Supporting Information

Two novel tetraphenylethylene-skeleton salamo-type fluorescent probes: Specific recognition of cyanide through different response patterns

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2.1. Materials and Measurements

All raw materials are obtained from suppliers and used directly. The melting points were determined using SGW X-4A Shanghai Jingke Micro Melting Point Apparatus (Shanghai, China). ^{1}H NMR/^{1}C NMR spectra were measured using a Bruker 500/126 MHz spectrometer with $CDCl_3$/DMSO-d_6 as the solvent (Bruck, Germany). The IR spectrum of the target compound was recorded on a Vertex 70 FT-IR spectrophotometer, and KBr was used as a tablet (Bruck, Germany). The absorption and emission spectra were measured on UV-3900 and F-7000 FL spectrophotometers (Tokyo, Japan), respectively.

Preparation of anhydrous tetrahydrofuran (THF) solvent: Under the protection of nitrogen, benzophenone was selected as the indicator and sodium metal was used to remove water and dry. When the solvent system turns dark blue, it was collected and used after distillation (now steamed and used now).

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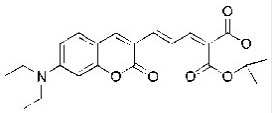
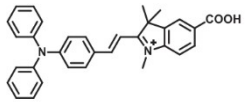
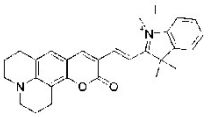
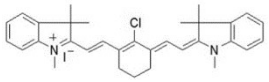
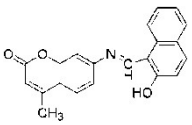
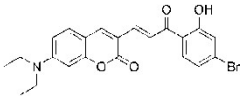
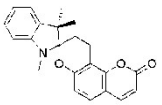
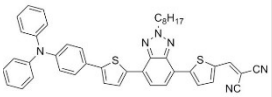
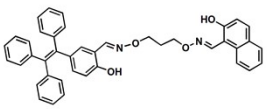
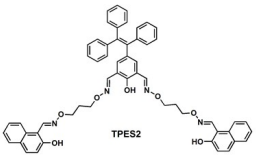
Table S1. Comparison of reported fluorescent probes for CN^- with **TPES1** and **TPES2**.

Probe	LOD (μM)	Response method	Response time	solvent	Ref	
	0.027	Ratiometric fluorescence	30 s	Tris-HCl, 10%DMSO	22(a)	
	0.0928	Fluorescence turn-on	-	HEPES	22(b)	
	0.066	Fluorescence turn-on	100 s	MeOH:HEPE, 1:1	22(c)	
	0.017	Fluorescence turn-off	< 30s	DMF:H_2O 7:3	22(d)	
	0.0772	Fluorescence turn-on	< 60 s	DMSO:H_2O, 8:2	22(e)	
	0.00032	fluorescence turn-off	12 min	DMSO:PBS (4:1, pH = 7.4)	22(f)	
	1.0	Fluorescence turn-on	3 min	H_2O:CH_3CN, 7:3,	22(g)	
	0.014	Fluorescence turn-on	240 s	THF:H_2O, 9:1	22(h)	
	0.0856	Ratiometric fluorescence turn-on	< 4s	DMSO-H_2O, 9:1	This Work	
	0.0573	Fluorescence turn-on	< 5s	DMSO-H_2O, 9:1	This Work	

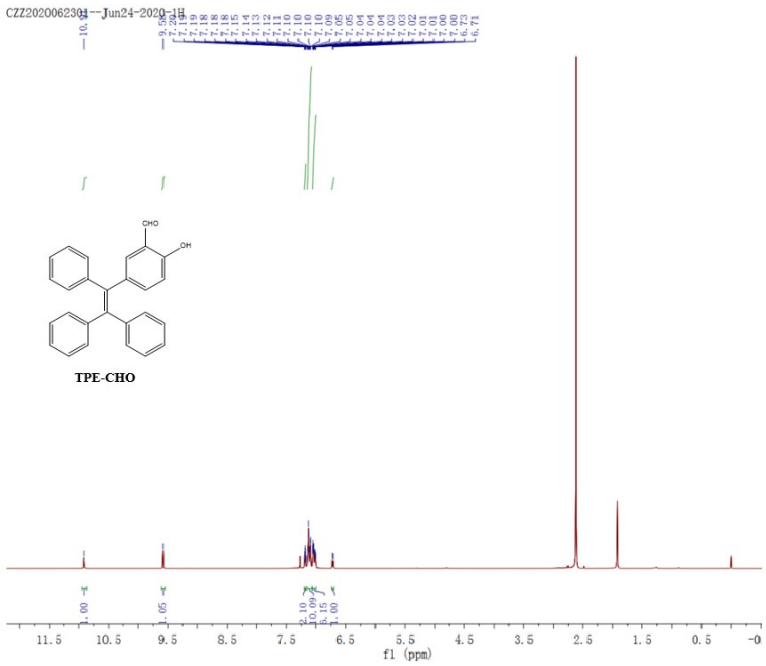


Fig. S1 ^{1}H NMR spectrum of compound **TPE-CHO**.

