Electronic Supplementary Material (ESI) for RSC Advances.

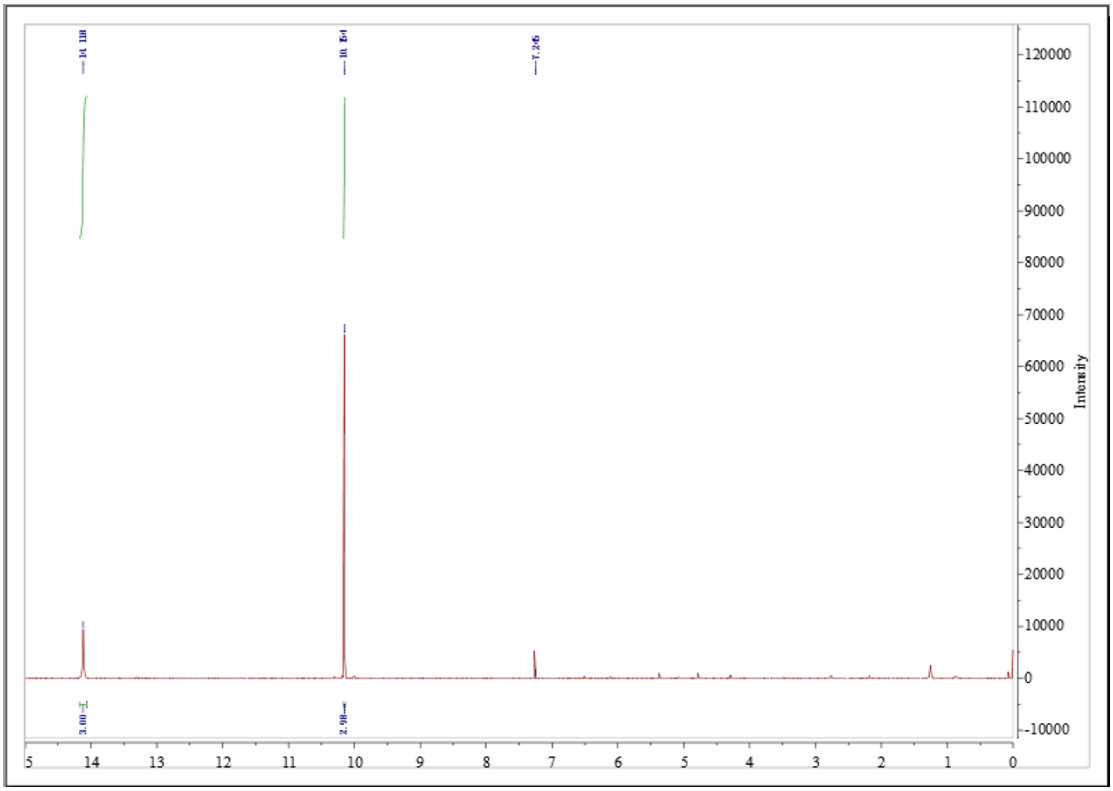

Figure S1 ^{1}H NMR spectra of Tp (600 MHz, $CDCl_3$): -OH (14.118 ppm, S, 3H), -CHO (10.154 ppm, S, 3H)

