Electronic Supplementary Material (ESI) for Nanoscale Advances.

Supporting Information

Synthesis of $Ti_3C_2T_x/MnO_2$ composites for synergistic catalytic/photothermal-based bacterial inhibition

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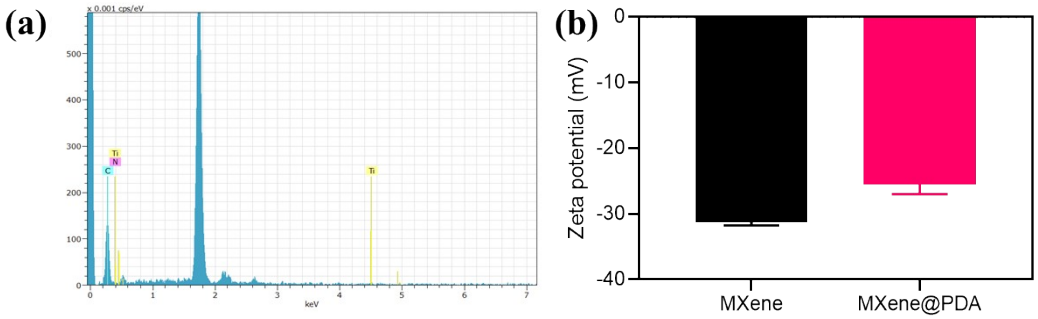

El	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
C	90.80	90.80	92.66	22.98
N	8.05	8.05	7.05	14.91
Ti	1.15	1.15	0.29	0.42

Fig. S1 (a) EDX image of $Ti_3C_2T_x$@PDA ; (b) The Zeta potentials of $Ti_3C_2T_x$ and $Ti_3C_2T_x$@PDA.