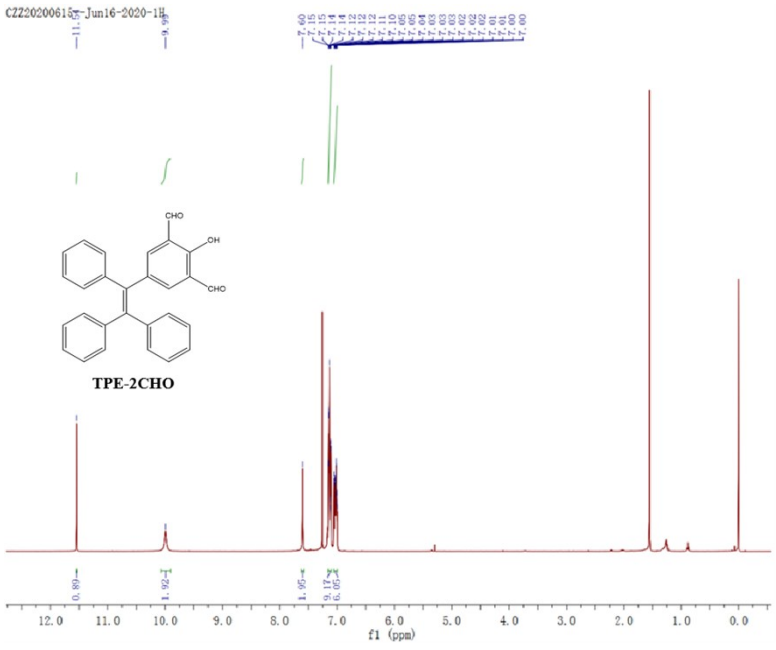


Fig. S2 ^{1}H NMR spectrum of compound **TPE-2CHO**.

