Supporting Information

Chemical etching of pH-sensitive aggregation-induced emission-active gold nanoclusters for ultra-sensitive detection of cysteine

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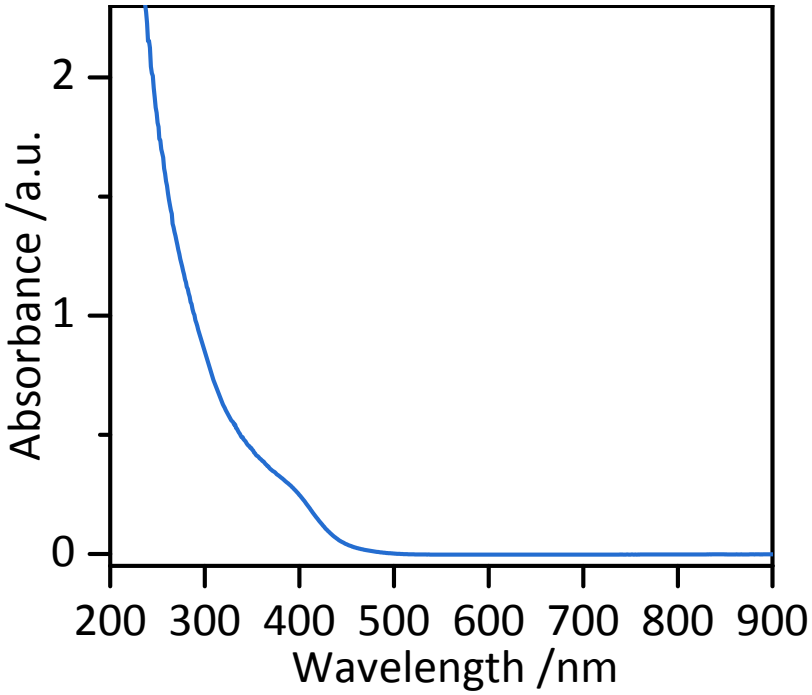

Figure S1. UV-vis absorption of the as-prepared AIE-active Au NCs.

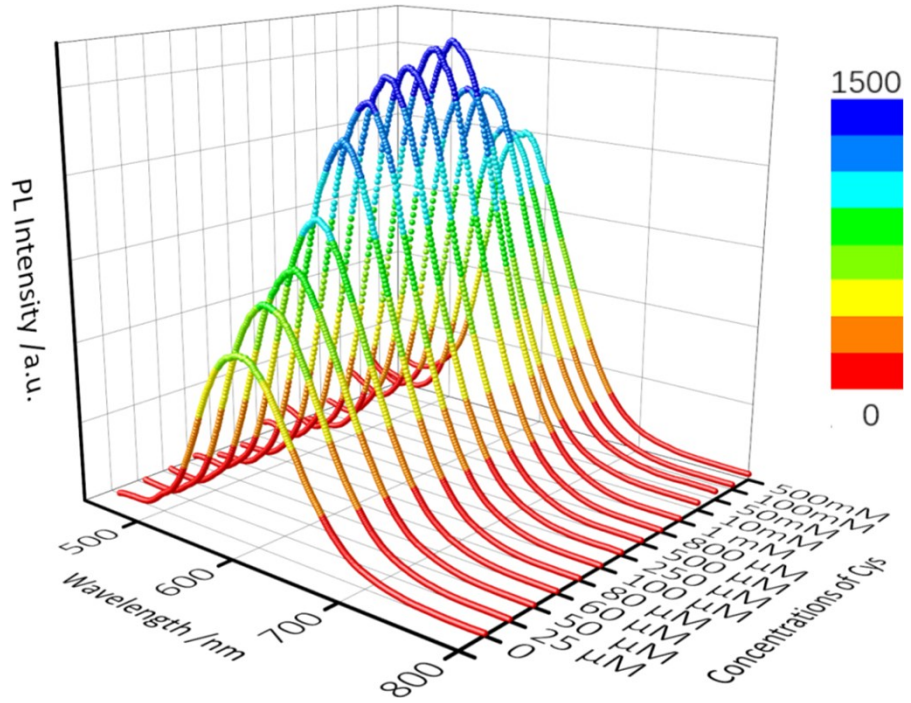

Figure S2. PL spectra of the Au NC solution containing various concentrations of cysteine (25 µM - 500 mM) at pH 2.0 recorded after reaction for 2 hours.

