Electronic Supplementary Material (ESI) for Analyst.

Supporting Information

Ultrasensitive Detection of Butyrylcholinesterase Activity based on the Inner Filter Effect of MnO_2 Nanosheets on Sulfur Nanodots

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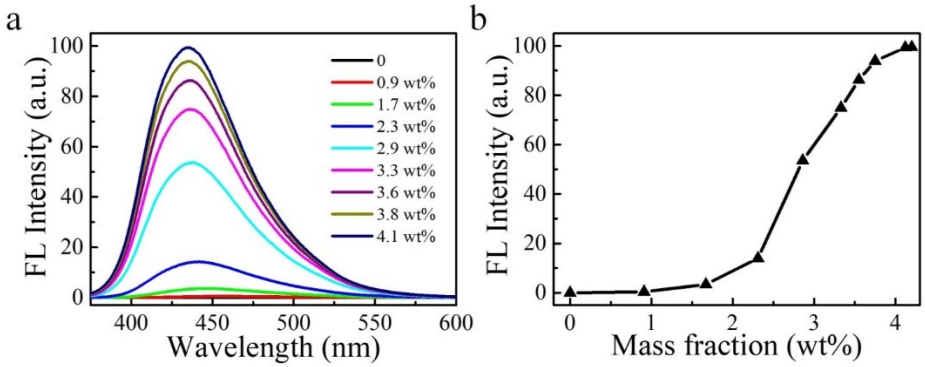

Figure S1. (a) FL spectra (excited at 365 nm) of S-dots synthesized by adding different amount of H_2O_2; (b) Relationship between the FL intensity (detected at 434 nm, excited at 365 nm) and the concentration of H_2O_2.

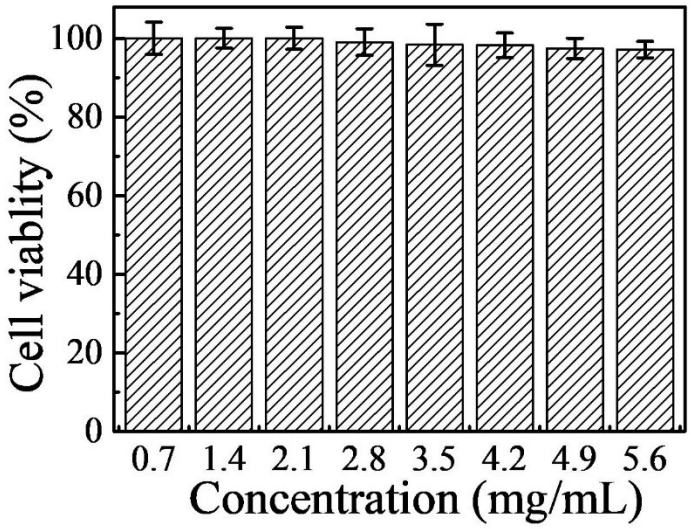

Figure S2. Cell viability after incubation different concentration of S-dots for 24 h.

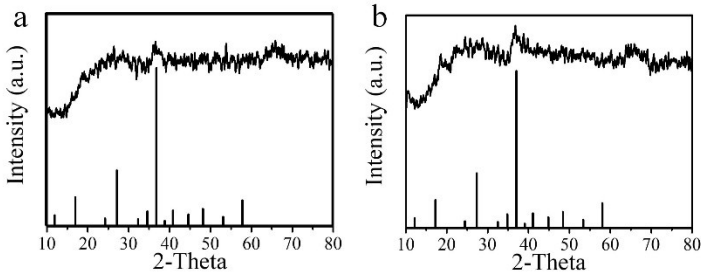

Figure S3. Powder XRD patterns of bulk MnO_2 particles (a) and MnO_2 NS (b).

Figure S4. EDS elemental distribution of the nanohybrid.