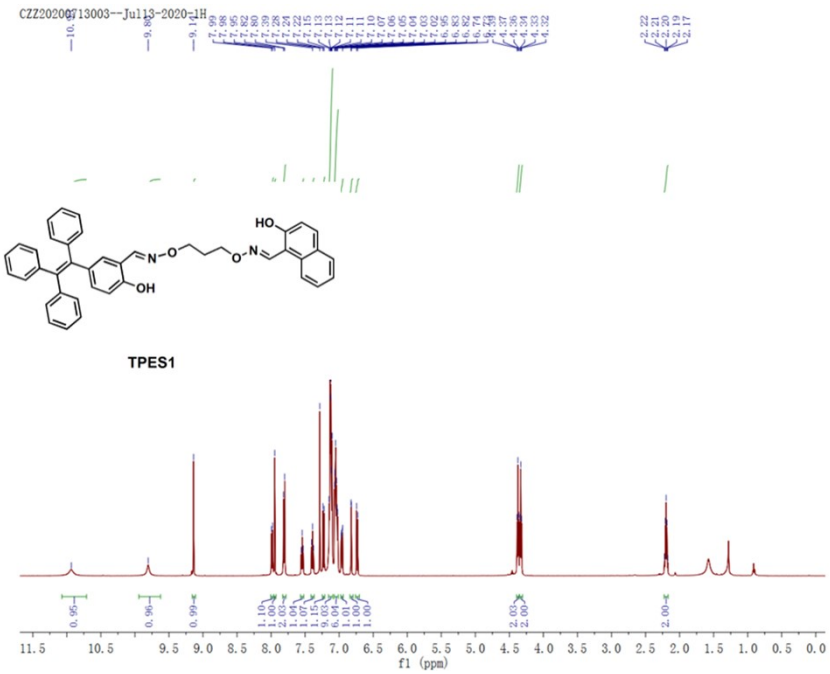


Fig. S3 ^{1}H NMR spectrum of probe **TPES1.**

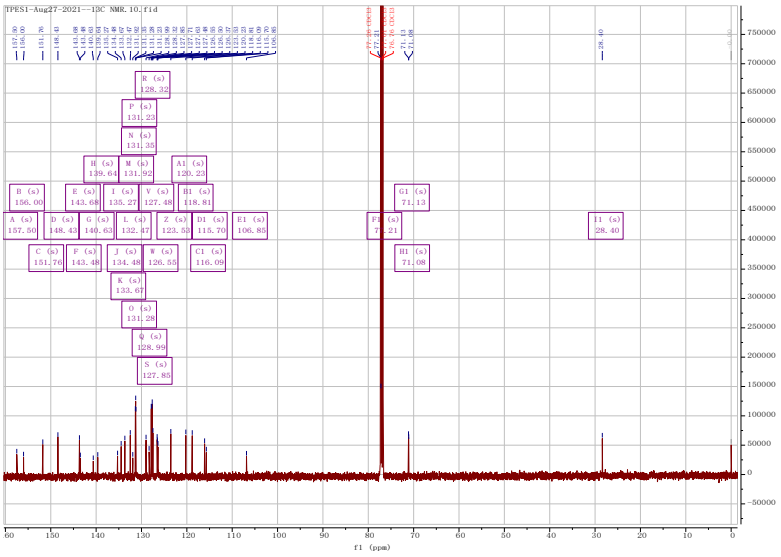


Fig. S4 ^{13}C NMR of **TPES1** in $CDCl_3$. ^{13}C NMR (500 MHz, Chloroform-d) δ 157.50, 156.00, 151.76, 148.43, 143.68, 143.48, 140.63, 139.64, 135.27, 134.48, 133.67, 132.47, 131.92, 131.35, 131.28, 131.23, 128.99, 128.32, 127.85, 127.71, 127.63, 127.48, 126.55, 126.50, 126.37, 123.53, 120.23, 118.81, 116.09, 115.70, 106.85, 77.21, 71.13, 71.08, 28.40.

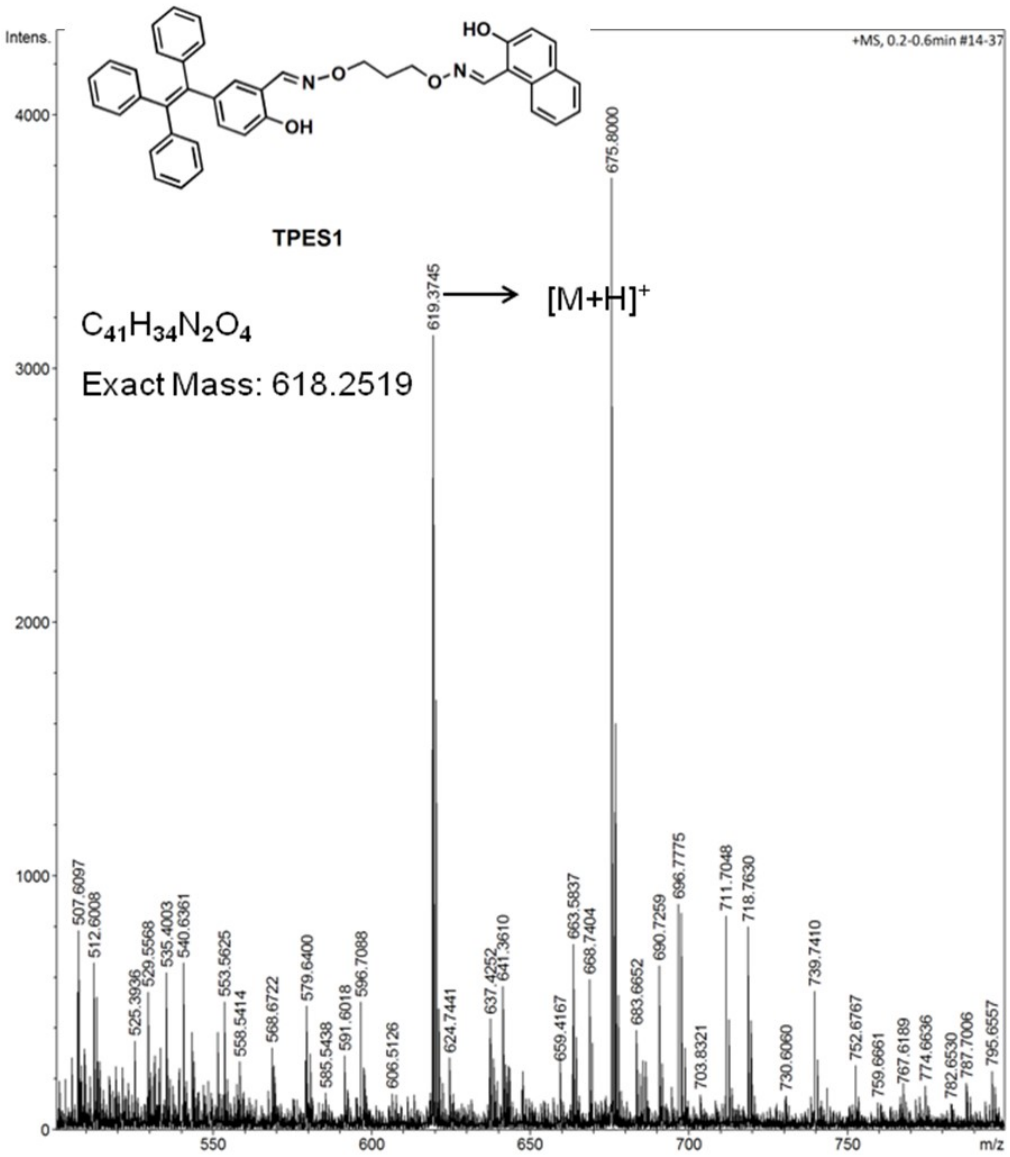


Fig. S5. Mass spectrum of the probe **TPES1**.

