New Journal of Chemistry-Supporting information

Ratiometric fluorescent determination of palladium based on the C-N bond cleavage of allyl quaternary ammonium

Zhize Ou, Liu He, Yunyan Gao*, Pingyi Li, Tianzhu Li, Jing Zhang, Yitao Dong, Weijuan Zhou, Yiqing Zhang

Department of Chemistry, School of Chemistry and Chemical Engineering, Northwestern Polytechnical University, Xi'an 710072, People's Republic of China

*Corresponding Author: gaoyunyan@nwpu.edu.cn

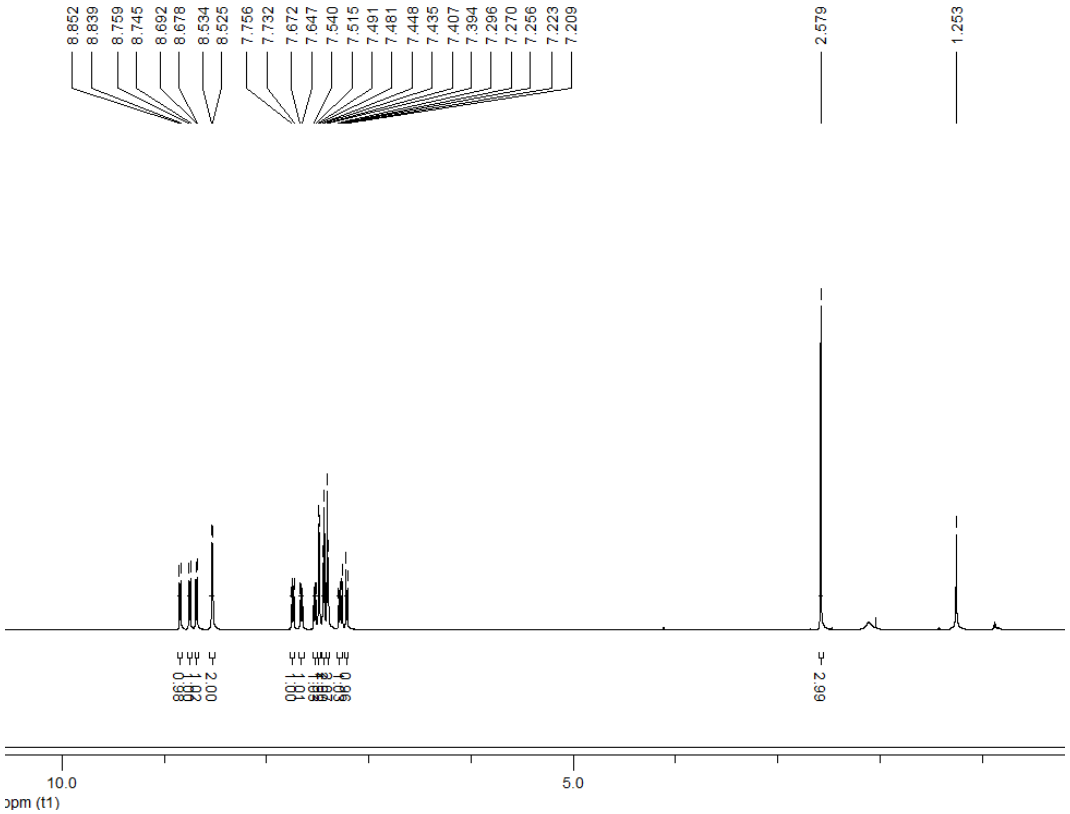

Fig. S1 ^{1}H NMR spectrum of **PPI** in $CDCl_3$.

