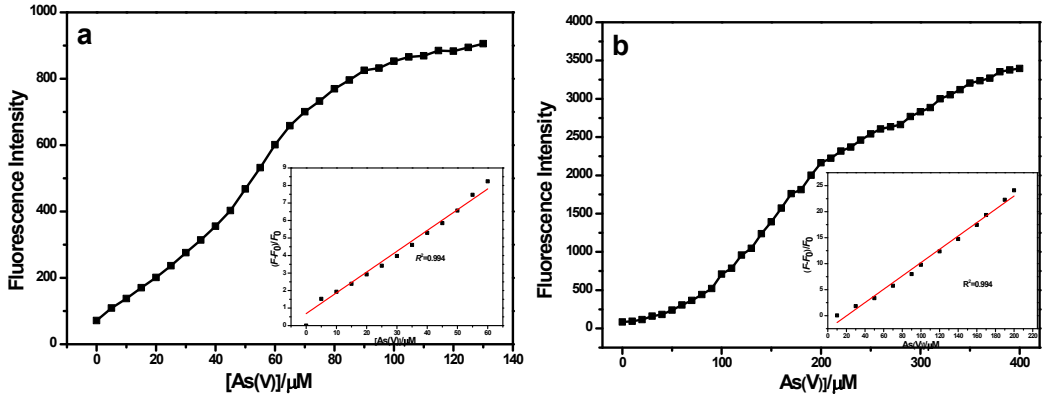

Figure S13 Job's Plot of HBBP(a) and HMBP (b) and As(V).

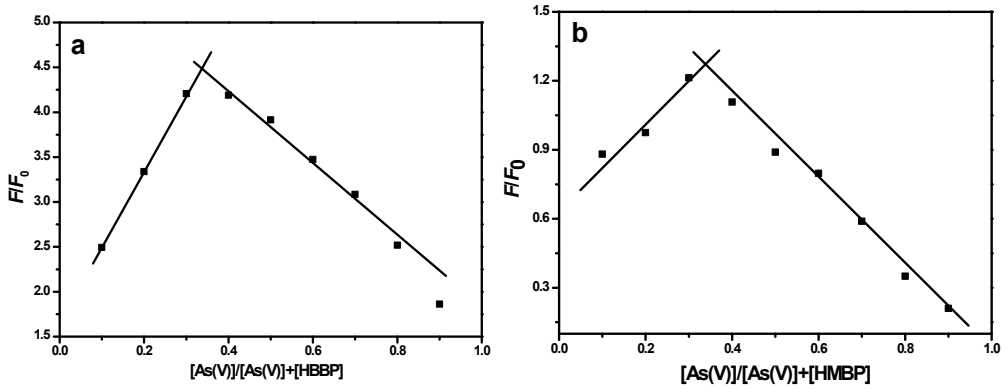

Figure S14 Determination of binding constant of HBBP (a) and HMBP (b) with As(V).

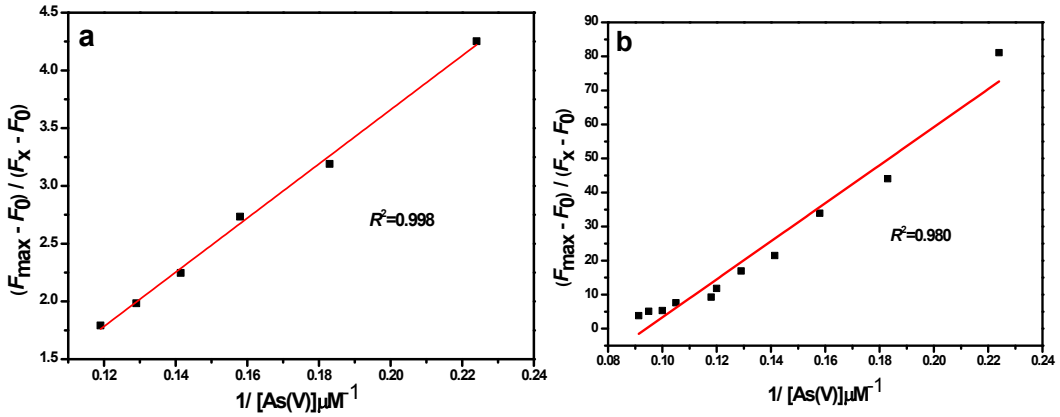

Figure S15 DFT theoretical calculation and geometry optimization of HBBP and HBBP+As(V)