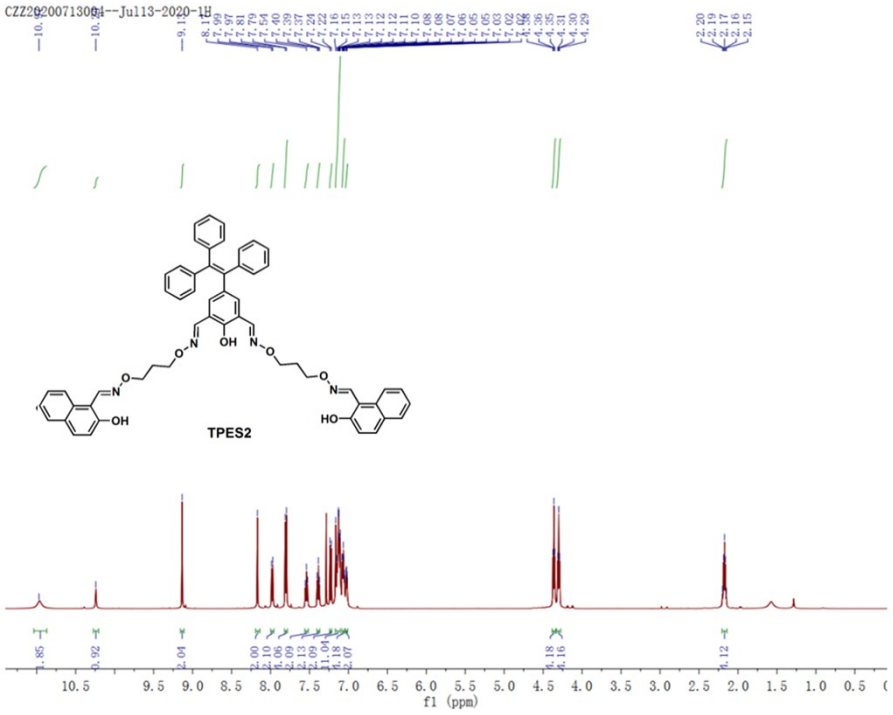


Fig. S6 ^{1}H NMR spectrum of probe **TPES2.**

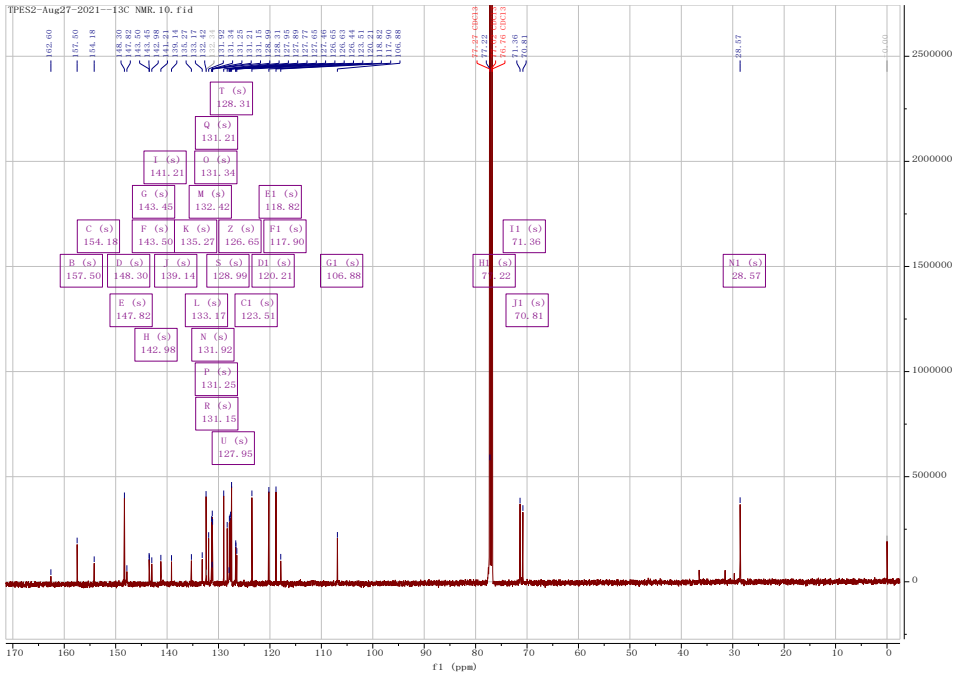


Fig. S7 ^{13}C NMR of **TPES2** in $CDCl_3$. (500 MHz, $CDCl_3$) δ, 157.50, 154.18, 148.30, 147.82, 143.50, 143.45, 142.98, 141.21, 139.14, 135.27, 133.17, 132.42, 132.34, 131.92, 131.34, 131.25, 131.21, 131.15, 128.99, 128.31, 127.95, 