Supplementary Information (SI) for Analyst.

Electronic Supporting Information

For

Headspace separation combined fluorescence strategy for highly selective detection of hydrogen sulfide using silver nanocluster assemblies as probe via a self-made device

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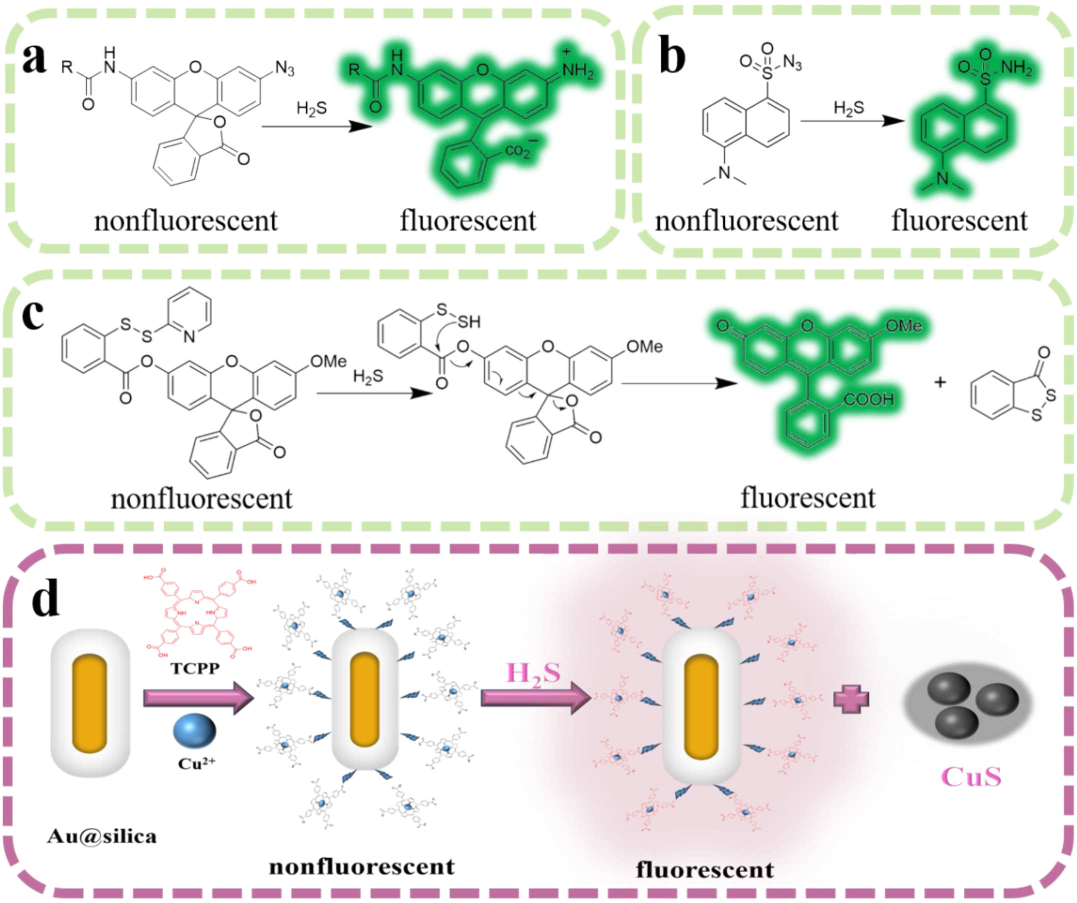

Figure S1 Schematic illustration of the three most common types of fluorescence probes for H_2S. (a, b) H_2S-involved reduction of azides mechanism; (c) nucleophilic reaction mechanism; (d) formation of metal-sulfur bond mechamism.