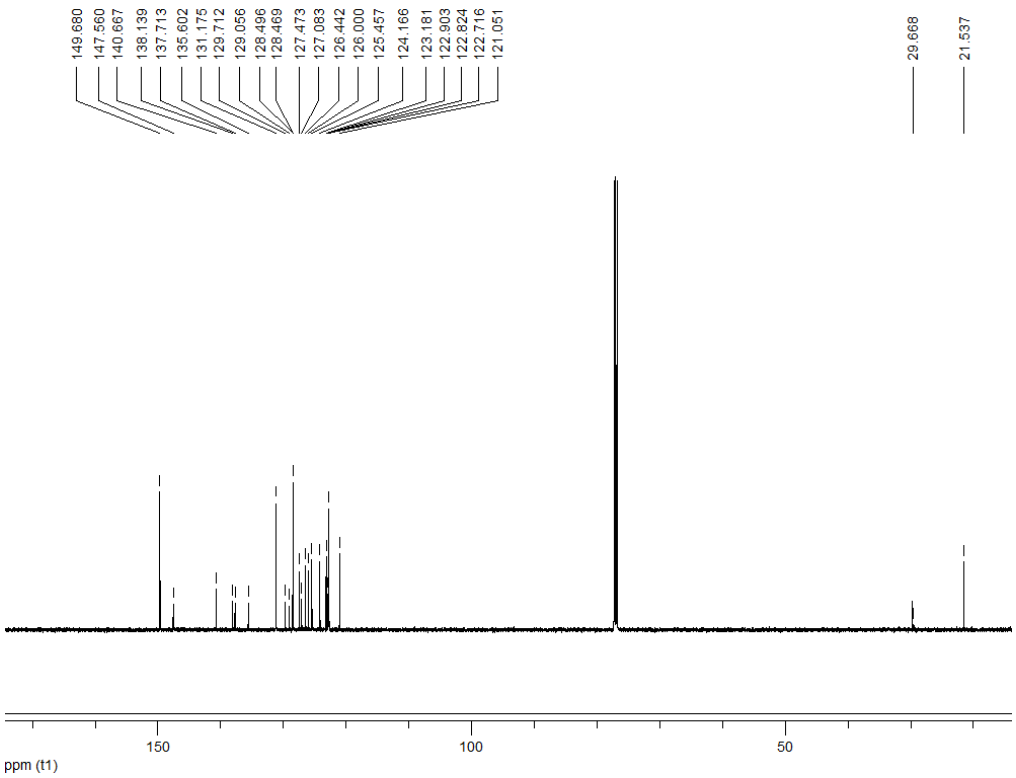

Fig. S2 ^{13}C NMR spectrum of **PPI** in $CDCl_3$.