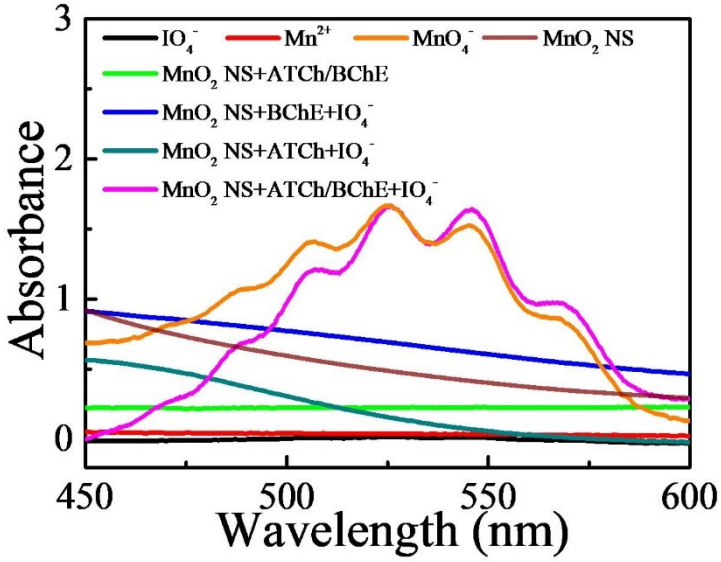

Figure S5. UV-Vis spectra of different combination of reactants, including MnO_2 NS + ATCh/BChE + IO_4^-, MnO_4^-, MnO_2 NS, IO_4^-, Mn^{2+}, MnO_2 NS + ATCh/BChE, MnO_2 NS + ATCh + IO_4^-, MnO_2 NS + BChE + IO_4^-.

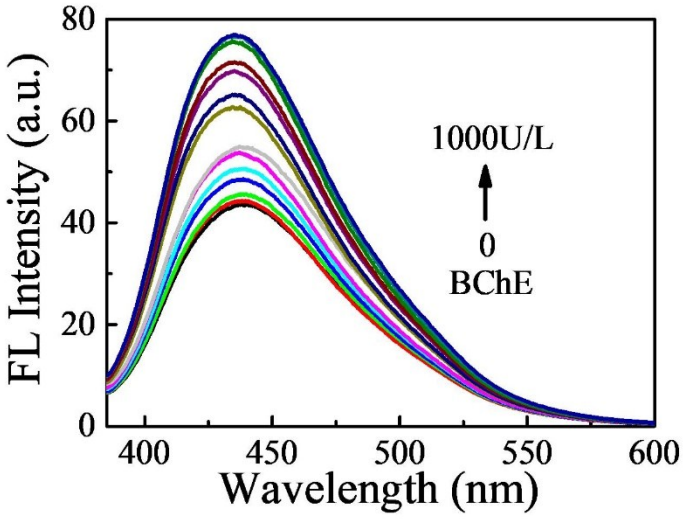

Figure S6. FL spectra (excited at 365 nm) of nanohybrid after adding different concentration of BChE.

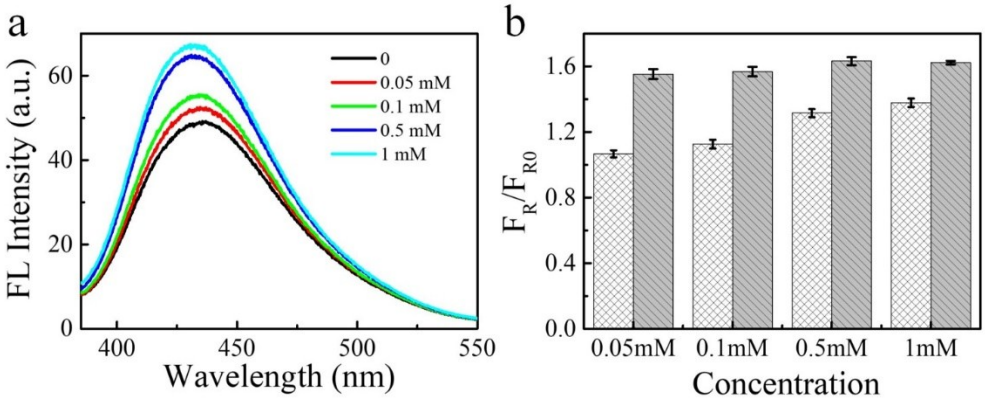

Figure S7. (a) FL spectra (excited at 365 nm) of the nanohybrid after adding different concentration of GSH; (b) The influence of GSH on the detection performance of BChE.