127.89, 127.77, 127.65, 127.46, 126.65, 126.63, 126.44, 123.51, 120.21, 118.82, 117.90, 106.88, 77.27, 77.22, 77.02, 76.76, 71.36, 70.81, 28.57.

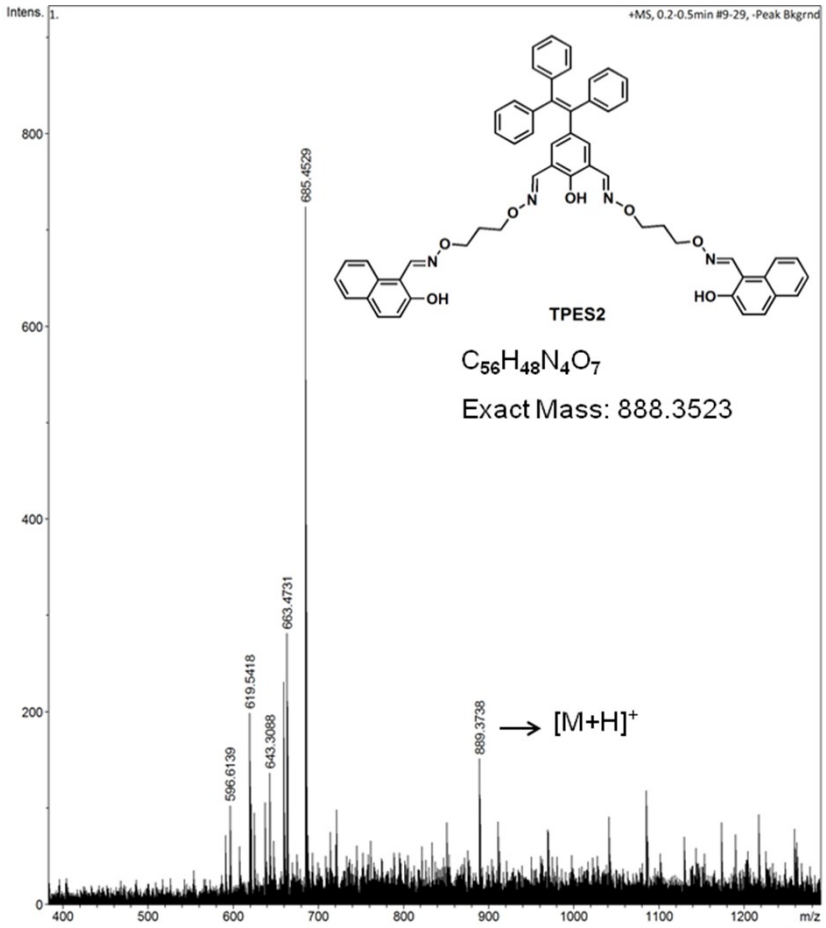


Fig. S8. Mass spectrum of the probe **TPES2**.

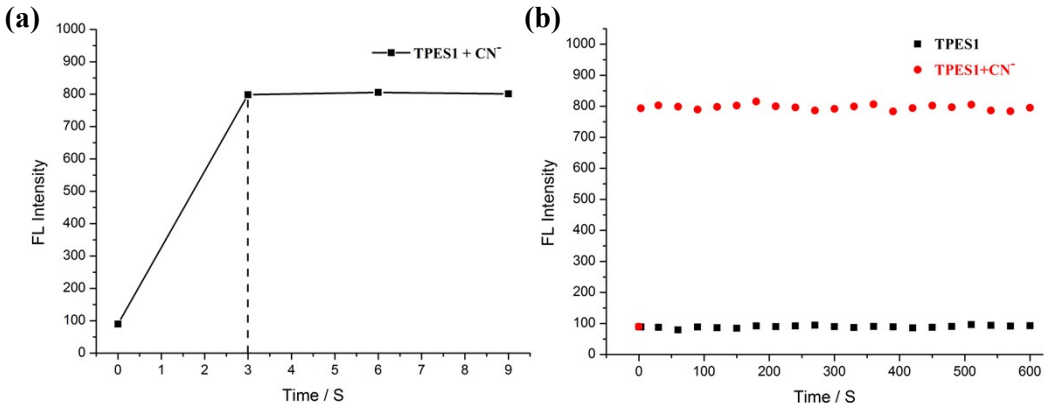


Fig. S9 (a) Response time and (b) fluorescence stability of probe **TPES1** towards CN^-.