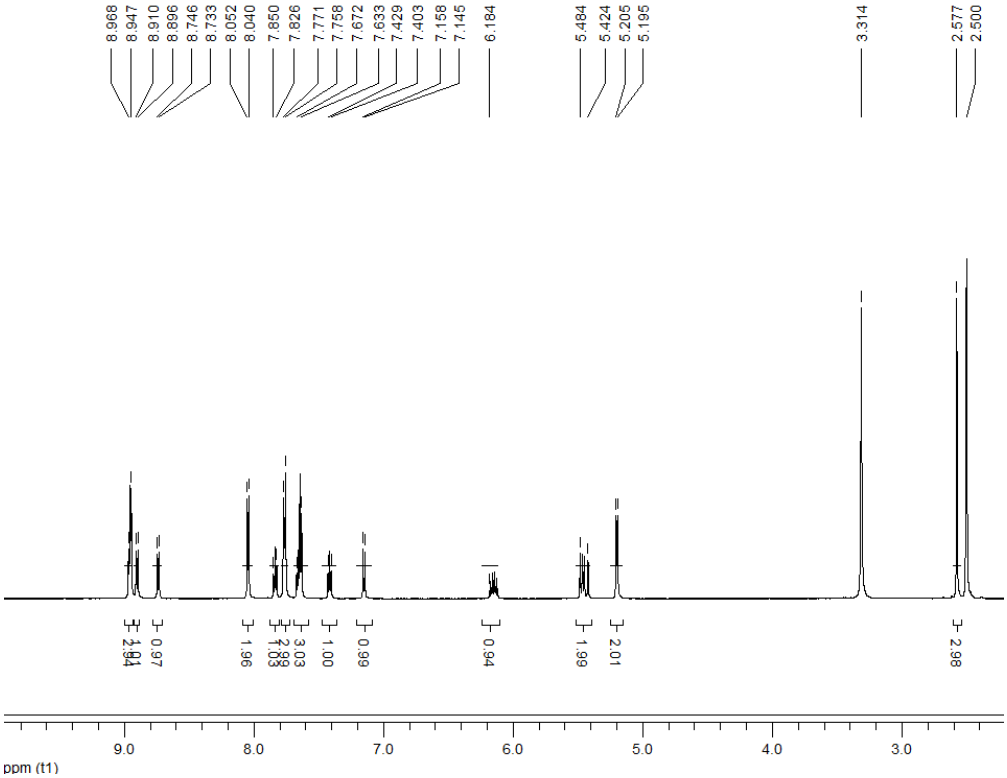

Fig. S3 ^{1}H NMR spectrum of **AL-PPI** in DMSO-d_6.

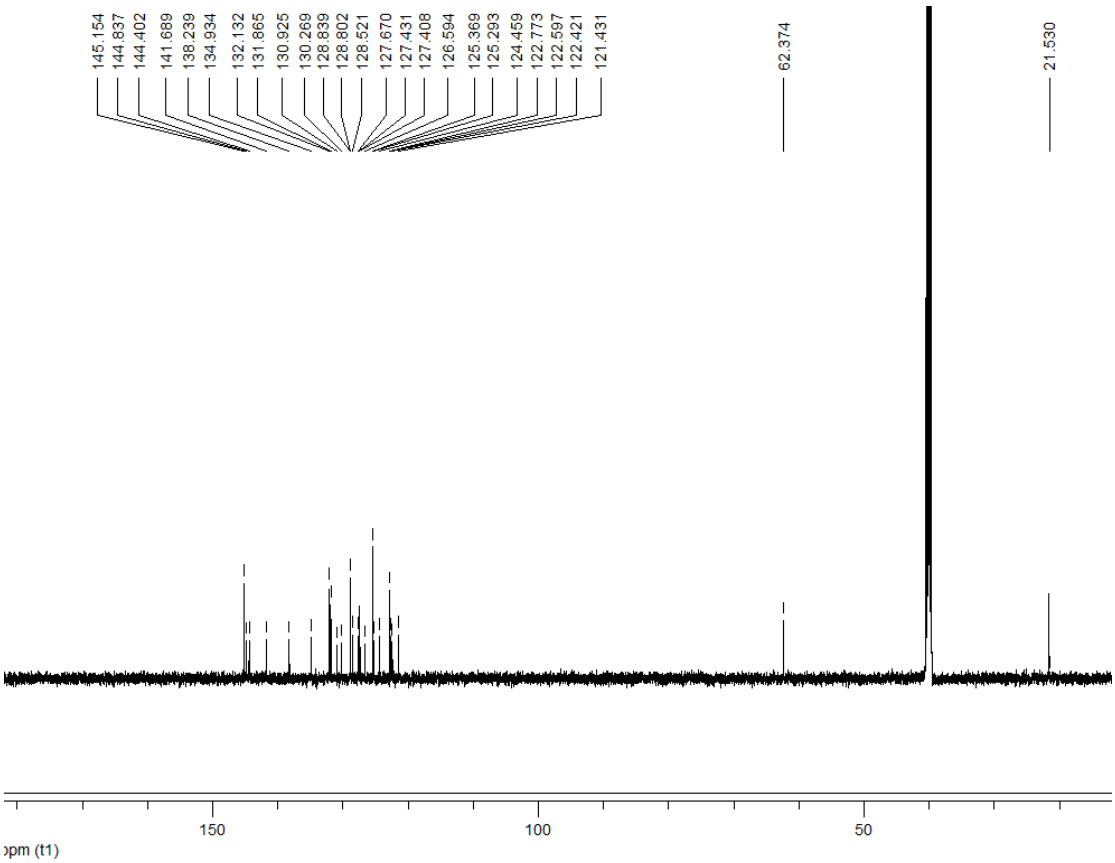

Fig. S4 ^{13}C NMR spectrum of **AL-PPI** in DMSO-d_6.