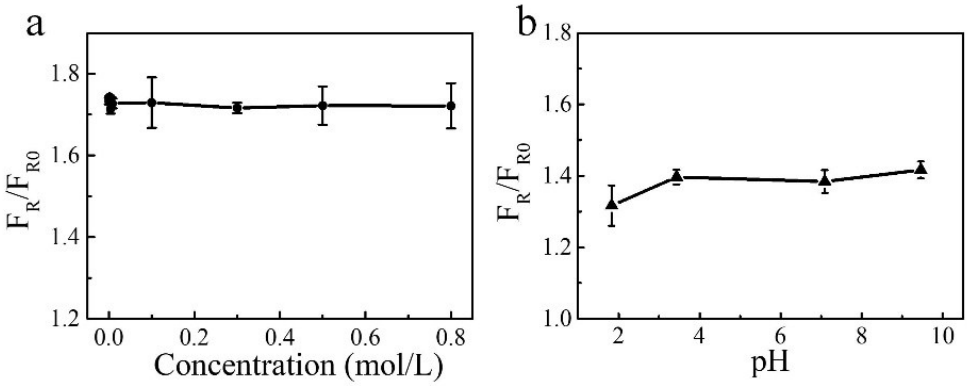

Figure S8. Evolution of fluorescence ratio of nanohybrid upon change of the salt concentration (a) and pH (b) of the detection system.

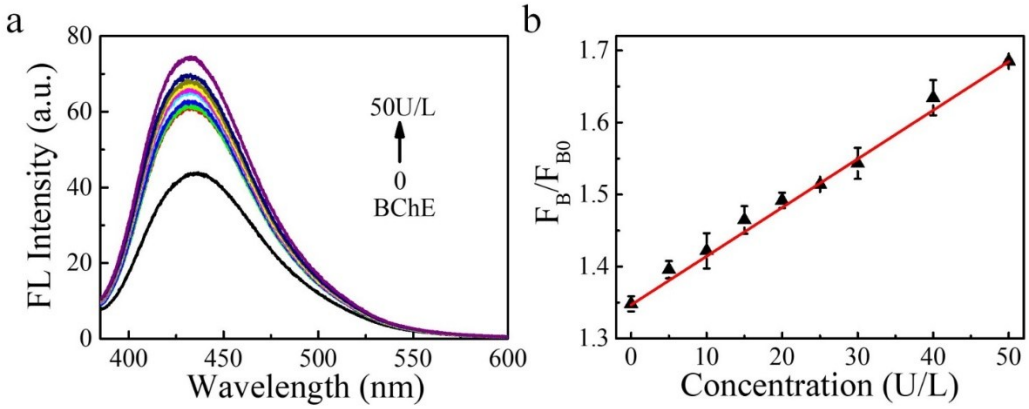

Figure S9. (a). Fl spectra (excited at 365 nm) and FL intensity (detected at 434 nm) of nanohybrid after adding different concentration of BChE in human serum; (b). The linear relationship between FL intensity ratio and concentration of BChE.

Table S1. Comparison of as-proposed sensor with the luminescent BChE detection methods reported in recent years.

Detecting materials used	Linear range (U/L)	Limit of detection (U/L)	Reference
Carbon dots-MnO_2 nanosheets	0.3-150	0.135	*Anal. Chem.,* 2018, 90, 2618-2624.
CdTe QDs	4-400	0.96	*Sens. Actuators, B,* 2019, 292, 180-186.
Au NR self-assembly	4.2×10^{-6}-8.4×10^{-3}	1.8×10^{-6}	*Anal. Chem.,* 2015, 87, 8584-8591.
Carbon dots-oxOPD	0.1-5	0.04	*Biosens. Bioelectron.,* 2019, 131, 232-236.
psC_4-Au NPs	50-250	6.8	*Sens. Actuators, B,* 2017, 251, 869-876.
TGA QDs-MGA QDs	10-1000	10	*Biosens. Bioelectron.,* 2013, 44, 204-209
S-dots-MnO_2 NS	0.5-10; 10-500	0.035	*This work*

Table S2. Concentrations of the investigated interferents.

Interferent	Concentration
Na^+	1.6 mM
K^+	2.0 mM
Mg^{2+}	0.29 mM
Ca^{2+}	14 mM
Zn^{2+}	50 μM
Fe^{3+}	2 μM
Glucose (Glu)	6 mM
Alanine (Ala)	50 μM
Histidine (His)	50 μM
Glutamic acid (Gla)	50 μM
Glutamine(Gln）	50 μM
Vitamine (Vc)	50 μM
Cysteine (Cys)	250 μM