

Electronic Supplementary Information

Copper nanoclusters with strong fluorescence emission as a sensing platform for sensitive and selective detection of picric acid

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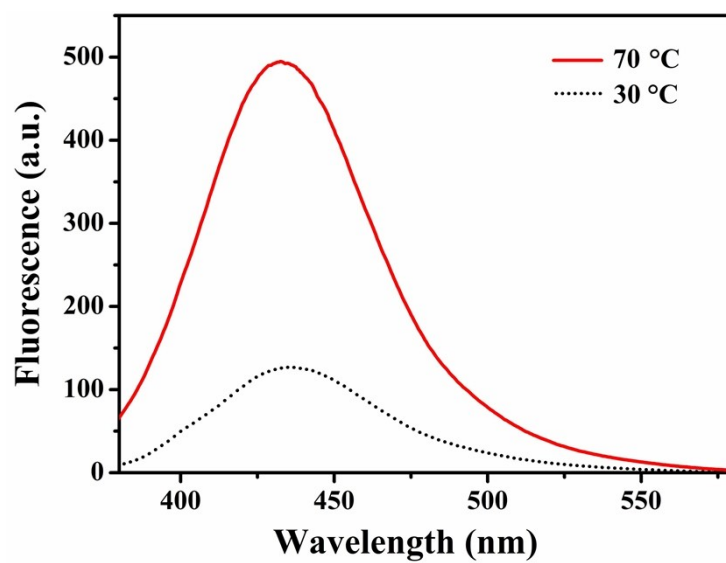


Fig. S1. Fluorescence spectra of the CuNCs synthesized at 70 °C and 30 °C, respectively. The as-obtained CuNCs are diluted 25 times with ultrapure water.

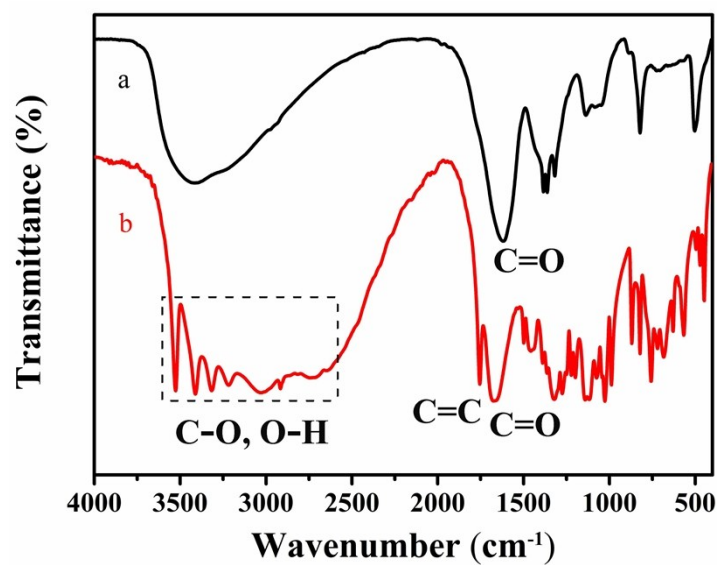


Fig. S2. FTIR spectra of the CuNCs (curve a) and pure AA (curve b).

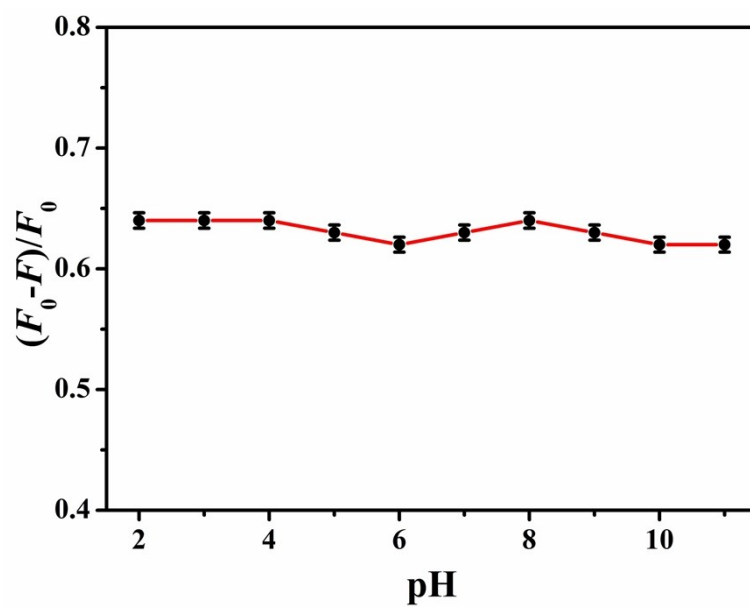


Fig. S3. Effect of different pH on the fluorescence-quenched efficiency of PA. $C_{(PA)} = 50 \mu\text{M}$.