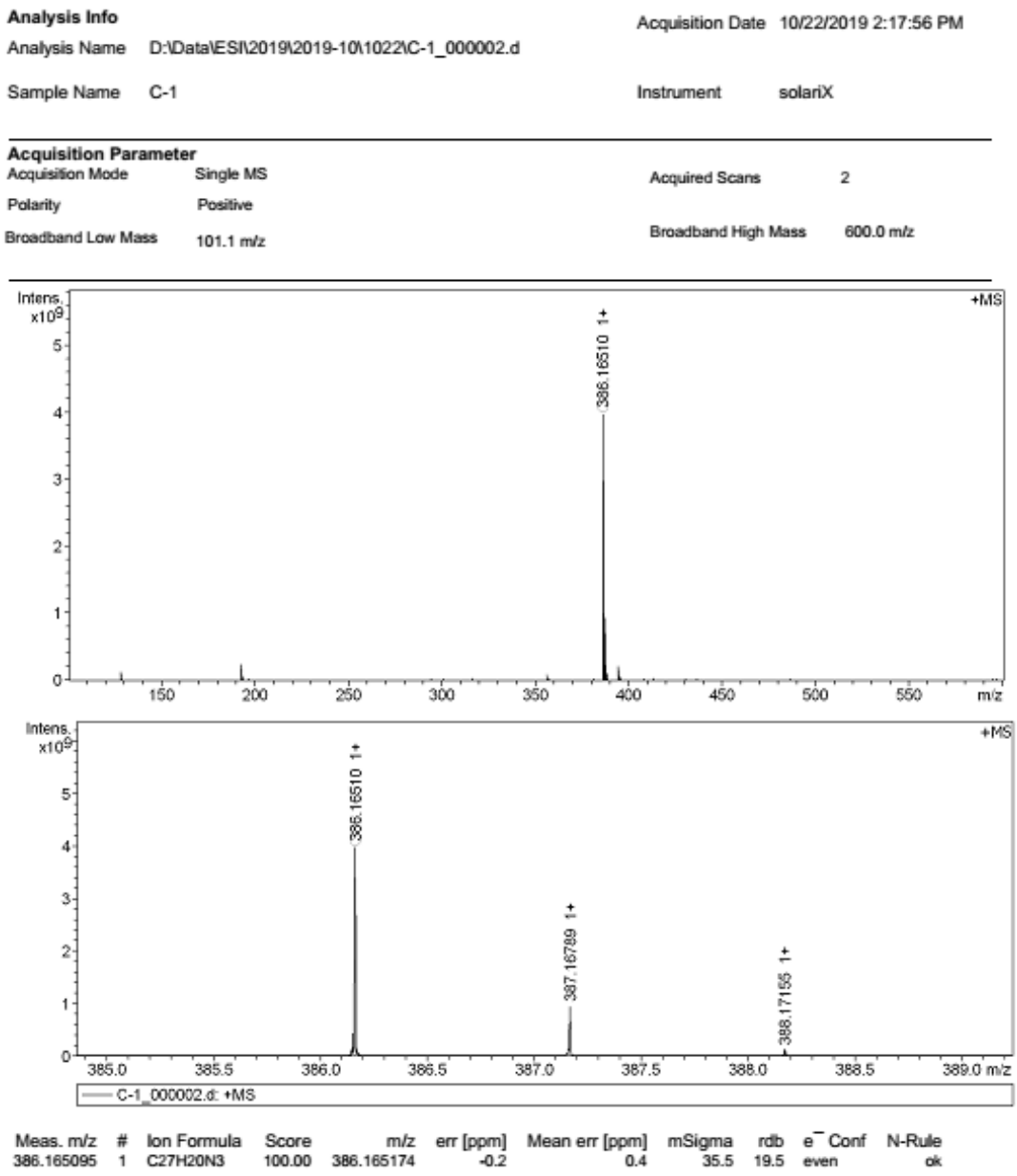

Fig. S5 ESI-HRMS spectra of **PPI**.

