Electronic Supplementary Information

Supersensitive and selective detection of picric acid explosive by fluorescent Ag nanoclusters

Jian Rong Zhang, Yuan Yuan Yue, Hong Qun Luo,* and Nian Bing Li*

Key Laboratory of Eco-environments in Three Gorges Reservoir Region (Ministry of Education), School of Chemistry and Chemical Engineering, Southwest University, Chongqing 400715, PR China.

* Corresponding authors: linb@swu.edu.cn (N.B. Li); luohq@swu.edu.cn (H.Q. Luo)

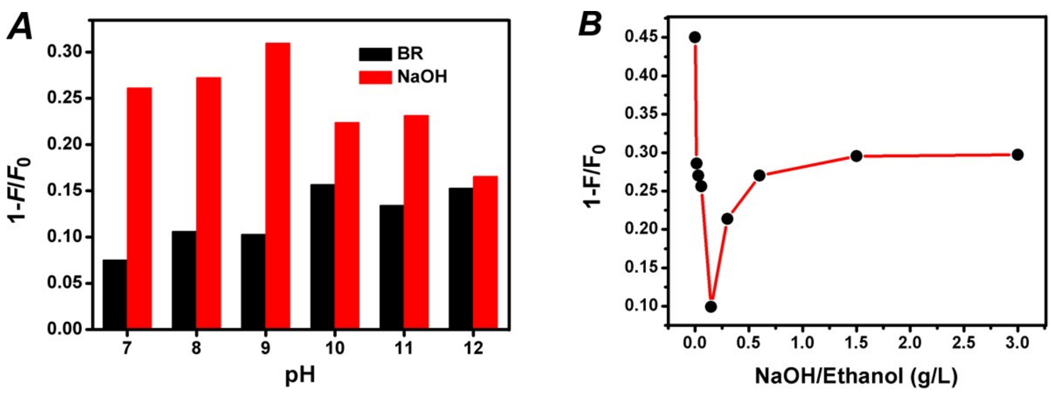

Fig. S1 Fluorescence quenching efficiencies of Ag nanoclusters in different media in the presence of 2 μM PA. Black column in (A) for 10 mM BR buffer solutions at different pHs; red column in (A) for NaOH aqueous solutions at different pHs; (B) for NaOH ethanol solutions with different basicities. F_0 and F represent the fluorescence intensity (λ_{ex} = 375 nm, λ_{em} = 450 nm) of Ag nanoclusters in the absence and presence of PA, respectively.

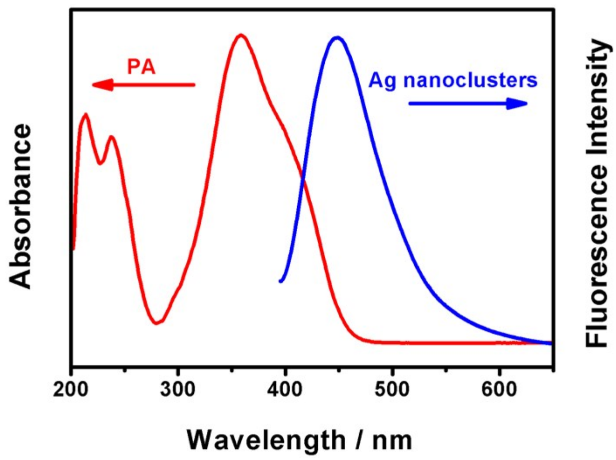

Fig. S2. Absorption spectrum of PA and fluorescence emission spectrum of Ag nanoclusters in ethanol medium.

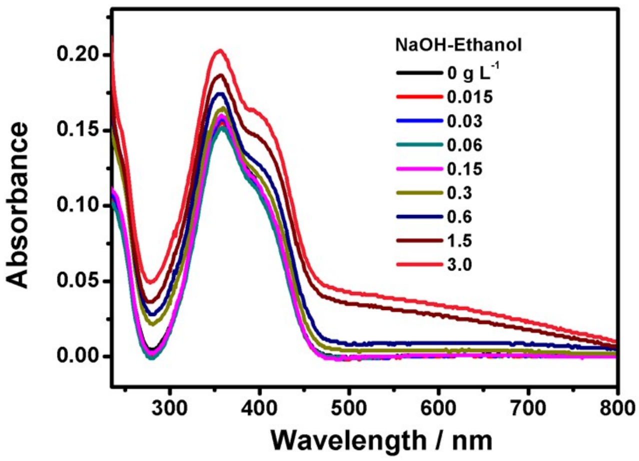

Fig. S3 Absorption spectra of 20 μM PA in the presence of NaOH ethanol solutions with different basicities. The alkalinities (g L^{-1}) of the NaOH ethanol solutions are denoted as grams of NaOH in 1 L ethanol.