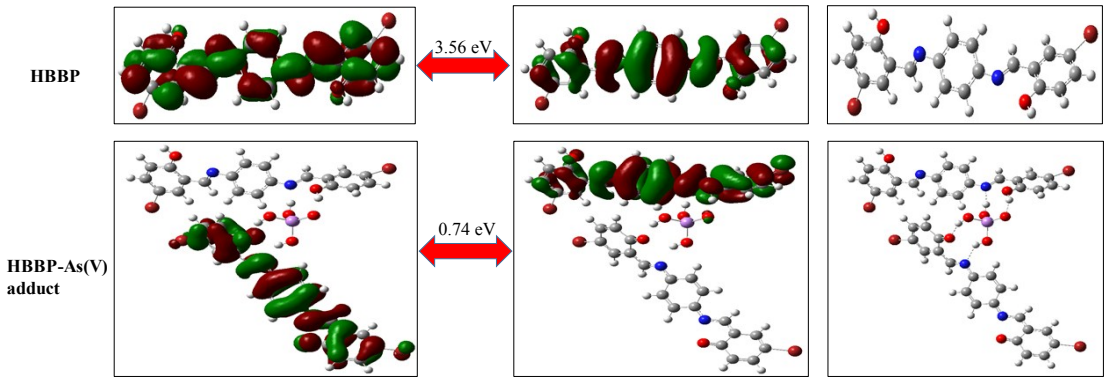

Figure S16 DFT theoretical calculation and geometry optimization of HMBP and HMBP+As(V)

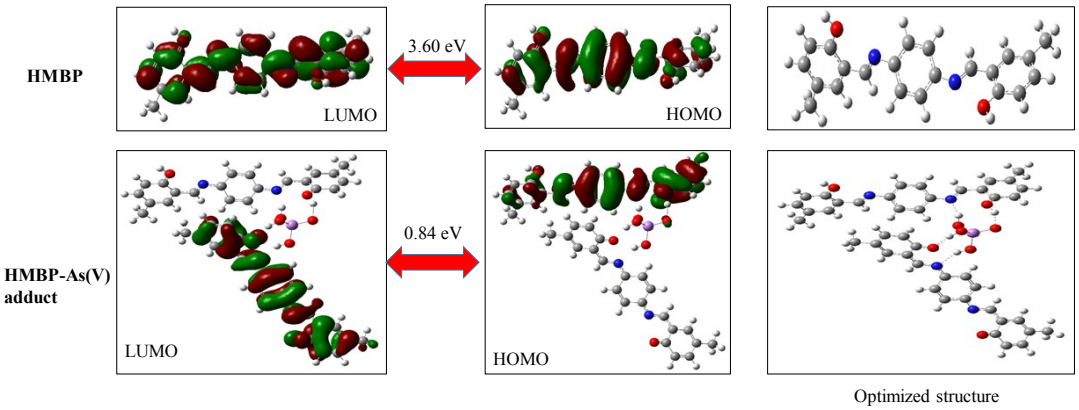

Figure S17 The selectivity and anti-interference of HBHP toward As(V). The black bars represent the fluorescence responses of HBHP to 10 equiv of various cations. The red bars represent the fluorescence response of the above mixture solutions upon sequent addition of 10 equiv of As(V). All the experiments were performed in DMF/H_2O mixture solution (v/v, 4:6).