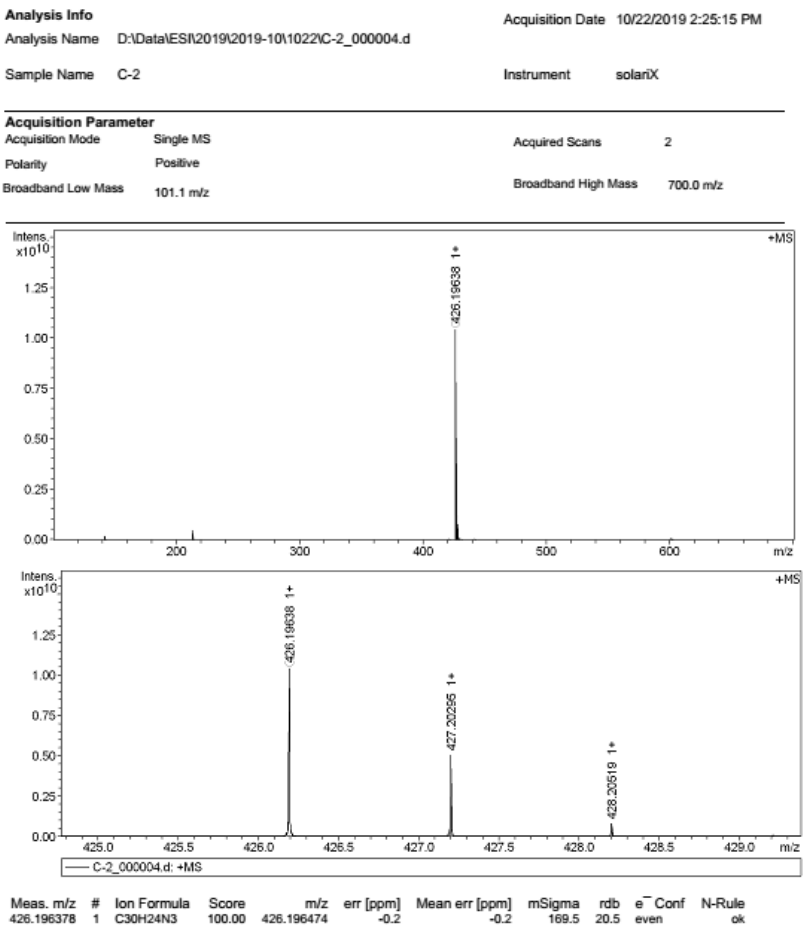

Fig. S6 ESI-HRMS spectra of **AL-PPI**.

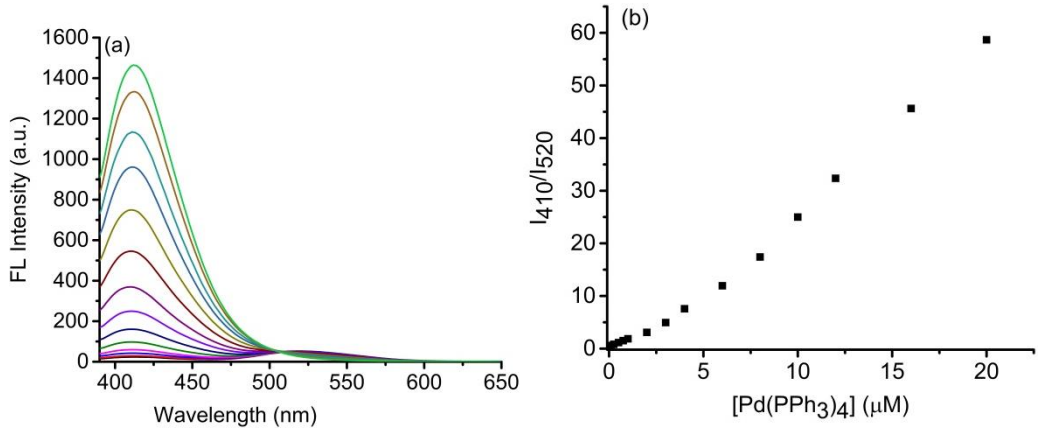

Fig. S7 (a) Fluorescence spectra of **AL-PPI** (10 μM) in the presence of different concentrations of $Pd(PPh_3)_4$ in ethanol. (b) Fluorescence intensity ratio (I_{410}/I_{520}) as a function of Pd^0 concentration.

