Supporting Information

Designing photocatalytic and self-renewed g-C_3N_4 nanosheets/ poly-Schiff base composite coating towards long-term biofouling resistance

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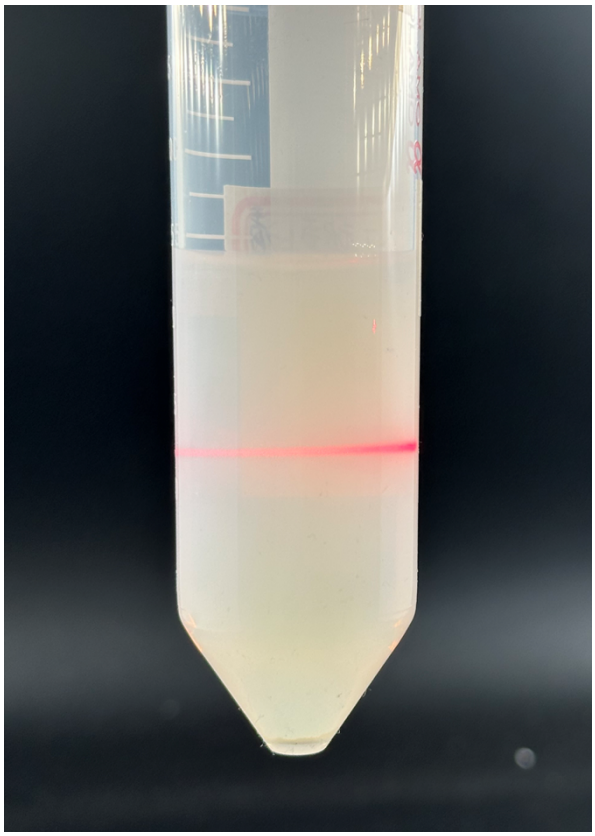

Fig. S1. Dispersed g-C-NS in IPA sit for more than five months.

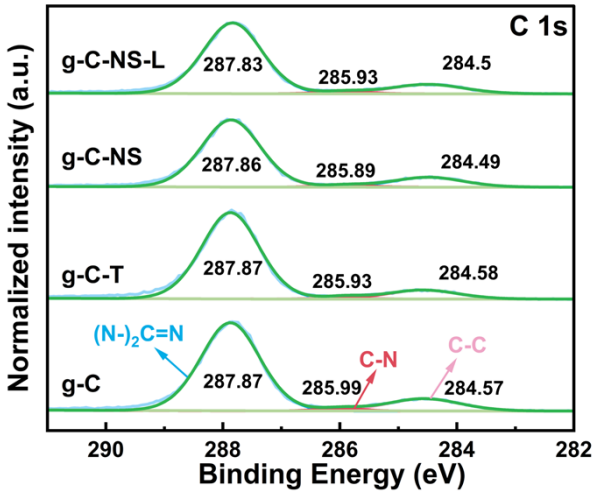

Fig. S2. C 1s XPS spectra for g-C, g-C-T, g-C-NS and g-C-NS-L.

