Electronic Supplementary Material (ESI) for Analyst.

Supporting information

Rapid detection of Shiga Toxin type II by lateral flow immunochromatography test strips of colorimetry and fluorimetry

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Materials and methods

All pharmaceutical reagents were of analytical grade and were not purified that used directly in the following experiments. Chloroauric acid ($HAuCl_4 \cdot 4H_2O$, ≥47.8%), trisodium citrate dihydrate ($Na_3C_6H_5O_7 \cdot 2H_2O$, ≥98%), tellurium (Te, 99.9%), sodium borohydride ($NaBH_4$, ≥96%), cadmium chloride($CdCl_2 \cdot 2.5H_2O$, 99.0%), sodium hydroxide (NaOH, ≥96%), sodium dihydrogen phosphate dihydrate ($NaH_2PO_4 \cdot 2H_2O$,≥99%) and disodium hydrogen phosphate dodecahydrate ($Na_2HPO_4 \cdot 12H_2O$, ≥99%) were purchased from Sinopharm Chemical Reagent Co., Ltd. 3-mercaptopropionic acid (MPA, ≥98%) was obtained from Aladdin Technology Co., Ltd. Potassium carbonate (K_2CO_3, ≥99%) and sucrose ($C_{12}H_{22}O_{11}$) were acquired from Nanjing Chemical Reagent Co., Ltd. 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (EDC, ≥99%) was offered form Sigma-Aldrich. Bovine serum albumin (BSA, ≥96%) was obtained from Shenggong Co., Ltd. Phosphate buffer solution (PBS, 10 mM, pH 7.4) was freshly prepared before use. All aqueous solutions were prepared with double distilled water.

Synthesis of colloidal gold nanoparticles

The synthesis of colloidal gold was carried out in a highly cleaned flask. Before the experiment, the flask was soaked with aqua regia [HNO_3/HCl (1:3)] (Attention: aqua regia is a very corrosive oxidizing agent, which should be handled with great care.) for 12 hours. After washing with secondary water, it was kept dry in drying oven. The synthesis of 15 nm Au NPs was similar to the previous literature with slight modification. 50 mL of 0.01% $HAuCl_4 \cdot 4H_2O$ was added into a 100 mL of flask and heated to boiling with vigorous stirring,, followed by the addition of 1% $Na_3C_6H_5O_7 \cdot 2H_2O$. The solution gradually changed from blue to burgundy. After heating for 30 minutes, the reaction was stopped and stored at 4 °C in the dark.

Synthesis of CdTe quantum dots

According to the published literature[1], the aqueous CdTe QDs were synthesized by hydrothermal method and the specific steps were changed. 7 μL of MPA and 91.3 mg of CdTe·2.5H2O were dissolved in 40 mL of water, and the pH of the above solution was adjusted to 11.0 with 1 M NaOH solution. NaHTe precursor was prepared by using $NaBH_4$ and Te powder in N_2 environment. 1 mL of the NaHTe solution (0.04 M) was pipetted into the above cadmium source solution, and the reaction was refluxed at 100 ℃ for 12 h with continuous stirring.

Table S-1. Au NPs based LFITS for STX2 stability detection.

Note: - Invisible + Weak visible ++ Visible +++ Clearly visible

Serial number	Concentration of STX2 Ag(ng/mL)	T Lines	C Lines
1	0	——	+++
	5	——	+++
	10	——	+++
	25	+	+++
	50	+	+++
	100	++	+++
	200	+++	+++
	500	+++	+++
	1000	++	+++
2	0	——	+++
	5	——	+++
	10	——	+++
	25	——	+++
	50	+	+++
	100	++	+++
	200	+++	+++
	500	+++	+++
	1000	+++	+++
3	0	——	+++

5	——	+++
10	——	+++
25	+	+++
50	++	+++
100	+++	+++
200	+++	+++
500	++	+++
1000	+++	+++

Table S-2. CdTe QDs based LFITS for STX2 stability detection.

Note: - Invisible + Weak visible ++ Visible +++ Clearly visible

Serial number	Concentration of STX2 Ag(ng/mL)	T Line	C Line
1	0	——	+++
	1	——	+++
	5	+	++
	10	+	+++
	50	++	+++
	100	+++	+++
	500	+++	+++
	1000	+++	+++
2	0	——	+++
	1	——	+++
	5	——	+++
	10	+	+++
	50	++	+++
	100	+++	+++
	500	+++	+++
	1000	+++	+++
3	0	——	+++
	1	——	+++
	5	+	+++
	10	+	+++
	50	++	+++
	100	+++	+++
	500	+++	+++
	1000	+++	+++

Notes and references

1. X. Zhang and S.-N. Ding, *Sensors and Actuators B: Chemical*, 2017, **240**, 1123-1133.