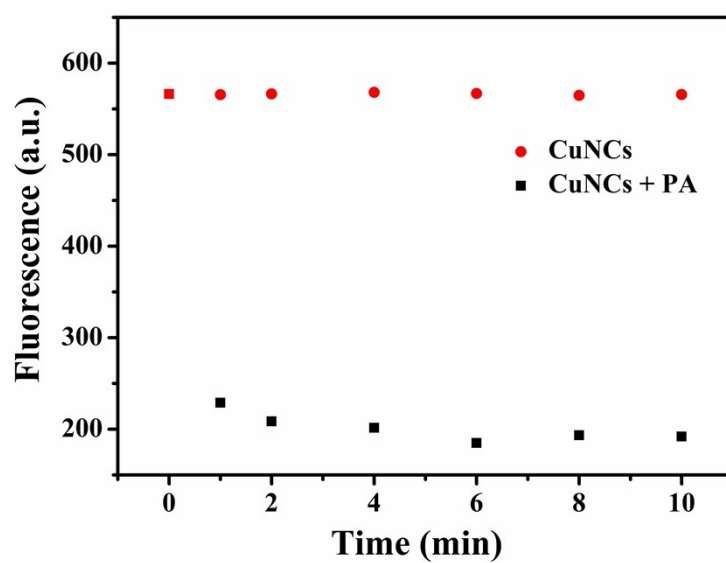


Fig. S4. The fluorescence intensity of the CuNCs at different incubation time before and after adding PA. $C_{(PA)} = 50 \mu\text{M}$.

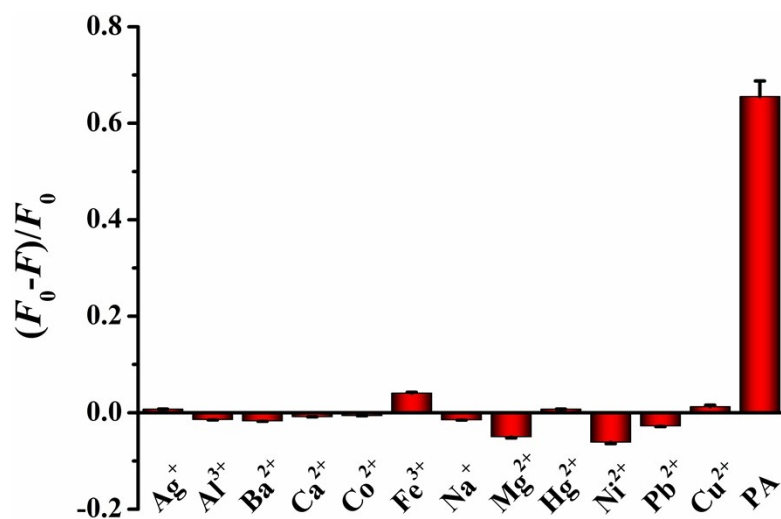


Fig. S5. Selectivity of PA determination at pH 8.0. The concentrations of PA and metal ions are 50 and 25 μ M, respectively.

