Supporting information

Gold nanoparticle-decorated covalent organic frameworks as amplified light-scattering probes for highly sensitive immunodetection of *Salmonella* in milk

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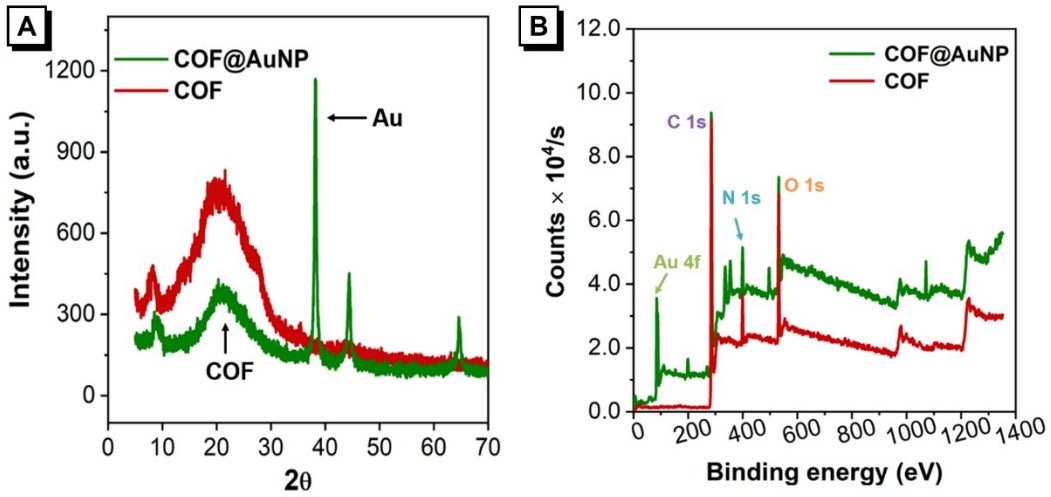

Figure S1. (A) Power XRD pattern and (B) XPS spectra of COF and COF@AuNP.

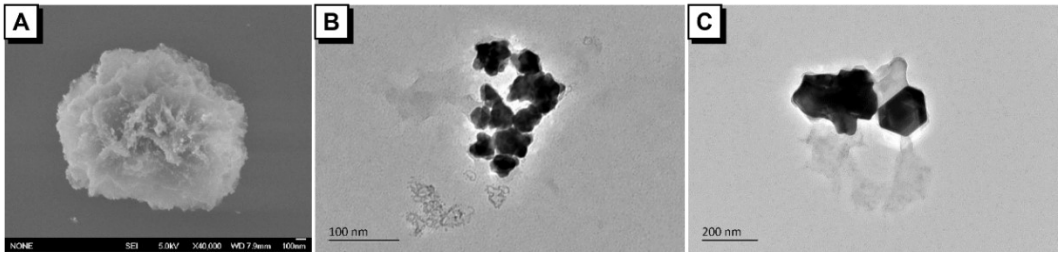

Figure S2. (A) SEM image of COF@AuNP; (B-C) Characterization of COF@AuNP based “cargo release-seed growth” process: TEM image of COF@AuNP after 20 min TFA treatment (B) and in-situ seed growth (C).

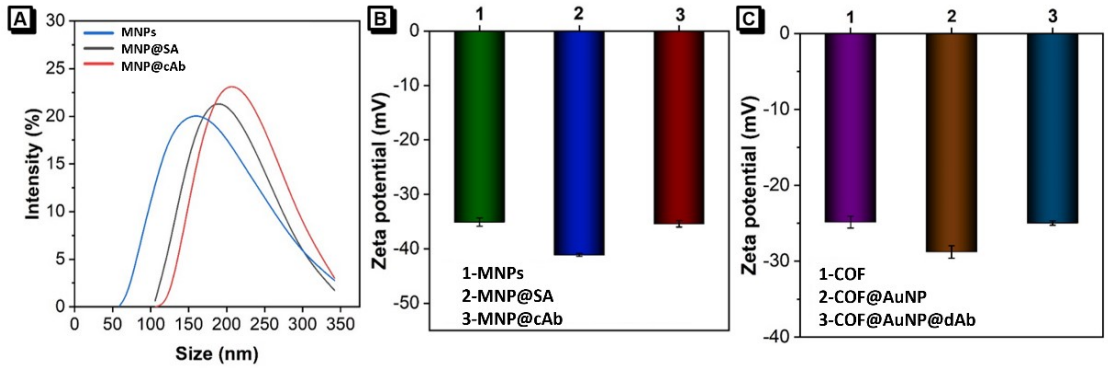

Figure S3. Characterization of MNP@cAb carrier and COF@AuNP@dAb probe. (A) Hydrodynamic diameter distribution of MNPs, MNP@SA and MNP@cAb. (B) Zeta potential of MNPs, MNP@SA and MNP@cAb. (C) Zeta potential of COF, COF@AuNP and COF@AuNP@dAb.