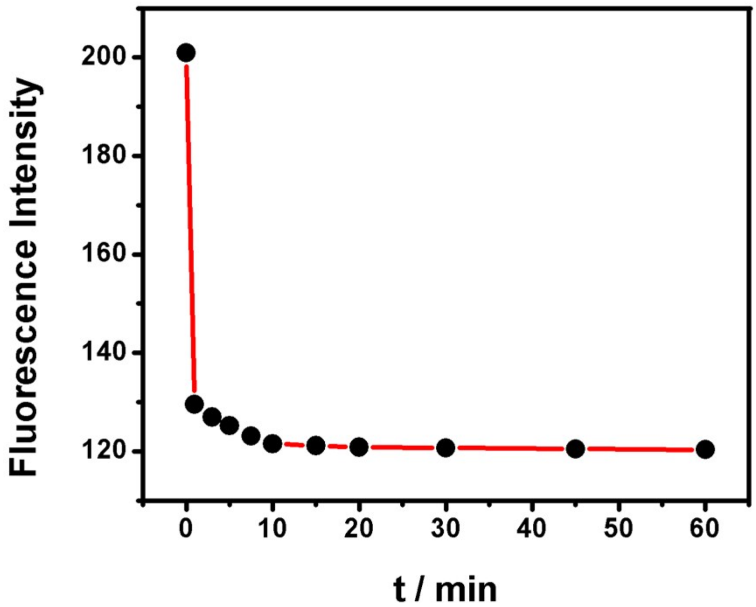

Fig. S4 The fluorescence intensity of Ag nanoclusters in the presence of 2 μM PA after different reaction times in ethanol medium.

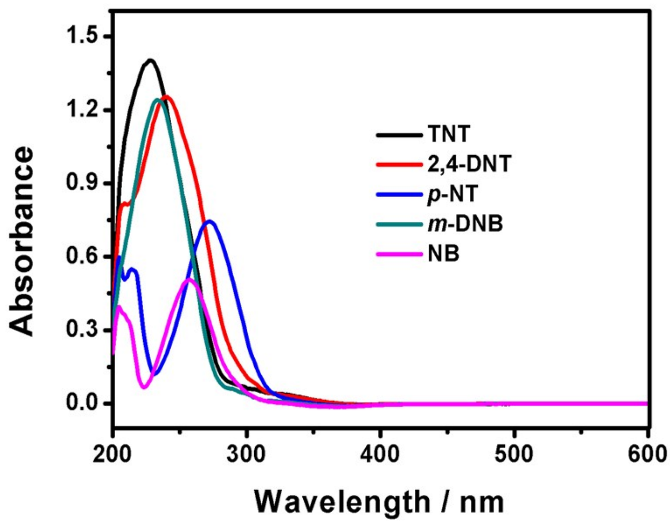

Fig. S5 Absorption spectra of other nitroaromatics in ethanol medium. The concentration of each nitroaromatic is 100 μM.

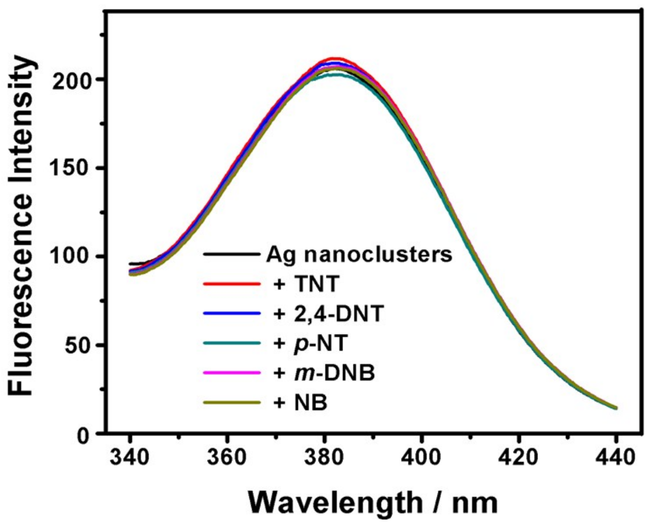

Fig. S6 Excitation spectra of Ag nanoclusters upon addition of different nitroaromatics in ethanol medium. The concentrations of TNT, 2,4-DNT, *p*-NT, *m*-DNB, and NB are 100 μM, respectively.