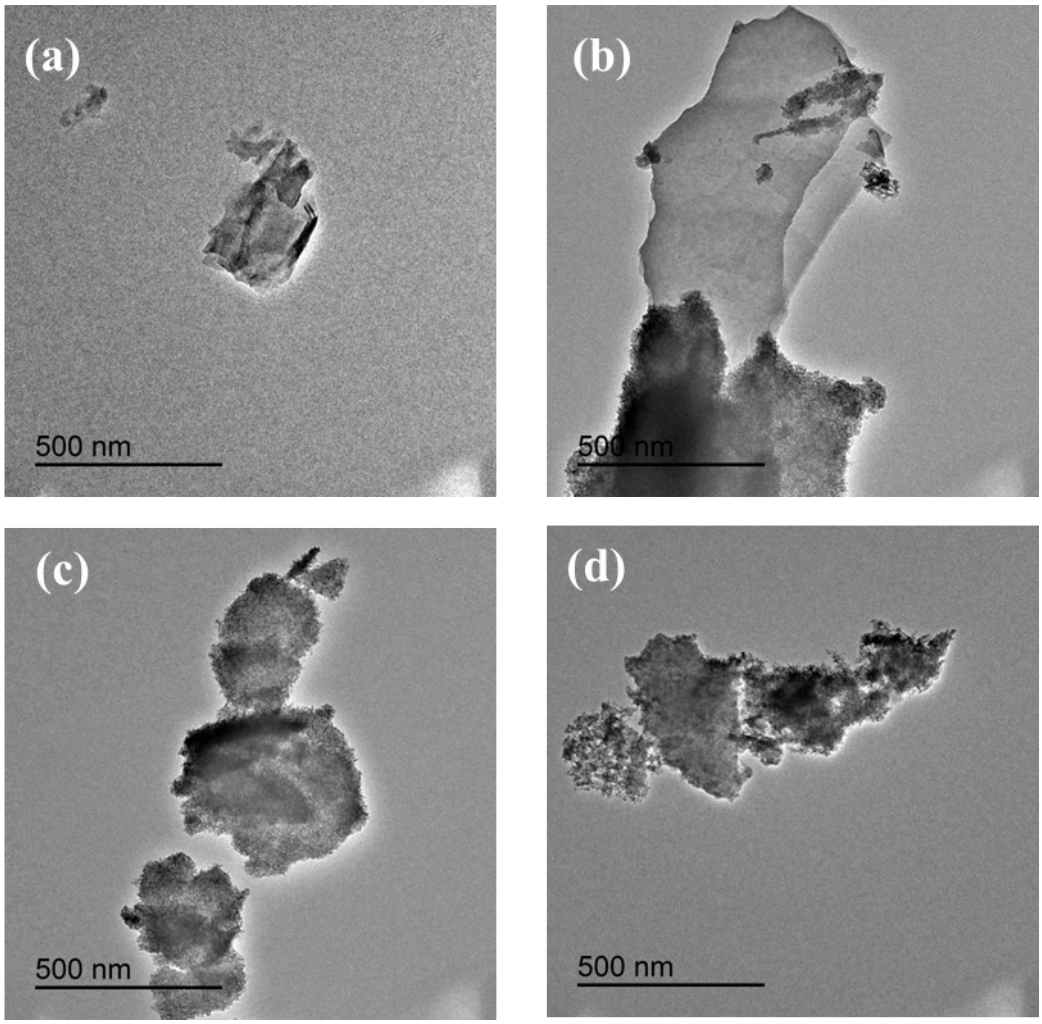

Fig. S2 TEM images of $Ti_3C_2T_x$@PDA(a), S1(b), S2(c) and S3(d).

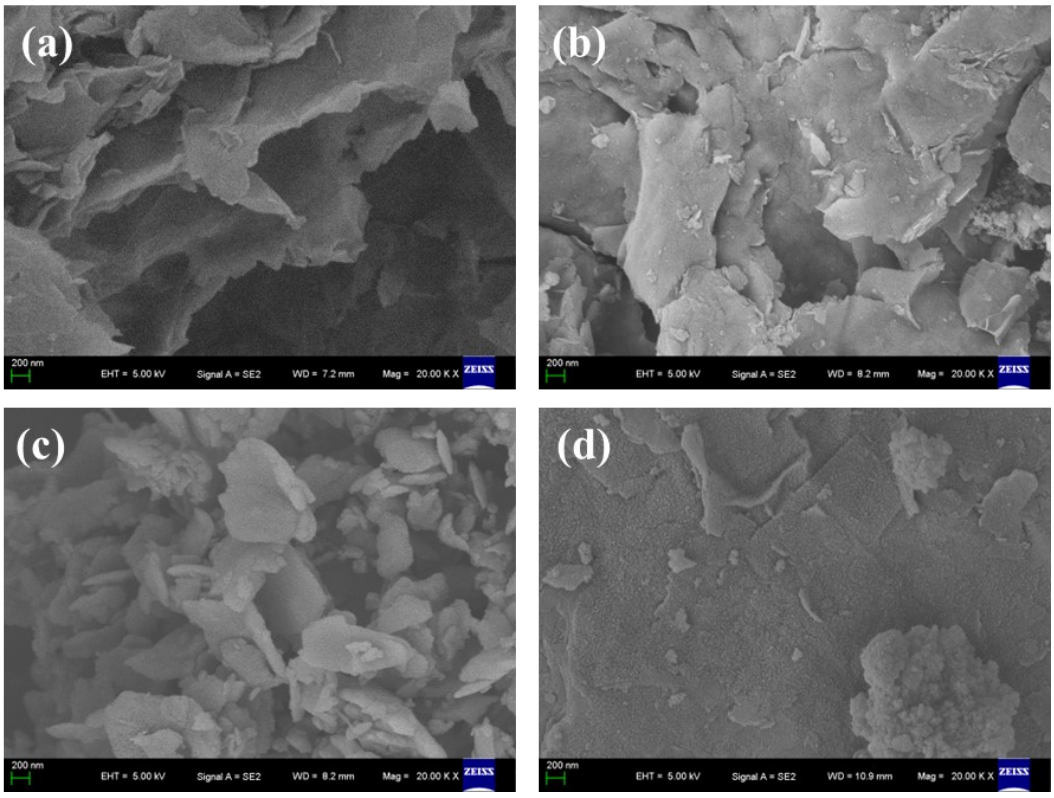

Fig. S3 SEM images of $Ti_3C_2T_x$@PDA(a), S1(b), S2(c) and S3(d).

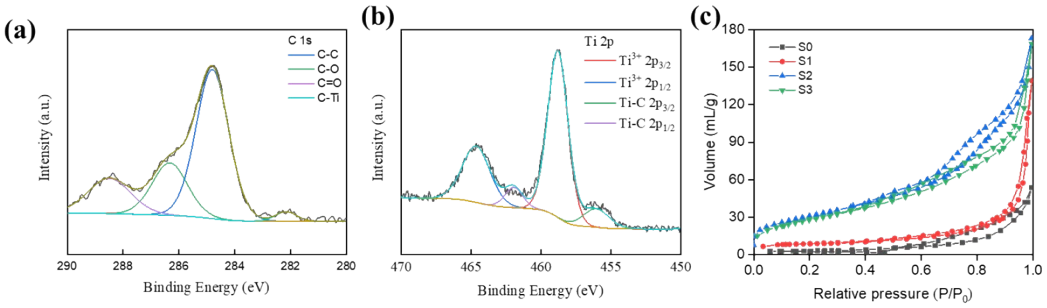

Fig. S4 (a,b) XPS spectra of C 1s and Ti 2p of S2. (c) Nitrogen adsorption-desorption isotherms of S0, S1, S2 and S3.