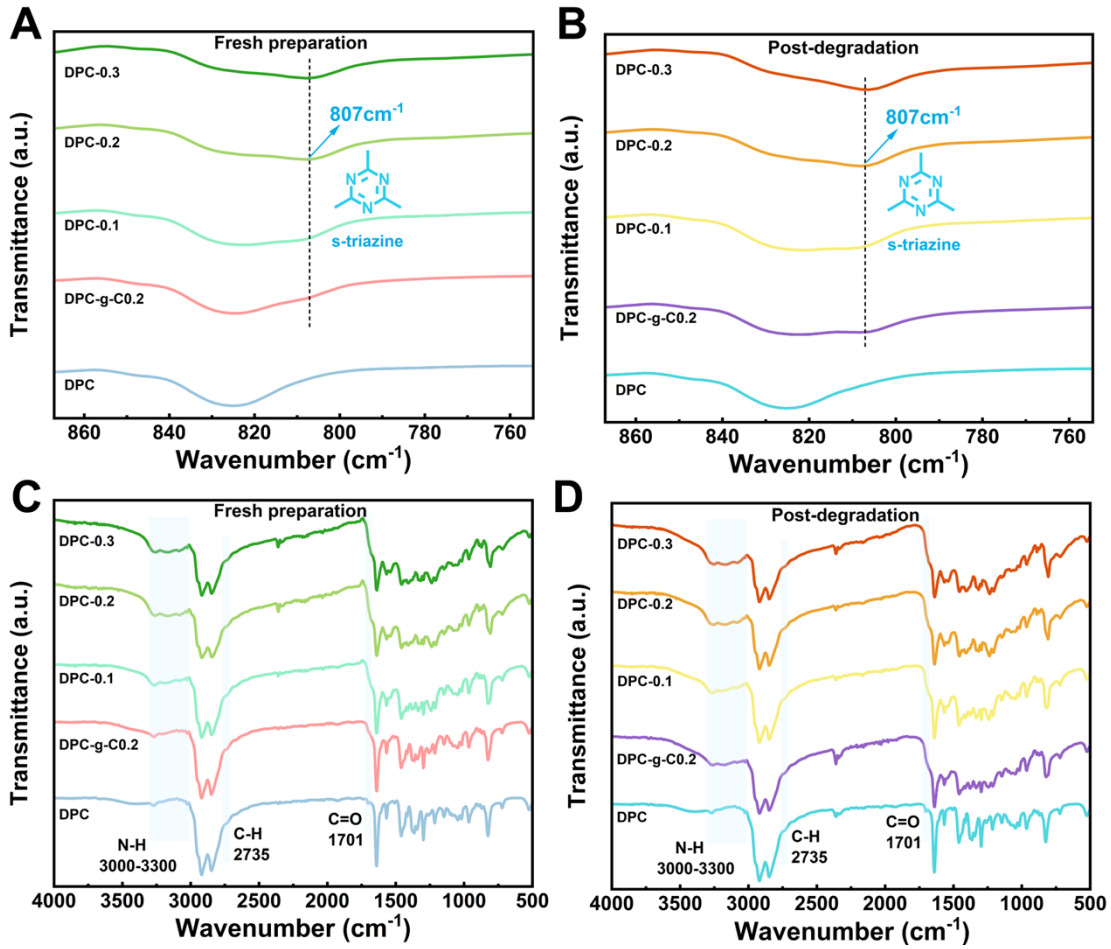

Fig. S3. FT-IR spectra of coatings before and after degradation.

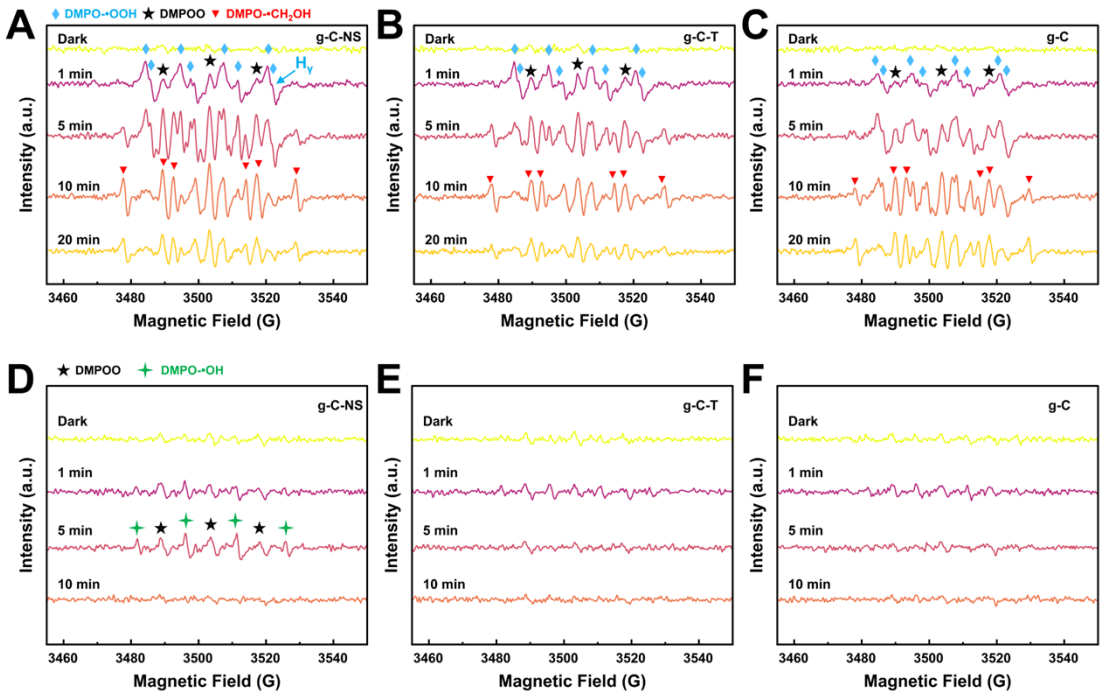

Fig. S4. EPR spectrum on visible light (λ>420nm) g-C, g-C-T and g-C-NS system captured by DMPO before and after irradiation: (A)-(C) signals captured in methanol solution; (D)-(F) signals captured in deionized water.