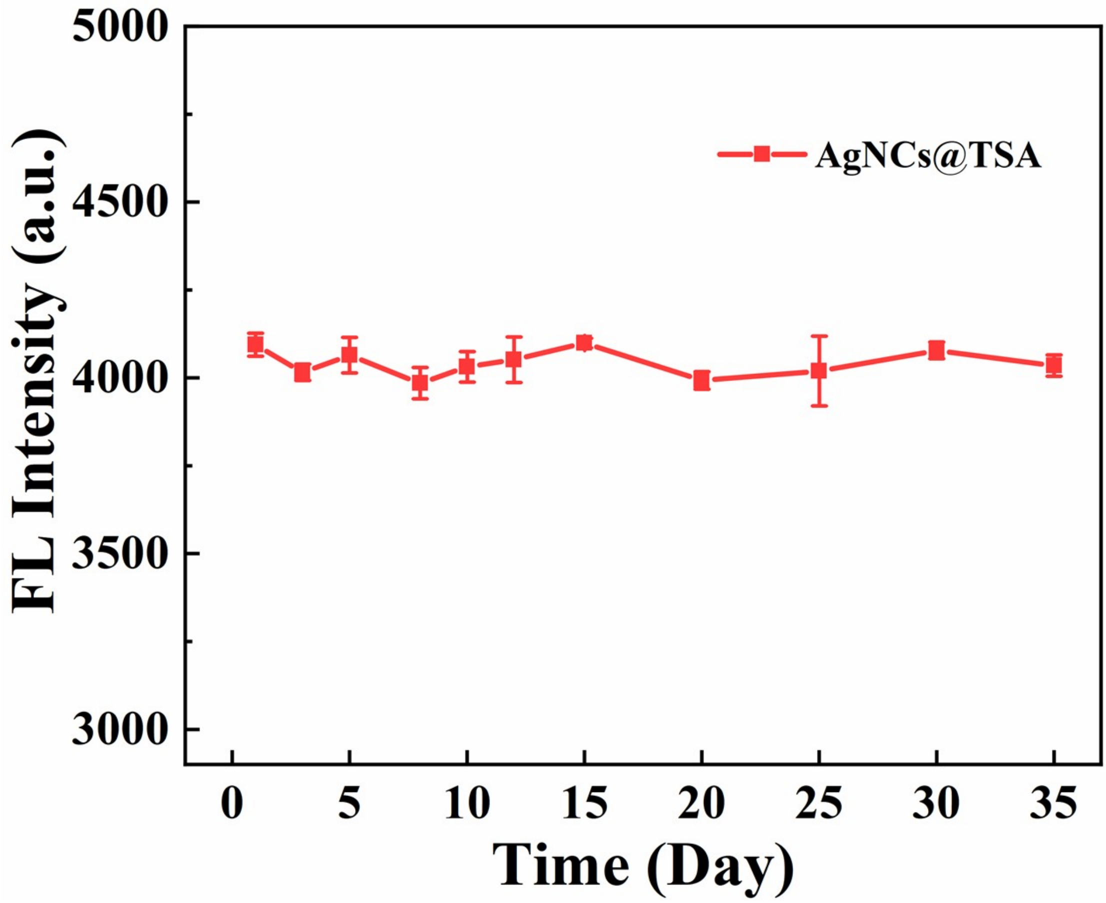

Figure S2 The long term stability of the PL property of AgNCs@TSA.

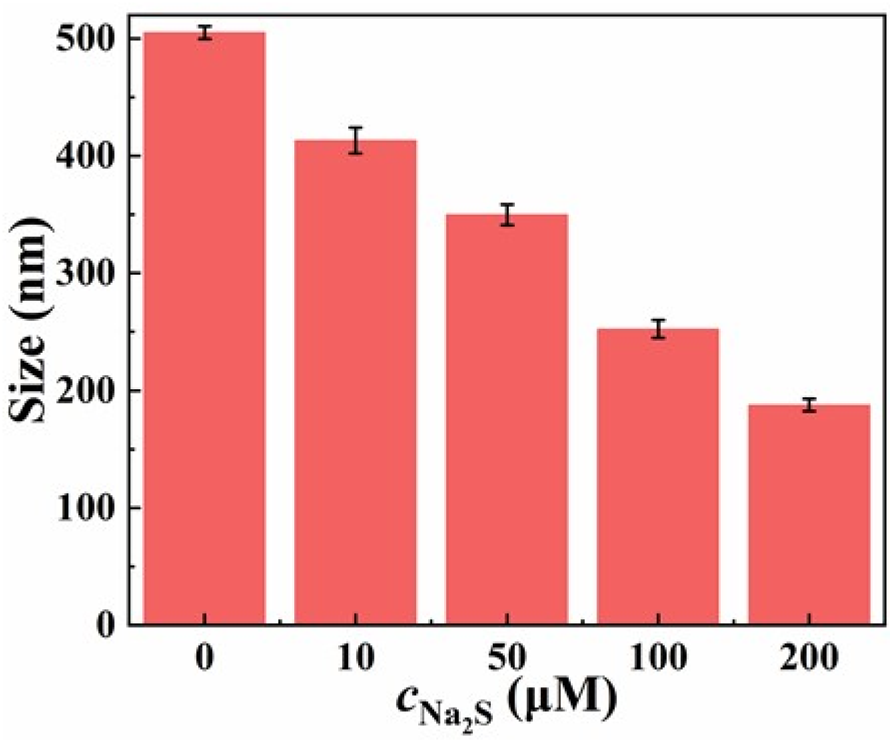

Figure S3 Hydrodynamic diameter of the AgNCs@TSA after being treated with increasing sulfide concentration as measured by DLS, which was performed at a 90° scattering angle in the ambient temperature of 25°C.