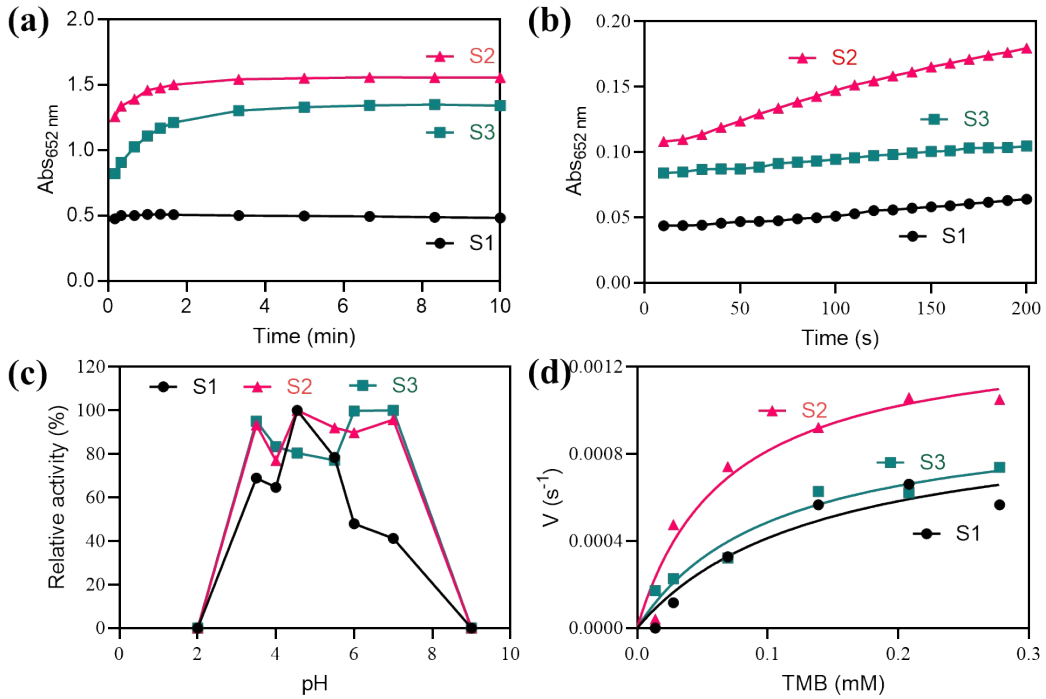

Fig. S5 (a, b) Comparison of the oxidase-like and peroxidase-like catalytic activities of S1, S2 and S3; (c) pH effect on the oxidase-like catalytic activity of S1, S2 and S3. (d) Concentration versus reaction rate for TMB as a substrate (peroxidase-like catalytic activities).