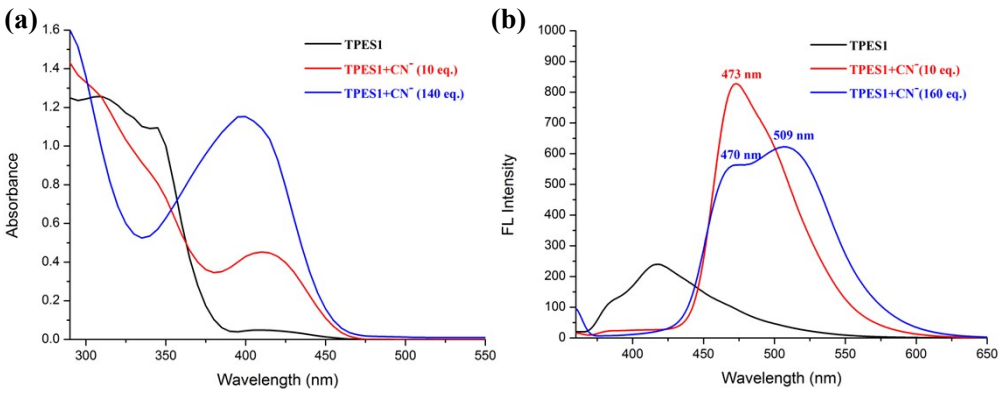


Fig. S10 UV-Vis and fluorescence spectra of initial addition and titration end points.

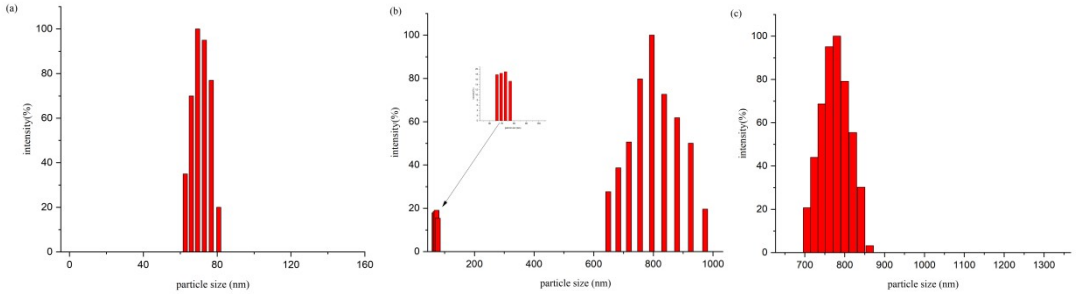


Fig. S11 (a) **TPES2** (b) **TPES2** + 10 eq. CN-, (c) **TPES2** + 160 eq. CN^- dynamic light scattering experiments.

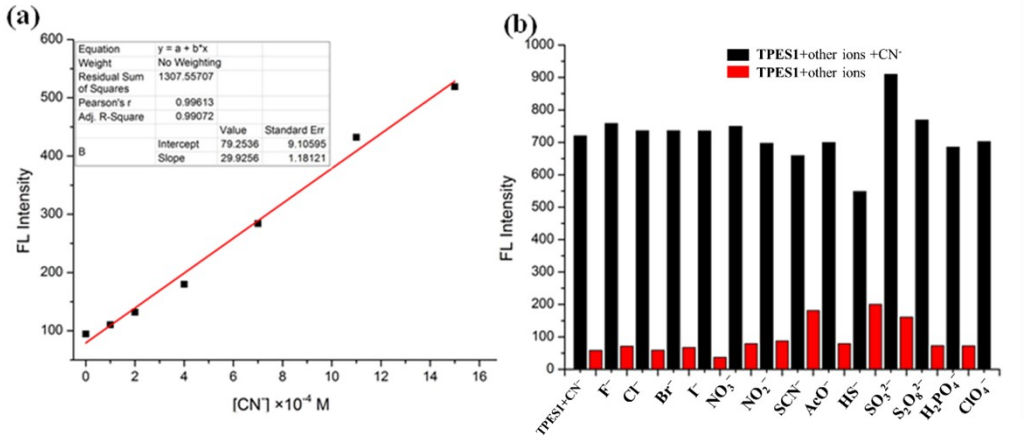


Fig. S12 (a) The relationship between the fluorescence intensity (473 nm) and the CN^- ion concentration (0-16.0 × 10^{-4} M); (b) anti-interference experiment of probe **PETS1** (473 nm).