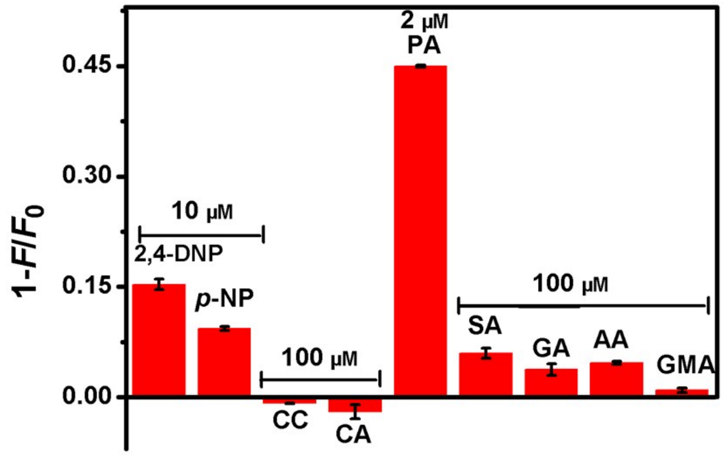

Fig. S7 The fluorescence quenching efficiencies ($1-F/F_0$) of Ag nanoclusters in the presence of different phenolic compounds and several other acidic and organic analytes in ethanol. The concentration of PA is 2 μM; the concentrations of 2,4-DNP and *p*-NP are 10 μM, respectively; the concentrations of o-dihydroxybenzene (CC), phenol (CA), salicylic acid (SA), glutaric acid (GA), adipic acid (AA), and L-glutamic acid (GMA) are 100 μM, respectively. F_0 and F denote the fluorescence intensity of Ag nanoclusters in the absence and presence of analyte in ethanol, respectively; $1 - F/F_0$ is the fluorescence quenching efficiency of Ag nanoclusters by analyte.

Table S1 The performance comparison of different fluorescent PA sensors.

Probe [ref.]	Medium	Selectivity	Sensitivity (nM)
a conjugated polymer containing heteroatom polycyclic units [1]	$CHCl_3$	high	NG
a conjugated polymer film [2]	aqueous solution	low	8.7
a composite film of hexaphenylsilole and achitosan [3]	water	high	21
photoluminescent polysiloles [4]	toluene	low	26
an luminogen-functionalized mesoporous material [5]	water	NG	1.7×10^3
hexa-peri-hexabenzocoronene [6]	H_2O:THF (4:6)	high	4
a pentacenequinone derivative [7]	toluene:DCM (8:2)	low	350
a mercury-modulated hexaphenylbenzene derivative [8]	H_2O:THF (4:6)	high	30
a pentacenequinone derivative [9]	H_2O:THF (9:1)	low	2.18×10^3
N,N-dimethylaminocinnamaldehyde-Hg^{2+} complex [10]	THF:H_2O (9:1)	high	170
zwitterionic squarainedye [11]	CH_3CN:H_2O (9:1)	high	70
N-acylhydrazone [12]	DMF	high	430
conjugated asymmetric triazines [13]	THF/water	high	65
a hetero-oligophenylene derivative [24]	H_2O:EtOH (6:4)	high	26
electron-rich oligofluoranthene [15]	water	low	10^{-3}
tris-imidazolium [16]	$CHCl_3$	low	NG
p-phenylenevinylene-based molecules [17]	THF/water	high	15.2
(benz)imidazolium based tricationic chemosensors [18]	HEPES buffer : DMSO (98:2)	high	1
pentacenequinone derivatives [19]	H_2O:THF (9:1)	low	250
a bispyrene-based molecular [20]	Milli-Q water	low	1.0×10^3
boron–dipyrromethene based fluorescence sensor [21]	CH_3CN:H_2O (9:1)	high	700
composite films containing oligotriphenylene and oligotriphenylene/polysulfone [22]	Water	low	10
copolymer microspheres of hexachlorocyclotri-phosphazene and curcumin [23]	CH_3OH	low	370
a metal organic frame [24]	CH_3CN	high	NG
triptycene based metal–organic gels [25]	ethanol	low	44
Pt^{II}_6 nanoscopiccages with an organometallic backbone [26]	acetonitrile/chloroform	high	3.4×10^3
8-hydroxyquinoline aluminum-based composite nano-spheres [27]	phosphate buffer	high	140
polymer functionalized CdTe/ ZnS quantum dots [28]	aqueous solution	high	9
graphitic carbon nitride (g-C_3N_4) nanosheets [29]	aqueous solution	high	8.2
MoS_2 quantum dots [30]	water	high	95
Ag nanoclusters/DNA hybrids [31]	phosphate buffer	low	5.2×10^{-3}
polyethyleneimine-capped Ag nanoclusters [This Work]	ethanol	high	0.1

NG: Not given

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