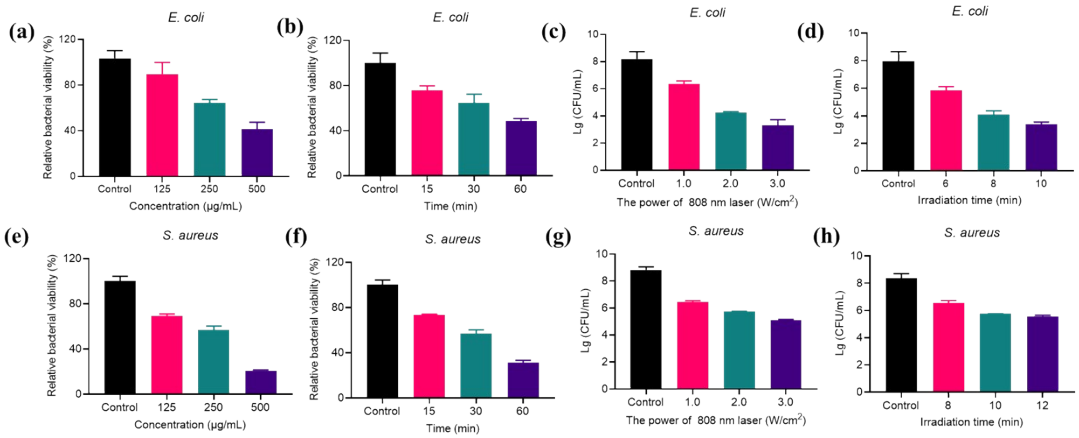

Fig. S6 Bacterial survival rate of *E. coli* and *S. aureus* cultured in S2; (a, e) different concentrations; (b, f) different reaction times; (c, g) different lighting powers; (d, h) different lighting time; sample concentration was 250 μg/mL; reaction time was 30 minutes.

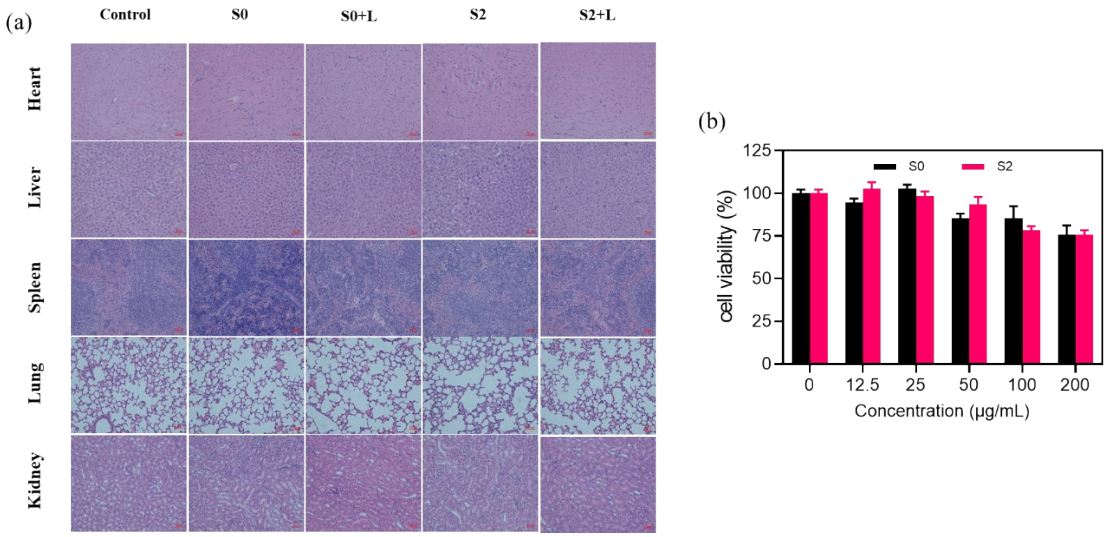

Fig. S7 (a) After 12 days of wound treatment, H&E staining analysis of the main organs (heart, liver, spleen, lung, and kidney); scale bar is 200 μm. (b) The survival rate of L02 cells after incubation with S0 and S2 nanoparticles was determined by CCK-8 colorimetric method.

Table S1. XPS measurements of the elements in S2 samples

Sample	Ti (%)	C (%)	Mn (%)	O (%)	N (%)	F (%)
S2	3.21	10.12	45.16	32.69	/	8.82

Table S2. Specific surface area of S0, S1, S2 and S3

Sample	BET surface area (m^2g^{-1})
S0	10.02
S1	27.52
S2	112.53
S3	102.38

Table S3. Kinetic parameters of oxidase-like catalytic reactions using TMB as substrate

Catalyst	[E](μg×mL^{-1})	Substrate	K_m(mM)	V_{max}(10^{-8}M×s^{-1})	V_{max}/K_m(10^{-5}×s^{-1})
S1	15	TMB	0.0031	0.13	41.94
S2	15	TMB	0.1044	8.07	77.30
S3	15	TMB	0.2394	8.41	35.13

Table S4. Kinetic parameters of peroxidase-like catalytic reactions using H_2O_2 and TMB as substrates

Catalyst	[E](μg×mL^{-1})	K_m(mM)		V_{max}(10^{-8}M×s^{-1})		V_{max}/K_m(10^{-5}×s^{-1})	
		H_2O_2	TMB	H_2O_2	TMB	H_2O_2	TMB
S1	15	0.9721	0.1388	0.54	2.53	0.56	18.23
S2	15	0.5876	0.0678	9.67	3.51	16.46	51.78
S3	15	0.1954	0.1045	0.97	2.55	4.96	24.40