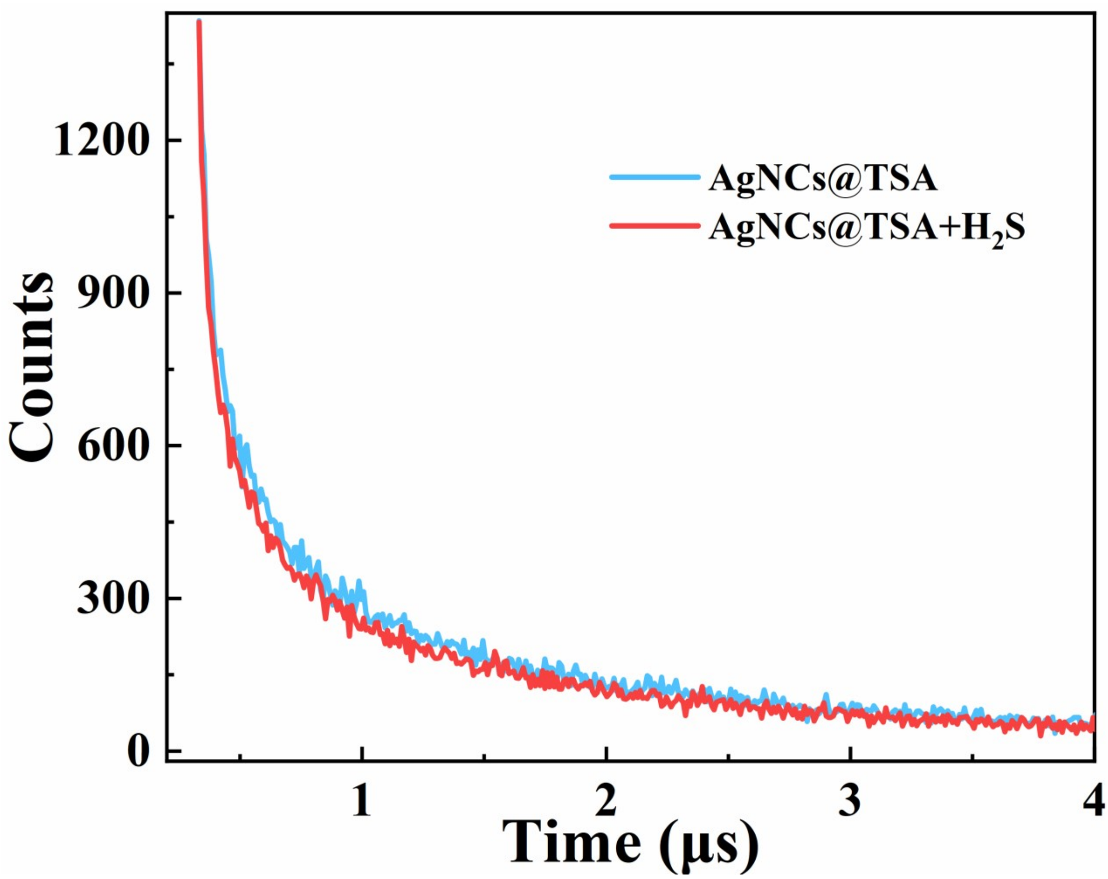

Figure S4 Time-resolved fluorescence decays of the AgNCs@TSA recorded before and after the treatment with H_2S.