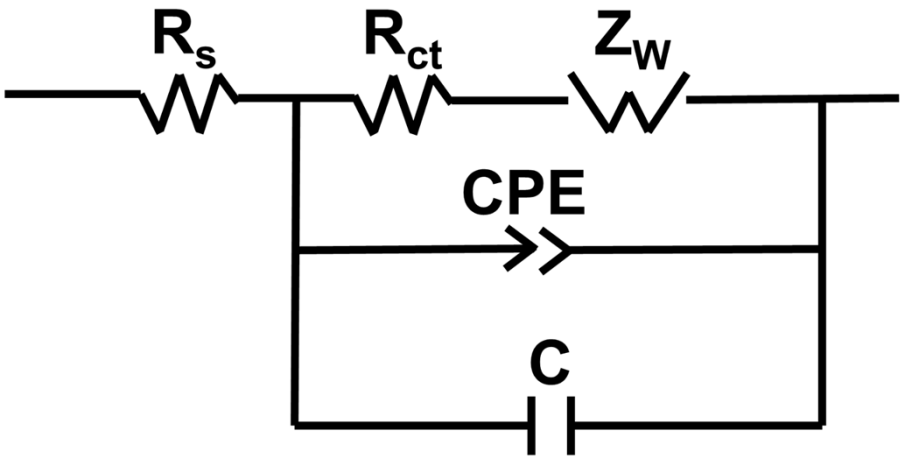

Fig. S5. Equivalent circuit diagram.

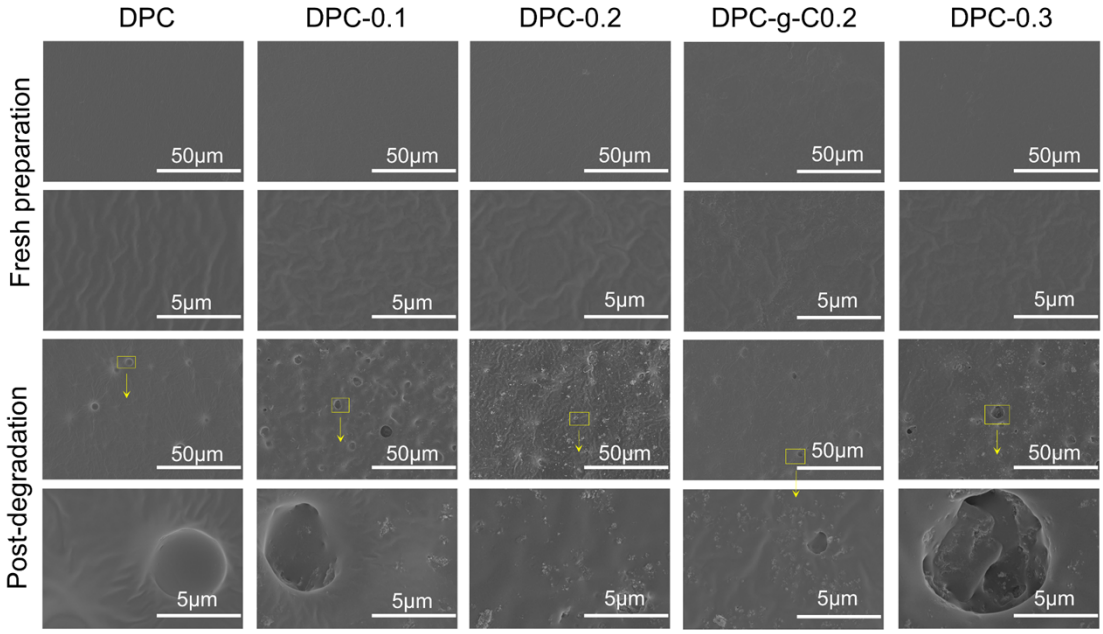

Fig. S6. Surface morphology of the coatings after immersion in deionized water for 5 days in the dark.