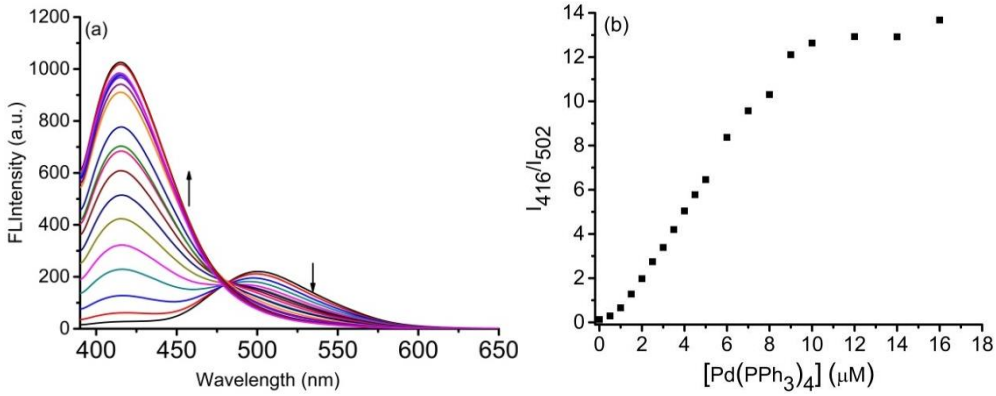

Fig. S8 (a) Fluorescence spectra of **AL-PPI** (10 μM) upon addition of $Pd(PPh_3)_4$ in CTAC (2 mM) aqueous solution (λ_{ex} = 375 nm). (b) The florescence intensity ratio (I_{416}/I_{502}) versus concentration of $Pd(PPh_3)_4$.

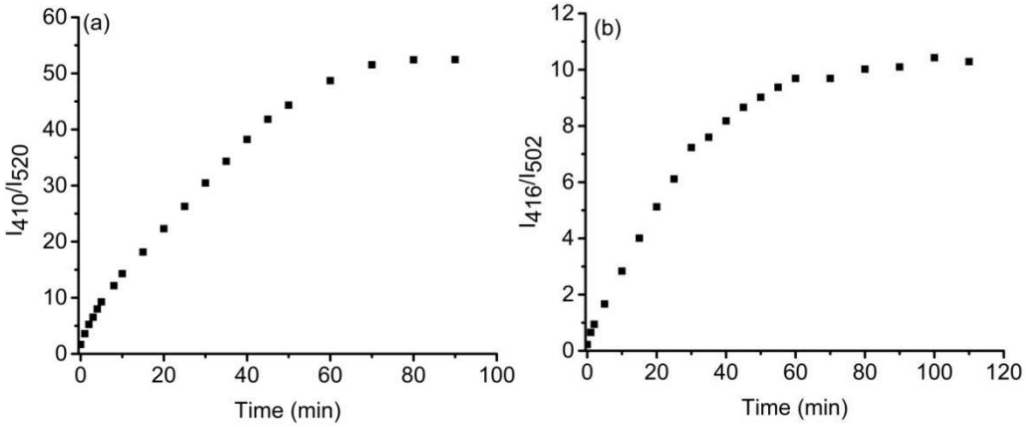

Fig. S9 Time course of emission intensity ratio of **AL-PPI** (10 μM) after addition of $Pd(PPh_3)_4$ (10 μM) in (a) ethanol and (b) in PBS (10 mM, pH 7.4) containing CTAC (2 mM).

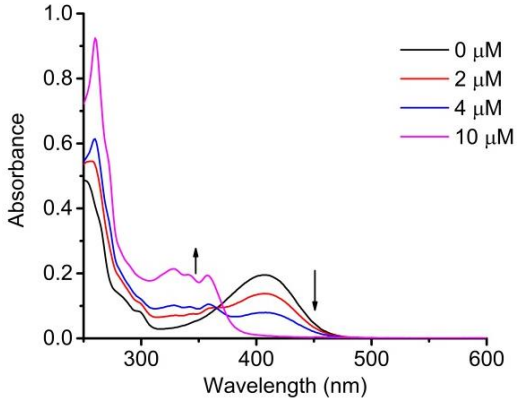

Fig. S10 The changes of absorption spectra of **AL-PPI** (10 μM) upon addition of $Pd(PPh_3)_4$ in CTAC aqueous solution.