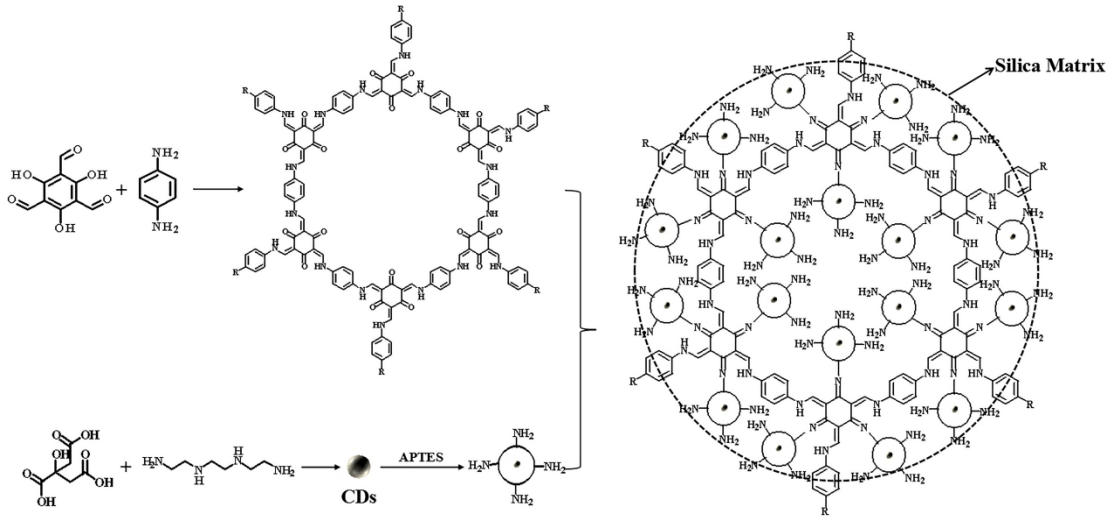

Figure S2 Preparation scheme of TpPa-1 COF@CDs

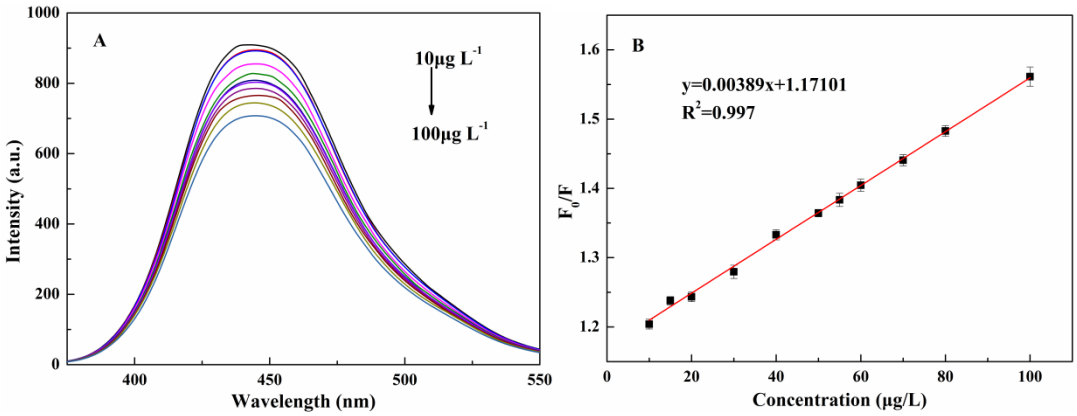

Figure S3 Fluorescence spectrum of TpPa-1 COF@CDs quenched by series concentration Hg^{2+} (A) and fluorescence titration curve for Hg^{2+} (B) in pure water

Table S1 Relevant parameters of Nengjiang River sample

Test items	Temperature (℃)	pH	Electric conductivity (ms m^{-1})	Dissolved oxygen (mg L^{-1})	Permanganate (mg L^{-1})	Five-day biochemical oxygen demand (mg L^{-1})	Ammonia nitrogen (mg L^{-1})	Oil (mg L^{-1})	Volatile phenol (mg L^{-1})	COD (mg L^{-1})	Total nitrogen (mg L^{-1})	Total phosphorus (mg L^{-1})	Mercury (mg L^{-1})
Test value	12.0	8.0	14.8	8.38	3.8	1.3	0.126	—	—	17	0.42	0.02	—
Test items	Selenium (mg L^{-1})	Arsenic (mg L^{-1})	Hexavalent chrome (mg L^{-1})	Cyanide (mg L^{-1})	Anionic surfactant (mg L^{-1})	Sulfide (mg L^{-1})	Boron (mg L^{-1})	Stibium (mg L^{-1})	Formaldehyde (mg L^{-1})	Hydrazine hydrate (mg L^{-1})	Butylxanthic acid (mg L^{-1})	Active chlorine (mg L^{-1})	Titanate (mg L^{-1})
Test value	—	0.0007	—	—	—	—	—	0.0004	—	—	—	—	—

“ — ” represented that the test items was not detected in Nenjiang River sample.

Table S2 The fluorescence lifetime of TpPa-1 COF@CDs solution before and after Hg^{2+} addition

System components	τ_1 (ns)	τ_2 (ns)	T_{av} (ns)	R^2
TpPa-1 COF@CDs	4.0366	13.5251	11.99	0.8169
TpPa-1 COF@CDs+Hg^{2+}	2.4534	9.5247	7.08	0.9867

Table S3 Results of actual water sample recoveries (n=5)

Analytical samples	Detected value (μg L^{-1})	Added (μg L^{-1})	Found (μg L^{-1})	Recovery (%)	RSD (%)
Nenjiang River	—[a]	0	—[b]	—	—
		20.00	19.15	95.76	5.66
		60.00	59.04	98.40	4.38
		90.00	94.21	104.68	7.62

—[a] and —[b] represented that the concentration of Hg^{2+} in blank water sample was below detection limit using GB 3838-2002 method and the fluorescence method of this work, respectively.

Table S4 Comparison of TpPa-1 COF@CDs with other fluorescent COFs

Names of Fluorescent COFs	Reaction functional monomer	Reaction time (h)	Adsorption capacity (mg g^{-1})	Fluorescence LOD (μg L^{-1})	Recyclable times	References
AH-COF	2,5-dihydroxy-3,6-diallylterephthalohydrazide (synthesized through three organic reaction procedures); 1,3,5-trisformylbenzene	72 h	—	20	4	10
TNPP	4-(bis(4-bromophenyl) amino) benzaldehyde, tris (4-(4,4,5,5-tetra-methyl-1,3,2-dioxaborolan-2yl) phenyl) amine, thiosemicarbazone	84 h	47.8	22.8	3	49
COF based amine and sulfonyl groups	2,4,6-trihydroxybenzene-1,3,5-tricarbaldehyde, 2,5-diaminobenzene sulfonic acid	72 h	98.42	640	5	19
TFPPy-CHYD	1,3,6,8-tetrabromopyrene, 4-formylphenylboronic acid, triphenylphosphine	72 h	758	3.41	6	52
NOP-28	cyanuric chloride, anhydrous $AlCl_3$, diphenylsulfane	24 h	658	12	—	54
TPE-S-COF	4,4’-dithiodianiline, 4’,4’’,4’’’,4’’’’-(ethene-1,1,2,2-tetrayl) tetrakis-(([1,1’-biphenyl]-4-carbaldehyde))	120 h	42.4	38.7	3	16
TpPa-1 COF@CDs	p-phenylenediamine, 1,3,5-triformylphloroglucinol, tartaric acid, ethylenediamine	20 h	235	0.75	5	This work

“—” represented that it is not mentioned in the previous report.

Table S5 The previous methods of detection of Hg^{2+} using carbon dots as fluorescent probe

Carbon source	Detection limit (μmol/L)	Concentration range (μmol/L)	References
catechol	0.015	0.015-10	29
folic acid	0.1	0-16	30
ampicillin sodium	0.033	0-50	32
ammonium citrate	0.41	0-20	33
2,4,6-triaminopyrimidine	0.011	0-10	34