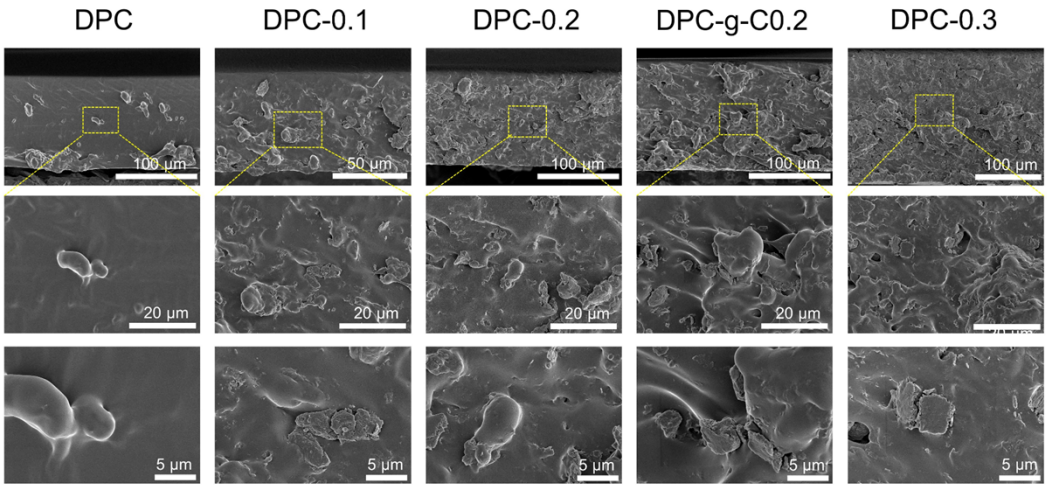

Fig. S7. Cross-sectional morphology of freshly prepared coatings.

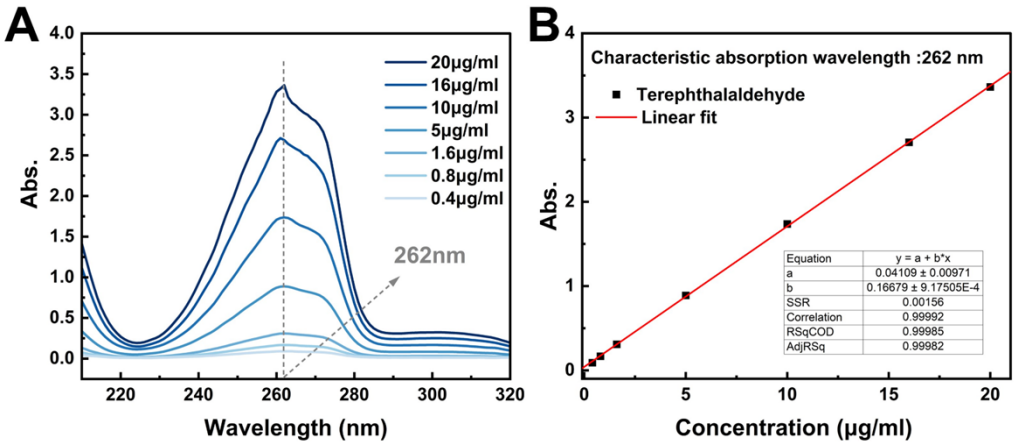

Fig. S8. Absorption spectra of TPA. (A) UV-Vis spectra of TPA solutions of different concentrations. (B) A linear fit of the maximum value of solution absorbance to the concentration of the solution.

A series of TPA solutions of different concentrations were configured and the absorbance at the maximum absorption wavelength was recorded. The Lambert-Beer law relates absorbance to solution thickness and solute concentration:
$A = lg(I_0/I) = abc$

Where I_0 is the intensity of incident monochromatic light, I is the intensity of transmitted light, a is the absorption coefficient. The absorbance A in dilute solution is proportional to the thickness b of liquid layer and the concentration c of solute. The corresponding calibration curve was done, the resulting equation was as follows:
[TPA] (μg/ml) = Absorbance/0.16679 (R^2 = 0.99982).