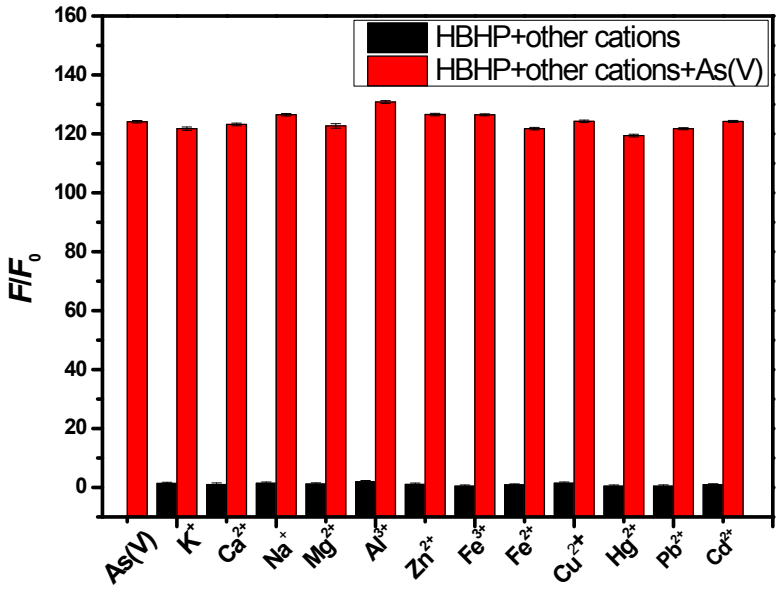

Figure S18 (a) The selectivity and anti-interference of HBBP toward As(V). The black bars represent the fluorescence responses of HBHP to 10 equiv of various anions. The red bars represent the fluorescence response of the above mixture solutions upon sequent addition of 10 equiv of As(V). All the experiments were performed in DMF. (b) The selectivity and anti-interference of HMBP toward As(V). The black bars represent the fluorescence responses of HBHP to 10 equiv of various anions. The red bars represent the fluorescence response of the above mixture solutions upon sequent addition of 10 equiv of As(V). All the experiments were performed in DMF.

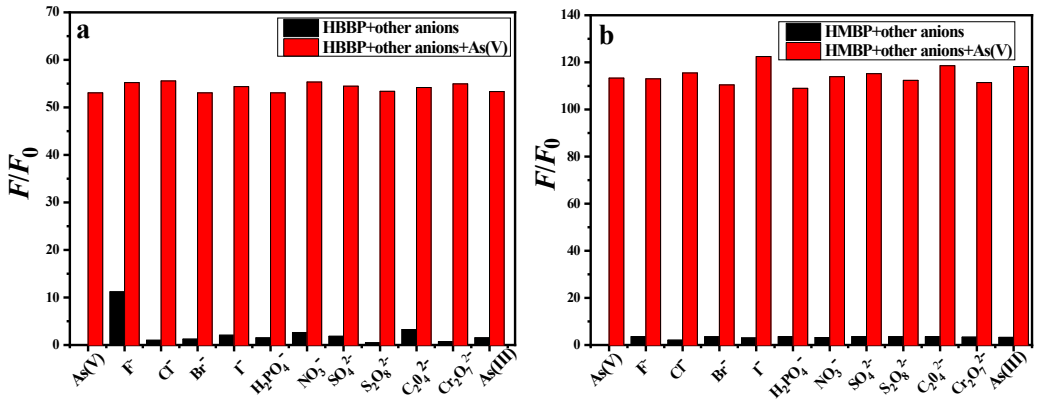

Table S1 Comparisons of detection limit of HBHP toward As(V) with some instrumental detection methods and reported fluorescence molecules.

Fluorescence molecules or detection methods	Detection limit	References
HG-AFS	0.0374 $ng \cdot mL^{-1}$	11
CSV	0.2 ppb	12
CE-ICP-MS	8 $ng \cdot L^{-1}$	13
Hydride generation-atomic absorption spectra	0.34 $\mu g \cdot L^{-1}$	35
(4E)-4-(2-Hydroxybenzylideneamino)-1,2-dihydro-2,3-dimethyl-1-phenylpyrazol-5-one	3 μM	21
Naphthalene–salisaldehyde	5 nM	36
2-hydroxy-5-methyl-benzene-1,3-dicarboxaldehyde di-oxime	0.23 μM	37
2,6-Bis(N-ethylhydrazonethiocarbamide)-4-methyl-phenol	15 nM	38
HBHP	0.88 ppb	This work