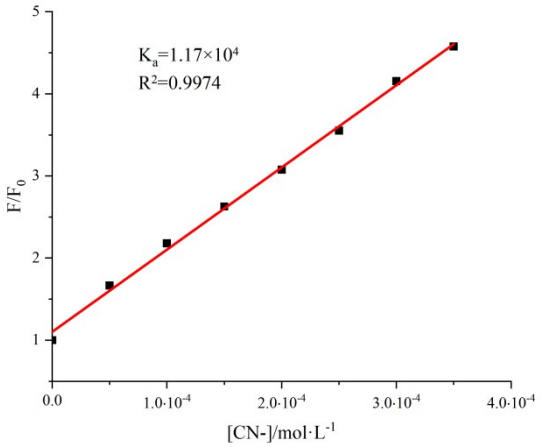


Fig. S13 The binding constant curve after CN^- is added to **TPES1**

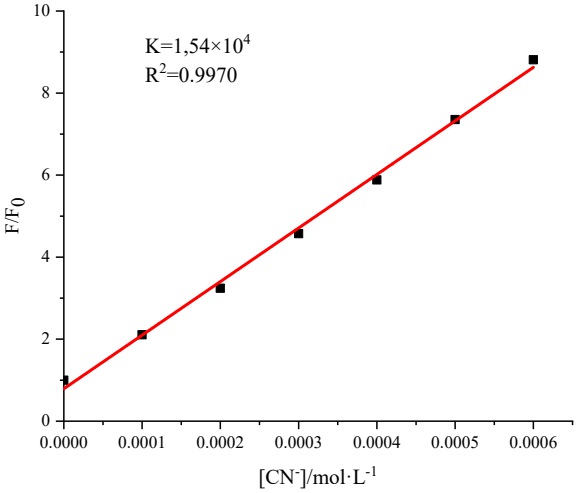


Fig. S14 The binding constant curve after CN^- is added to **TPES2**

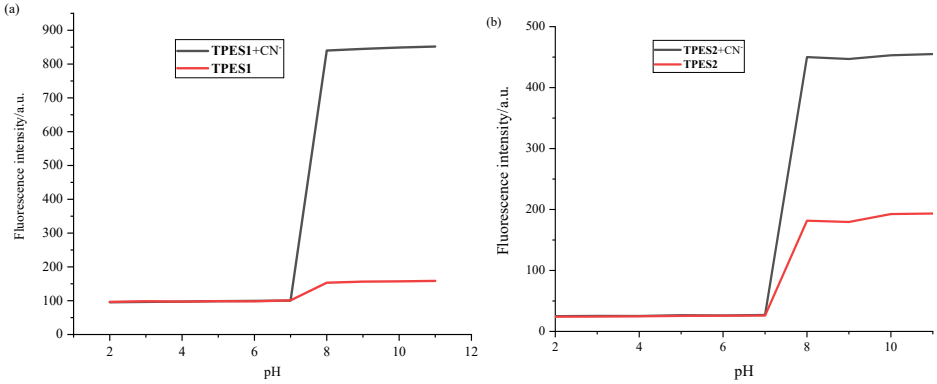


Fig. S15 The fluorescence intensity of the probe (a)**TPSES1** and (b) **TPES2** changed with pH after adding CN^-.

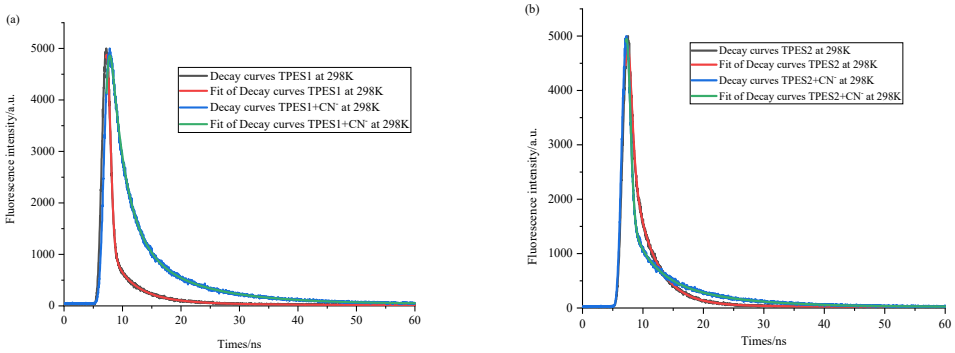


Fig. S16 (a) **TPES1** and **TPES1**+CN^-, (b) **TPES2** and **TPES2**+CN- fitting curve of fluorescence lifetime