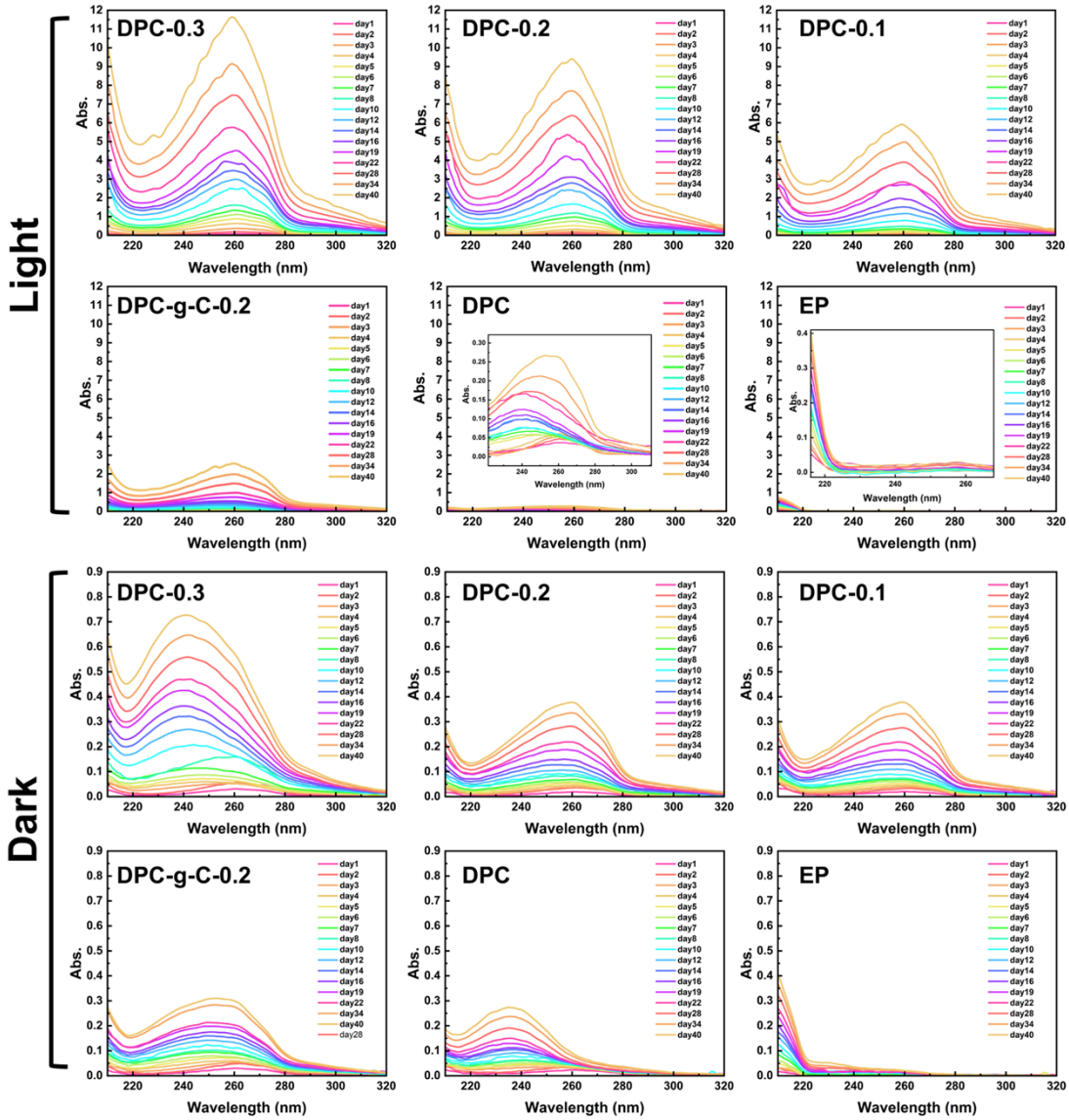

Fig. S9. Absorption spectra of coatings degradation solution in light/dark conditions at 293.15 K.