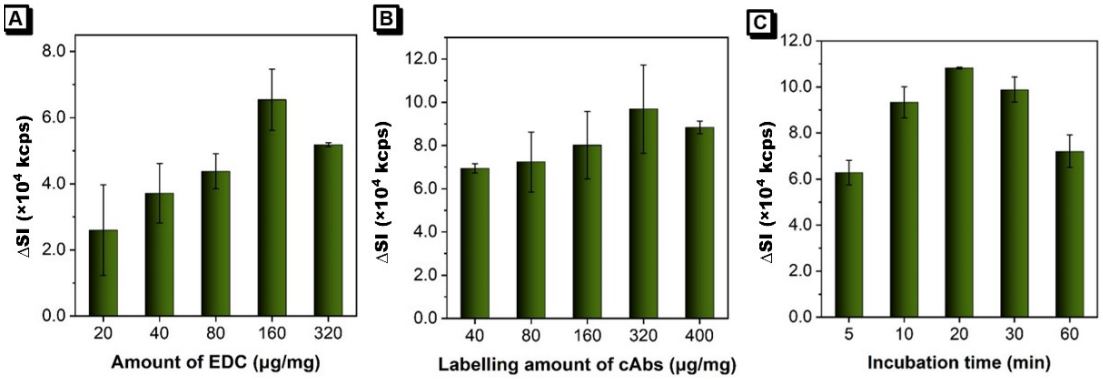

Figure S4. Parameter optimization for preparing and applying the MNP@cAb carriers. (A) The dosing amount of EDC. (B) The saturated labelling amounts of biotinylated anti-*Salmonella*-cAb. (C) The incubation time for target capture using MNP@cAb.

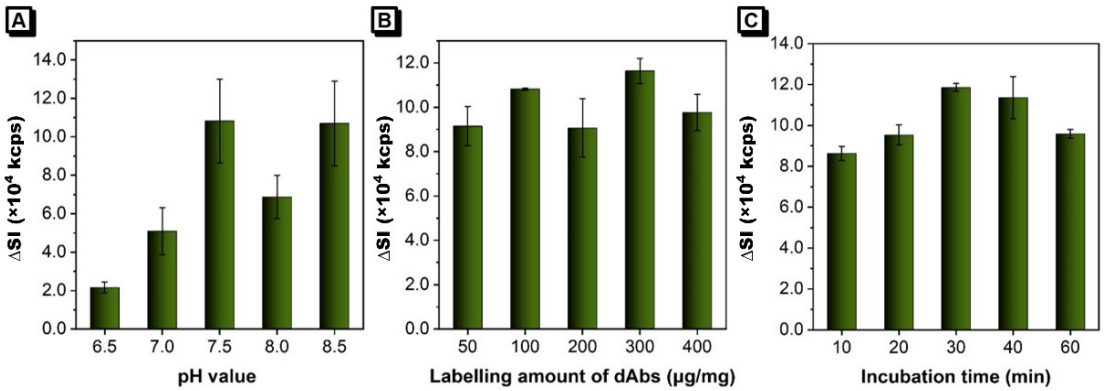

Figure S5. Parameter optimization for preparing and applying the COF@AuNP@dAb probes. (A) The pH value for preparation. (B) The saturated labelling amounts of anti-*Salmonella* dAb. (C) The incubation time for COF@AuNP@dAb to bind with the MNP@cAb-*S. typhimurium* immunocomplex.

Table S1. Comparison of the proposed DLS immunosensor with other reported *Salmonella* analytical technologies.

Methods	Matrix	LOD (CFU/mL)	Linear range (CFU/mL)	Ref
ELISA	milk	1.4×10^5	1×10^8	1
Electrochemical	chicken meats	80	$10^2 – 10^6$	2
LFIA	potable water, salad, watermelon juice,	10^2	$10^2 – 10^8$	3
	orange juice, milk	9.8×10^4	$2.9 \times 10^6 – 2.9 \times 10^{11}$	4
Fluorescence	milk	4.9×10^3	$4.9 \times 10^3 – 4.9 \times 10^7$	5
Colorimetric	milk	95	$3.3 \times 10^1 – 3.3 \times 10^6$	6
DLS	milk	60	2.0×10^2 - 2.0×10^5	This work

Table S2. Detection of *S. typhimurium* in milk samples with the proposed DLS immunosensor.

Sample No.	Spiked conc. (CFU/mL)	Detected conc. (CFU/mL)	Recovery (%)	CV (%)
1	0	ND	—	—
2	0	ND	—	—
3	0	ND	—	—
4	200	174	87	10.4
5	200	186	93	8.6
6	200	205	102.5	9.6
7	1×10^3	1.12×10^3	112	3.9
8	1×10^3	0.89×10^3	89	11.5
9	1×10^3	1.05×10^3	105	4.2
10	5×10^3	4.67×10^3	93.4	7.7
11	5×10^3	5.08×10^3	101	4.7
12	5×10^3	4.92×10^3	98.4	9.8
13	1×10^4	1.07×10^4	107	10.2
14	1×10^4	1.16×10^4	116	5.3
15	1×10^4	0.98×10^4	98	10.6
16	1×10^5	0.91×10^5	91	8.1
17	1×10^5	1.14×10^5	114	13.2
18	1×10^5	0.95×10^5	95	6.7

ND is representative for not detected.

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