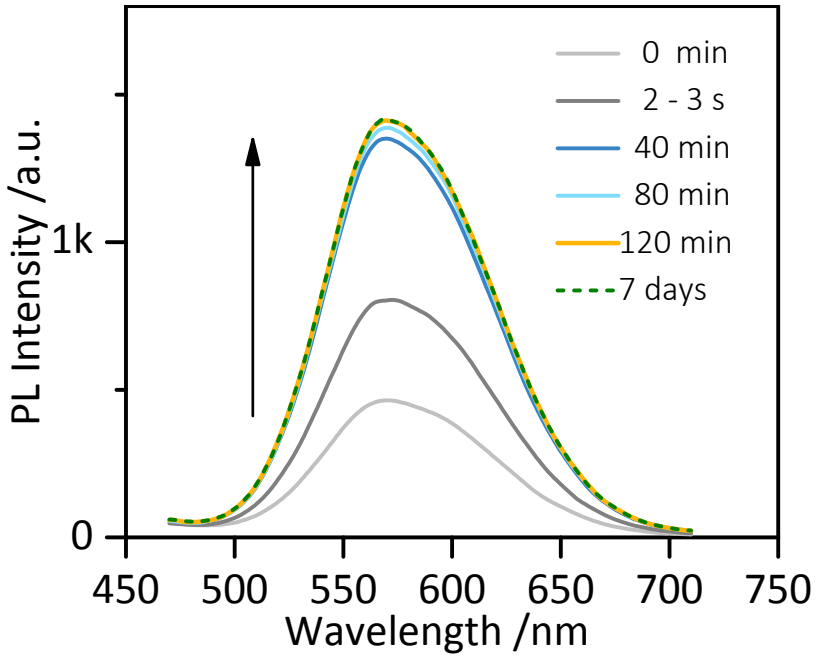

Figure S3. Time-dependent PL spectra of the as-prepared Au NC solution incubating with 1 mM cysteine at pH 2.0.

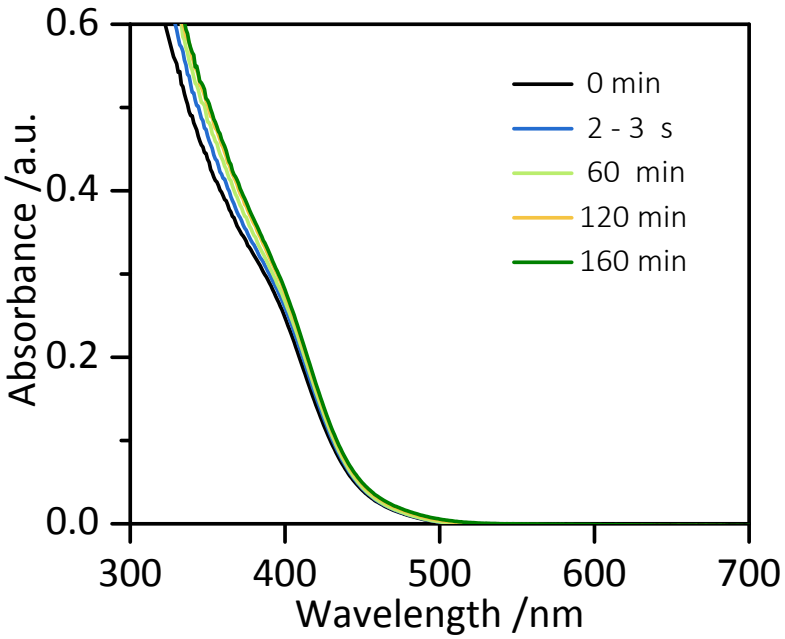

Figure S4. Time-dependent UV-vis absorption spectra of the as-prepared Au NC solution incubating with 1mM cysteine at pH 2.0. Note: the curve of 120 min coincides totally with that of 160 min.

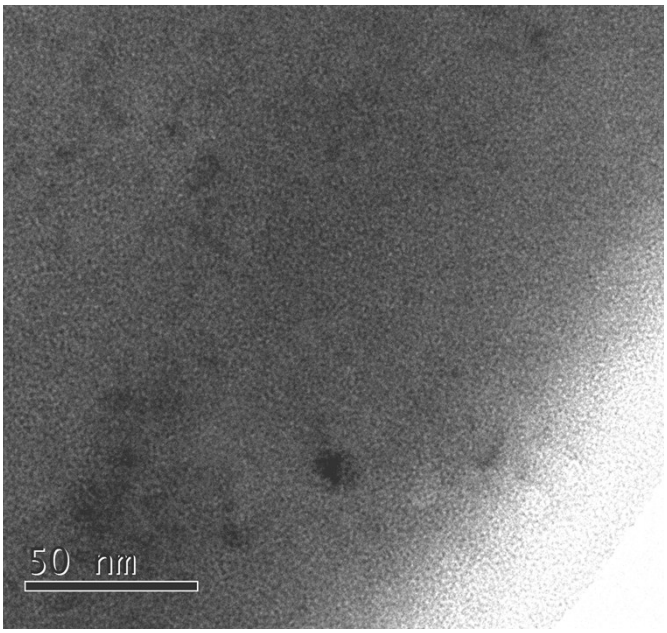

Figure S5. TEM image of the as-prepared Au NC solution at pH 2.0.