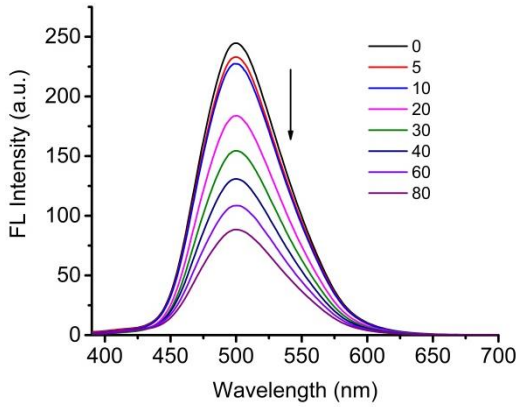

Fig. S11 Fluorescence spectral changes of **AL-PPI** (10 μM) upon addition of Pd^{2+} (0-80 μM) in CTAC aqueous solution (λ_{ex} = 375 nm).

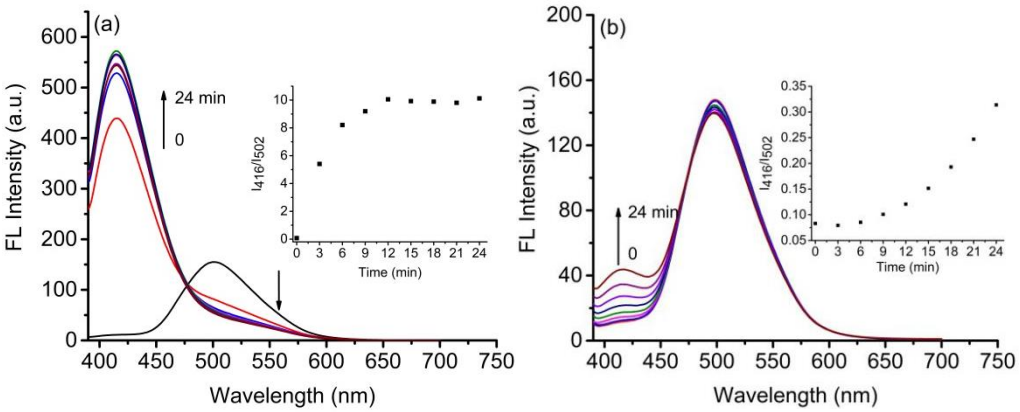

Fig. S12 (a) Fluorescence spectra of **AL-PPI** (10 μM) in the presence of (a) TFP (75μM) and (b) PPh_3 (75 μM) in PBS buffer (10 mM, pH 7.4) containing Pd^{2+} (10 μM) and CTAC (2 mM). Inset: time-dependent fluorescence response of **AL-PPI** toward Pd^{2+} in the presence of phosphine ligand.

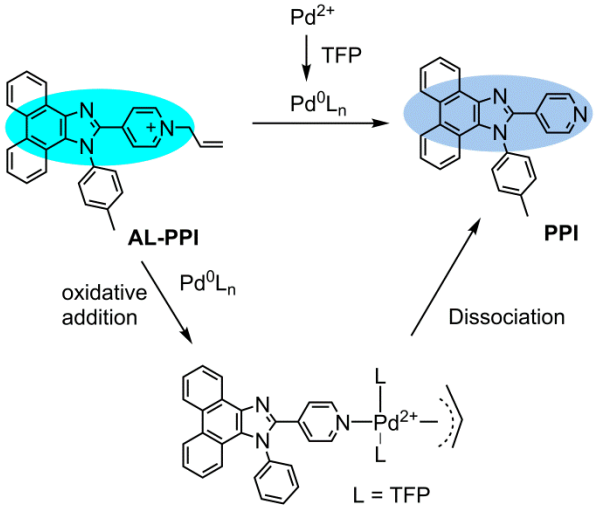

Fig. S13 Mechanism for selective recognition of Pd^{2+} by **AL-PPI** with the aid of TFP.