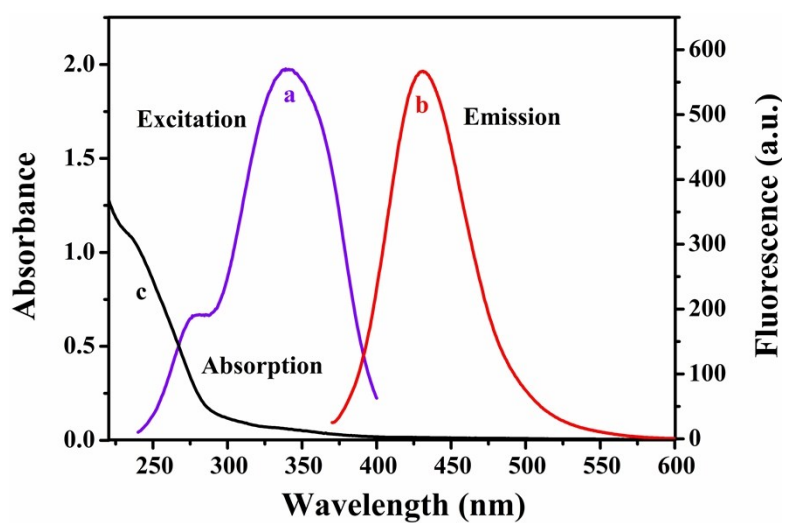
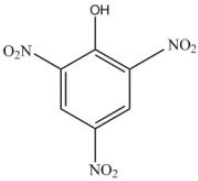
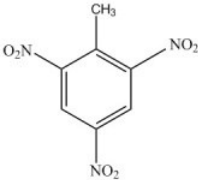
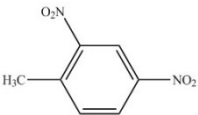
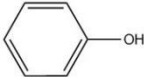
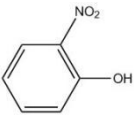
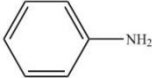
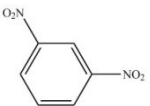
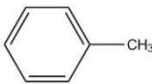
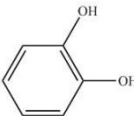
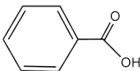
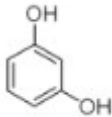


Fig. S6. Fluorescence excitation (curve a) and emission spectra (curve b) of the CuNCs and absorption spectrum (curve c) of TNT.

Table S1. Basic information of PA and its analogues involved in the experiments.

Analogue	Abbreviation	Molecular formula	Molecular weight	Structure
picric acid	PA	$C_6H_3N_3O_7$	229.11	
2,4,6-trinitrotoluene	TNT	$C_7H_5N_3O_6$	227.13	
2,4-dinitrotoluene	2,4-DNT	$C_7H_6N_2O_4$	182.14	
phenol	CA	C_6H_6O	94.11	
<i>o</i> -nitrophenol	<i>o</i> -NP	$C_6H_5NO_3$	139.11	
aniline	AN	C_6H_7N	93.14	
<i>m</i> -dinitrobenzene	<i>m</i> -DNB	$C_6H_4N_2O_4$	168.11	
methylbenzene	MB	C_7H_8	92.14	
<i>o</i> -dihydroxybenzene	<i>o</i> -DHB	$C_6H_6O_2$	110.11	
<i>p</i> -dihydroxybenzene	<i>p</i> -DHB	$C_6H_6O_2$	110.11	
benzoic acid	BA	$C_7H_6O_2$	122.12	
<i>m</i> -dihydroxybenzene	<i>m</i> -DHB	$C_6H_6O_2$	183.10	

<i>p</i> -chlorophenol	<i>p</i> -CP	C ₆ H ₅ OCl	128.56	
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Table S2. Comparison of multiple strategies for PA sensing.

Strategy	Linear range (μM)	Detection limit (μM)	Medium used	Reference
C-dots	Not given	0.33	DMF ^a	[1]
Bimetallic Schiff-base Al ³⁺ complexes	Not given	55 168	MeOH ^b /DMSO ^c	[2]
MOFs ^d	0 – 50	2.5	DMA ^e	[3]
Covalent-organic polymer	Not given	~ 4.37	Methanol	[4]
C-dots	Not given	1	Water	[5]
Conjugated polymers	Not given	1	Water/THF ^f (v/v = 9:1)	[6]
CDs	1-110	1.8	Water	[7]
C-dots	Not given	1	Hydrophobic medium	[8]
Metal complex	Not given	Not given	Water/acetone(v/v=9:1)	[9]
CuNCs	2-40	0.98	water	This work

^a DMF, dimethylformamide; ^b MeOH, methanol; ^c DMSO, dimethyl sulfoxide;

^d MOFs, metal-organic frameworks; ^e DMA, N,N-dimethylacetamide;

^f THF, tetrahydrofuran.

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