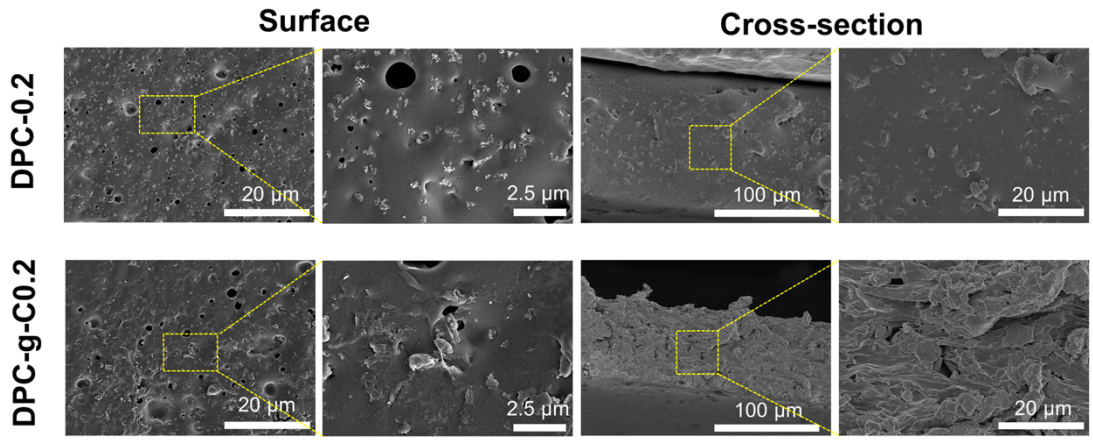

Fig. S10. SEM images of surface/cross-section of coatings after immersion in PBS solution for 12 h in visible light.

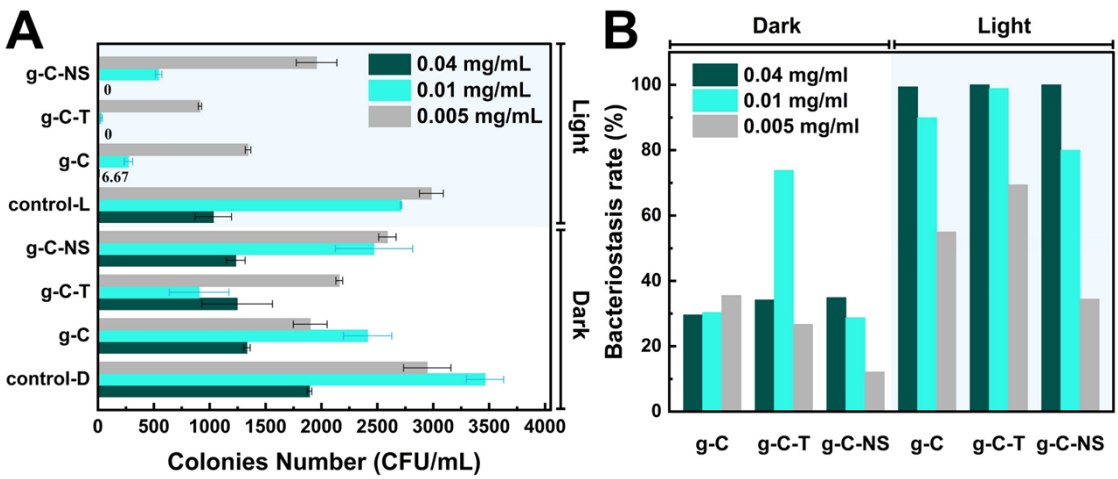

Fig. S11. (A) Concentration of surviving bacteria in photocatalyst suspensions. (B) Bacteriostasis rate of g-C, g-C-T and g-C-NS.