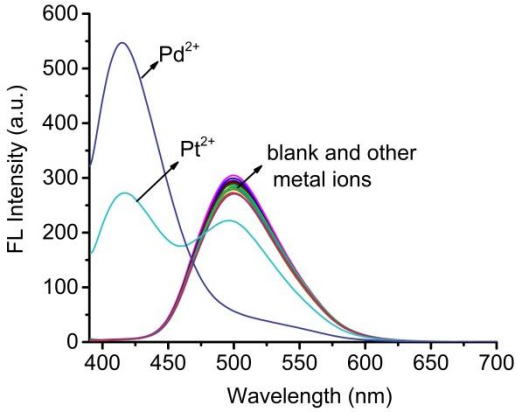

Fig. S14 Fluorescence spectra of a mixed solution of **AL-PPI** (10 μM), TFP (75 μM) upon addition of Pd^{2+} (10 μM) and other metal ions, including Mg^{2+}, Ca^{2+}, Hg^{2+}, Fe^{2+}, Fe^{3+}, Ni^{2+}, Cu^{2+}, Zn^{2+}, Ag^{+}, Sn^{2+}, Al^{3+}, Cd^{2+}, Co^{2+}, Cr^{3+}, Pb^{2+} and Pt^{2+} (20 μM, respectively) (λ_{ex} = 375 nm). All spectra were recorded at 15 min after mixing of **AL-PPI** and analyte in PBS (10 mM, pH 7.4) containing CTAC (2 mM) (λ_{ex} = 375 nm).

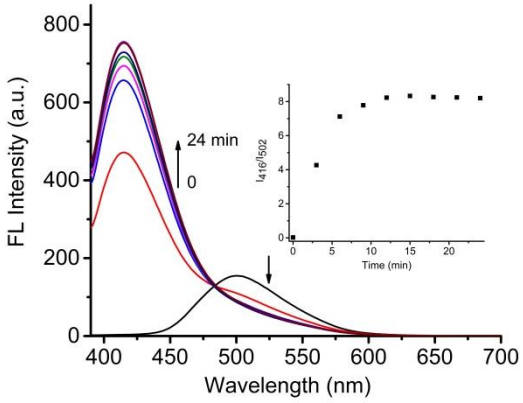

Fig. S15 Fluorescence emission spectra of of **AL-PPI** (10 μM) upon addition of in NaOAc-HOAc buffer solution (10 mM, pH = 5.0) containing CTAC (2 mM). Inset: time-dependent fluorescence change of **AL-PPI** (10 μM) in the presence of TFP (75 μM) and Pd^{2+} (10 μM).

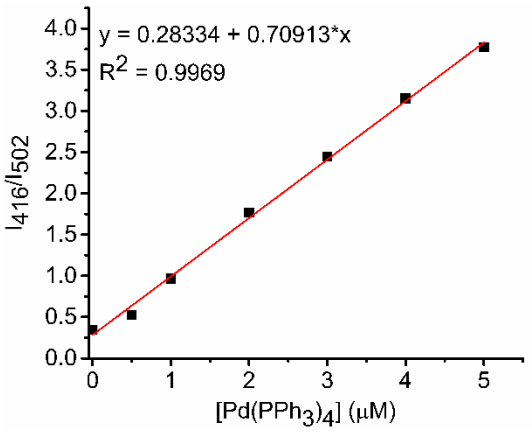

Fig. S16 The linear relationship of the I_{416}/I_{502} as a function of the concentration of $Pd(PPh_3)_4$ (0-5 μM) in the Qizhen Lake water containing **AL-PPI** (10 μM) and CTAC (2 mM).

Table S1 Analysis results of Pd^0 in real water samples (n = 4)[a,b]

AL-PPI	Added (μM)	Found (μM)	RSD (%)	Recovery (%)
1	0.5	0.453	0.25	90.6
2	1.0	1.257	2.67	125.7
3	3.0	3.041	5.37	101.3
4	5.0	5.399	1.37	108.4

[a]lake water from Qizhen Lake, Northwestern Polytechnical University. [b]$Pd(PPh_3)_4$ is used as source of Pd^0.