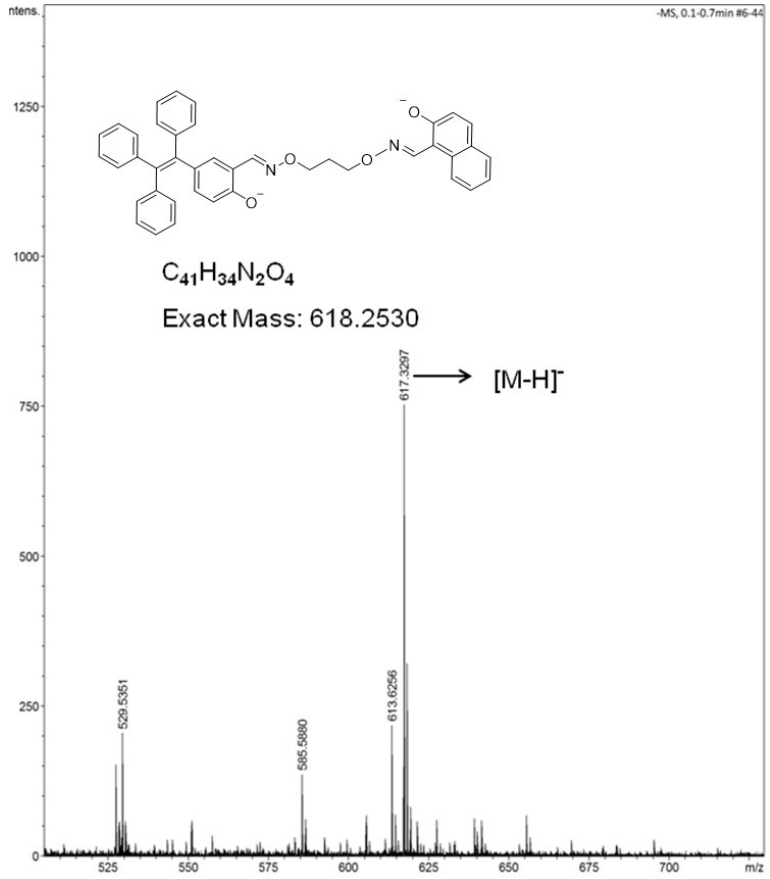


Fig. S17 The mass spectrum of probe **TPES1** and CN^- after mixing for 15 minutes.

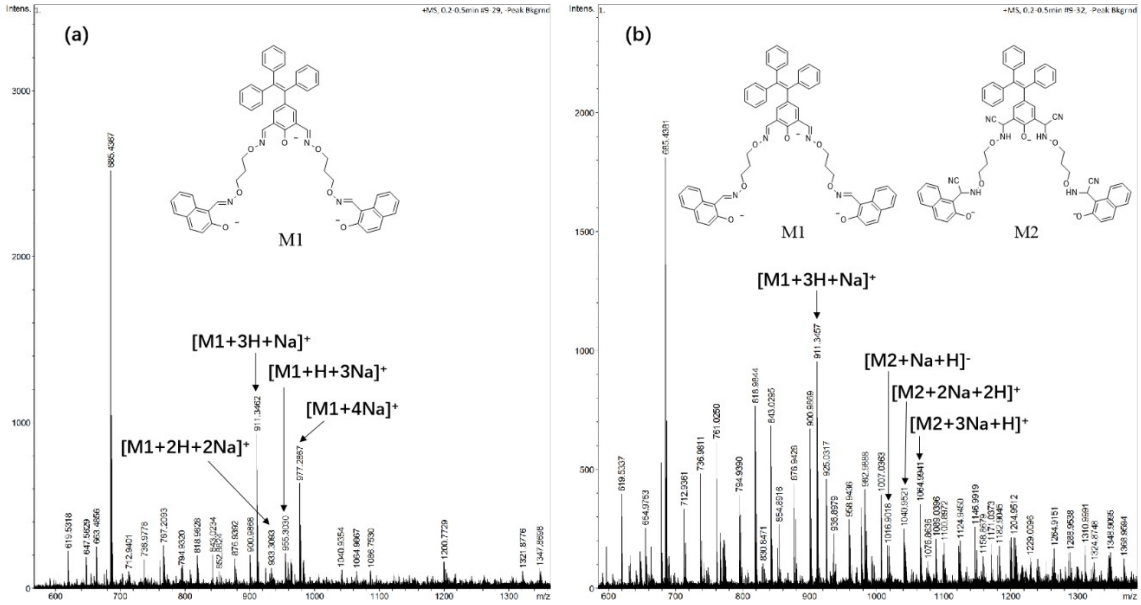


Fig. S18 The mass spectra (a) measured immediately; (b) after mixing for 15 minutes after probe **TPES2** and CN^- are mixed.