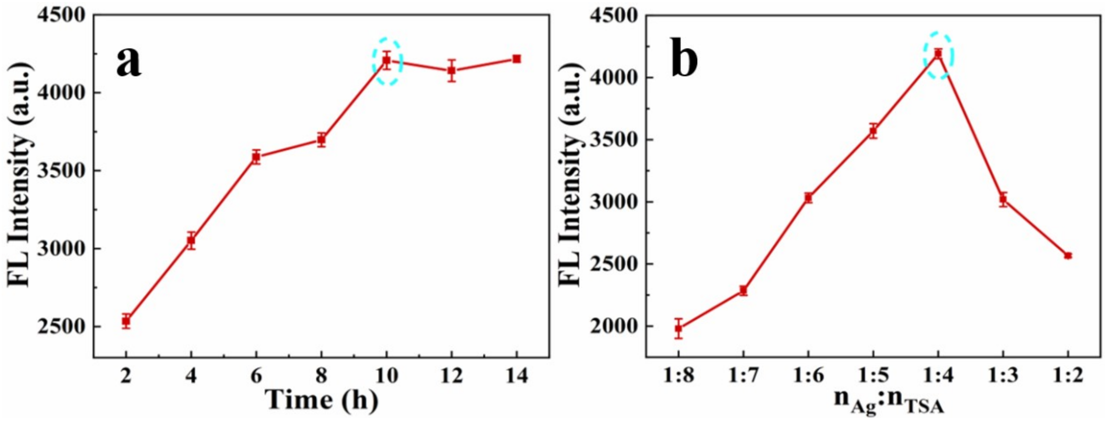

Figure S5 The optimization of synthesis condition of the AgNCs@TSA. (a) influence of synthesis time on the PL of AgNCs@TSA; (b) effect of mole ratio between Ag^+ ions and TSA ligands on the PL of the as-prepared AgNCs@TSA.

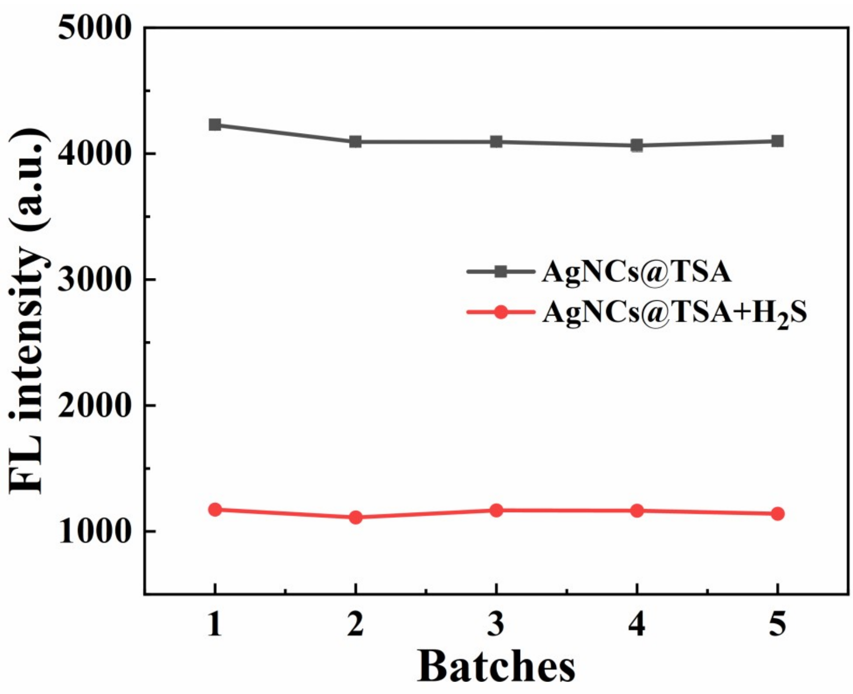

Figure S6 The optical properties and response of AgNCs@TSA to H_2S between different batches. Concentration: AgNCs@TSA, 0.2 mg/mL; H_2S 80 μM.

Table S1. Comparison on the analytical performance of the different optical probes for H_2S determination.

Material	Liner range	LOD	Reaction Time	Interference	Reference
Cda-DNP	0-30 μM	0.18 μM	60 min	yes (GSH)	(1)
6-(2,4-dinitrophenoxy)-2-	0-70 μM	76 nM	30 min	yes (GSH, Cys)	(2)
Mn-doped ZnS QDs	2-100 μM	0.2 μM	30 min	no	(3)
AgNF@dsDNA	1-10 μM	0.53 μM	120 min	no	(4)
Tb^{3+}@Cu1	0-1.6 mM	1.2 μM	2 min	no	(5)
Cu-ZnMOF	0.1-80 μM	35 nM	10 min	yes (Cys, Hcy, H_2O_2)	(6)
NanoBODIPY	0-8 μM	7 nM	30 min	no	(7)
CuO@TO@UiO-66	0-100 μM	0.51 μM	4.5 h	yes (GSH)	(8)
Ag NCs	0-3 μM	32 nM	5 min	yes ($H_2PO_4^-$)	(9)
Au NCs-Cy1	0-20 μM	1.83 μM	90 s	serious (cation)	(10)
AgNCs@TSA	0.1-100 μM	72.2 nM	3 min	no	This

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