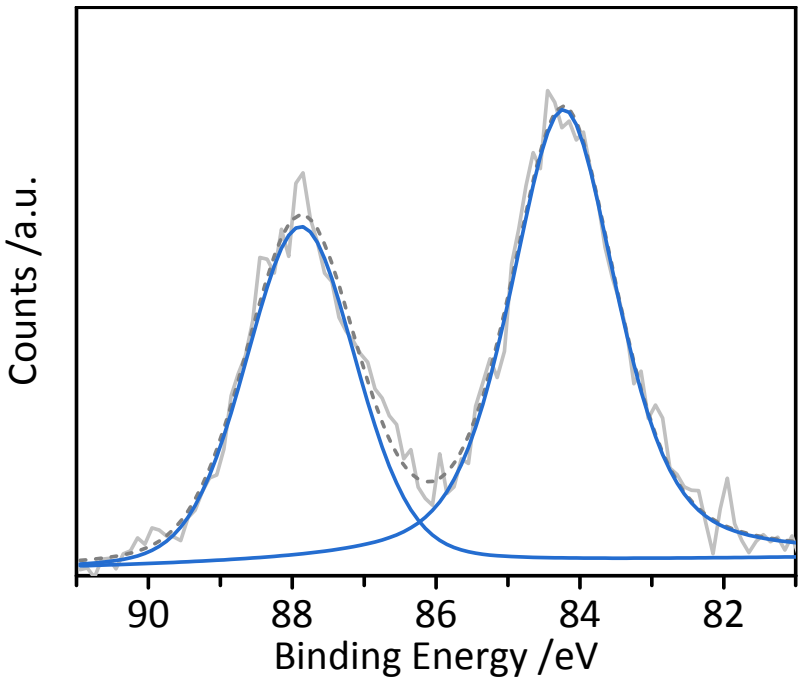

Figure S6. The Au 4f XPS spectra of the AIE-active Au NCs after reaction with 1 mM cysteine at pH 11.0.

Table 1. Comparison of the proposed sensor with previously reported metal NCs-based cysteine sensors.

Sensors	Linear range	LOD	Refs.
BSA-Au NCs [a]	2-800 nM	1.2 nM	1
BSA-Au NCs+Hg^{2+} [a]	0-250 nM	8.3 nM	2
BSA-Au NCs+Ag^{+} [a]	0-2.71 μM	16.54 nM	3
BSA-Au NCs+Au NPs [a]	0.5 mM-50 μM	3.6 μM	4
NBD/BSA-Au NCs [a]	8.33-100 μM	1.45 μM	5
BSA-Au NCs [b]	0.2-60 μM	80 nM	6
GO/Au NCs [c]	0.05-20 μM	0.02 μM	7
PMAA-Ag NCs [a]	25 nM-6.0 mM	20 nM	8
AC12T-Ag NCs [a]	8-100 nM	4 nM	9
dC_{12}-Ag NCs [a]	25-200 nM	0.15 nM	10
C-rich ssDNA-Ag NCs [a]	1 nM-7.5 μM	0.5 nM	11
DNA-Ag NCs [a]	0-5 μM	0.134 μM	12
DNA-Ag NCs+Hg^{2+} [a]	0.02-0.6 μM	1.59 nM	13
L-GSH reduced-Ag NCs[a]	0-500 nM	3 nM	14
L-GSH-Ag NCs [a]	0.025-50 μM	3.4 nM	15
PI-Ag NCs [a]	0.1-5 μM	[f]	16
PEI-Ag NCs [a]	0.1-10 μM	42 nM	17
LSPR-Ag NCs [a]	0.5-100 nM	0.32 nM	18
Dual emission Ag NCs [a]	0.5-220 μM	10 nM	19
PMAA-Ag NCs [d]	5 nM-1 μM	2.5 nM	20
DNA-Ag NCs [e]	0.5-50 μM	5.38 μM	21
BSA-Cu NCs [a]	0.2-10 mM	57 μM	22
PEI-Cu NCs [a]	1-25 μM	0.34 μM	23
DNA-Ag/Pt bimetallic NCs [a]	5-500 nM	2 nM	24
BSA-Pt/Au bimetallic NCs [a]	0.1-50 μM	0.04 μM	25
AIE-type GSH-Au NCs [a]	10 pM-2 mM	6.3 pM	This work

[a] Fluorescent Sensors; [b] Colorimetric Sensors; [c] Electrochemical Sensors; [d] Chemiluminescent Sensors; [e] Electrochemiluminescence (ECL) Methods; [f] not shown.

Human serum samples	Added cysteine	Measured	Recovery (%)	RSD (n=3, %)
1	100 nM	95 nM	95 %	0.42
	1 mM	1.07 mM	107 %	2.30
2	100 nM	103 nM	103 %	1.04
	1 mM	0.97 mM	97 %	1.58
3	100 nM	109 nM	109 %	0.46
	1 mM	0.98 mM	98 %	0.26

Table S1. Recovery of cysteine from EDTA-pretreated human serum samples spiked with 100 nM and 1 mM cysteine, respectively.

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