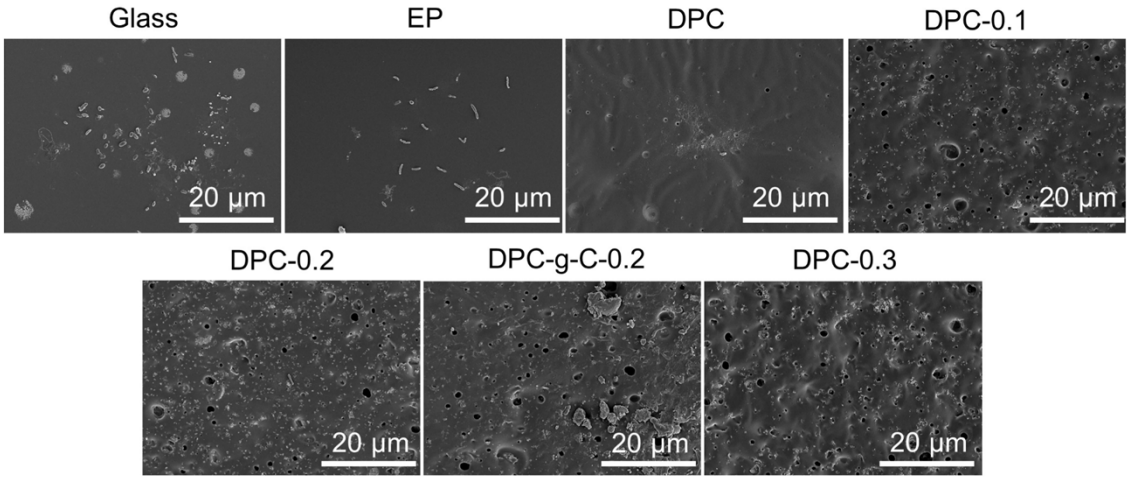

Fig. S12. Number of bacteria on the surface of glass and coatings after immersion in PBS solution for 12 h in visible light.

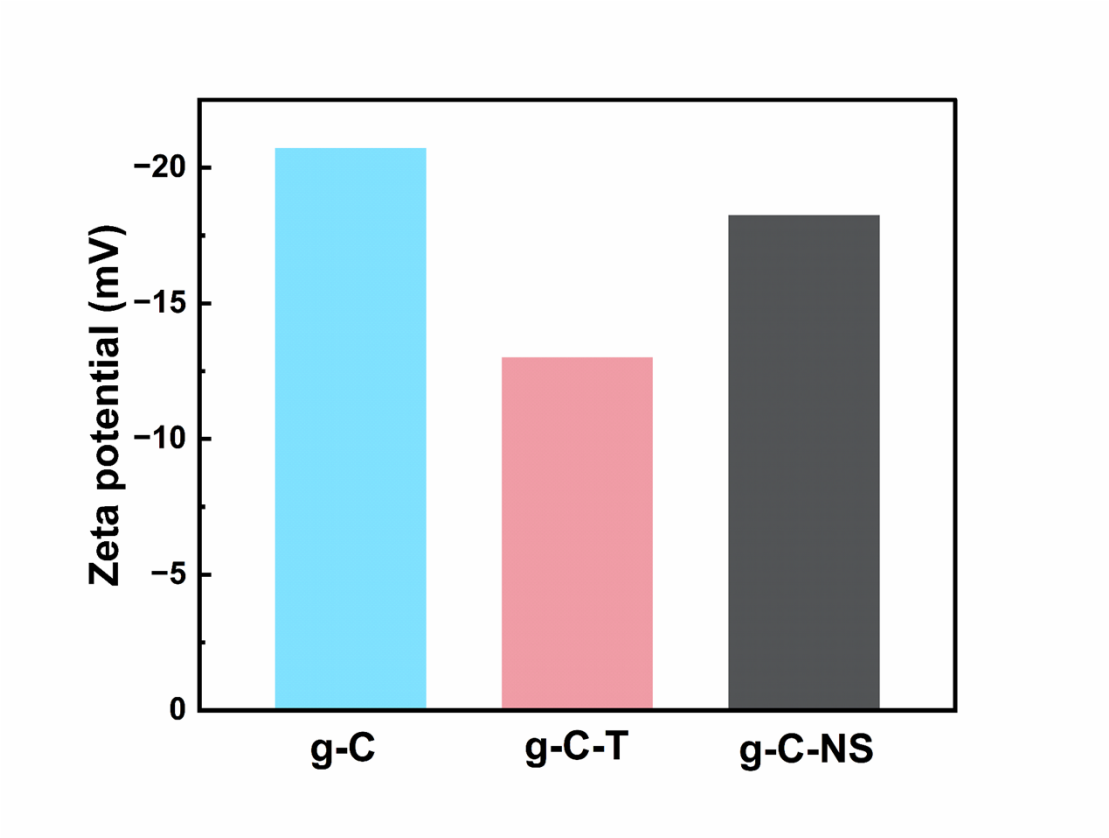

Fig. S13. Zeta potentials of g-C and g-C-NS in deionized water.

Table S1. Summarized XPS data for g-C, g-C-T, g-C-NS and g-C-NS-L.

Samples	Elements Content (at%)		
	C	N	O
g-C	47.291	51.359	1.35
g-C-T	47.619	50.938	1.443
g-C-NS	48.744	50.186	1.069
g-C-NS-L	47.440	50.486	2.075

C 1s	$(N-)_2C=N$		C-N		C-C	
	area	a%	area	b%	area	c%
g-C	12155.3	83.656	267.1	1.837	2109.8	
g-C-T	11611.1	87.043	253.0	1.895	14.507	
g-C-NS	6576.1	83.306	149.0	1.886	1476.8	11.061
g-C-NS-L	9739.1	83.898	255.0	2.196	1170.0	14.808
					1615.8	13.907

N 1s	C-N=C(sp^2)		N-$(C)_3$(sp^2)		$C-NH_x$	
	area	a%	area	b%	area	c%
g-C	18832.4	64.468	8378.8	28.694	1995.9	6.838
g-C-T	18289.7	65.055	8775.7	31.23	1043.5	3.715
g-C-NS	8716.1	55.610	6283.6	40.104	671.2	4.286
g-C-NS-L	14743.4	62.028	8106.5	34.118	915.3	3.854

Table S2. Charge transfer resistance for photocatalysts.

Samples	R_{ct} (ohm)
g-C	219
g-C-T	153.5
g-C-NS	123.6

Table S3. Summarized XPS data for coatings before/after degradation (DPC, DPC-0.2/DPC (D), DPC-0.2 (D)).

Samples	Elements content (at%)		
	C	N	O
DPC	84.8	8.31	6.9
DPC (D)	77.7	9.2	13.1
DPC-0.2	87.88	8.21	3.9
DPC-0.2 (D)	80.42	10.77	8.81

C 1s	C-C		C=C		C=O	
	area	a%	area	b%	area	c%
DPC	13315.4	65	6392.2	31.2	778.7	3.8
DPC (D)	8925.9	60.2	4379	29.5	1530.3	10.3
DPC-0.2	16293.6	77.8	4062.6	19.4	596.9	2.8
DPC-0.2 (D)	9664.3	60.2	4684.7	29.2	1690.8	10.6

N 1s	C=N		N-C		NH_2	
	area	a%	area	b%	area	c%
DPC	1829.6	62.4	1153.5	27.3	297.6	10.3
DPC (D)	924.3	34.9	1402	52.9	323.2	12.2
DPC-0.2	2278.8	81.7	423.3	15.2	86	3.1
DPC-0.2 (D)	1680.1	47	1558.5	43.6	337.1	9.4

Table S4. Pseudo-first-order reaction linear fittings for coating degradation in the light/dark conditions.

Linear fittings	y = a + k*x (**Light**)				
	DPC-0.3	DPC-0.2	DPC-0.1	DPC-g-C0.2	DPC
Intercept (a)	-0.00399 ± 7.9414E-4	-0.00406 ± 6.95056E-4	-0.00347 ± 6.28587E-4	-0.00158 ± 4.45604E-4	1.90342E-4 ± 2.87661E-5
Slope (k)	0.00214 ± 4.63459E-5	0.00181 ± 4.05633E-5	0.00113 ± 3.66842E-5	4.41919E-4 ± 2.60053E-5	4.0631E-5 ± 1.67878E-6
Correlation	0.99626	0.99599	0.99169	0.9734	0.98662
RSqCOD	0.99253	0.992	0.98345	0.9475	0.97341
AdjRSq	0.99207	0.9915	0.98241	0.94422	0.97175

Linear fittings	y = b + k *x (**Dark**)				
	DPC-0.3	DPC-0.2	DPC-0.1	DPC-g-C0.2	DPC
Intercept (b)	6.1592E-5 ± 8.07839E-5	3.31421E-5 ± 1.91641E-5	3.1399E-5 ± 1.60513E-5	2.5753E-4 ± 4.15773E-5	9.59764E-5 ± 1.35215E-5
Slope (k)	1.38564E-4 ± 4.71453E-6	6.80653E-5 ± 1.11842E-6	6.77365E-5 ± 9.36751E-7	5.40602E-5 ± 2.55521E-6	4.60361E-5 ± 7.89111E-7
Correlation	0.99087	0.99785	0.99847	0.98365	0.99766
RSqCOD	0.98181	0.9957	0.99695	0.96758	0.99532
AdjRSq	0.98068	0.99543	0.99676	0.96541	0.99503