Supporting Information for

Enhanced Piezo-Phototronic Effect in Carbon Nitride Nanosheets via Oxidative Exfoliation for High-Efficiency Piezo-Photocatalysis

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Text S1 Photoelectrochemical measurements

The photocurrent−time response (I–t), electrochemical impedance spectroscopy (EIS) spectra and Mott–Schottky (M-S) diagrams were obtained using a standard three-electrode system on a CHI660E electrochemical station. The parameters of the electrochemical three-electrode workstation were as follows: 0.5 M Na_2SO_4 solution was configured as test electrolyte. An Ag/AgCl (saturated KCl) electrode served as the reference electrode, while a platinum wire electrode served as the counter electrode. The material was applied in thin layers on a 1 cm × 1 cm fluorine-doped tin oxide (FTO) coating, which was secured to act as the working electrode using a platinum plate electrode holder. The applied bias for photocurrent measurement was set to 0.4 V. Mott-Schottky measurements were conducted at frequencies of 1000 Hz.

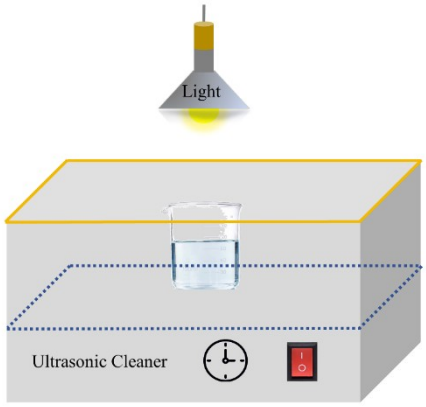

Figure S1. Scheme of the piezo-photocatalysis reaction equipment.

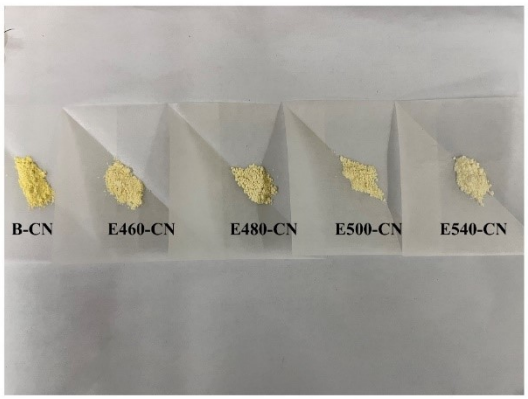

Figure S2. Color change of the samples from B-CN to E540-CN.

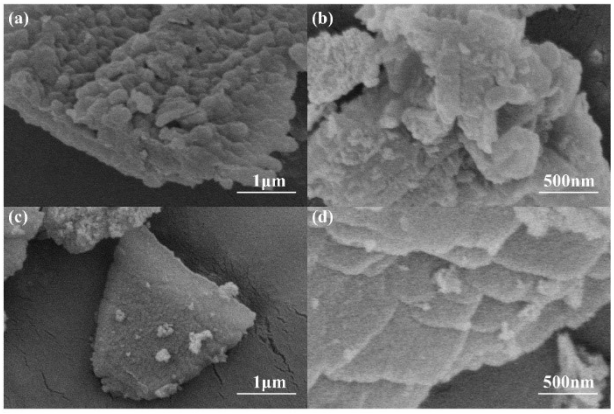

Figure S3. (a–b) SEM images of B-CN, (c–d) SEM images of E500-CN.

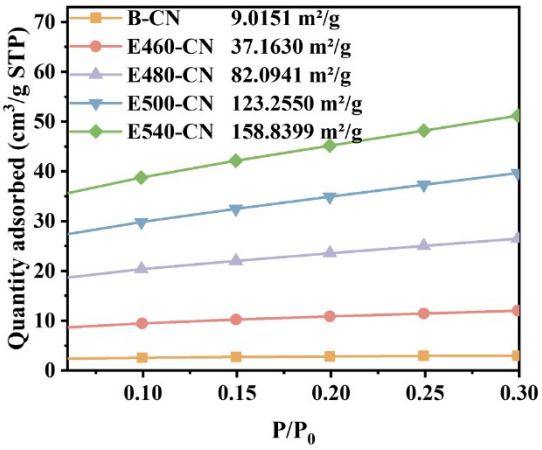

Figure S4. Specific surface area of all samples.

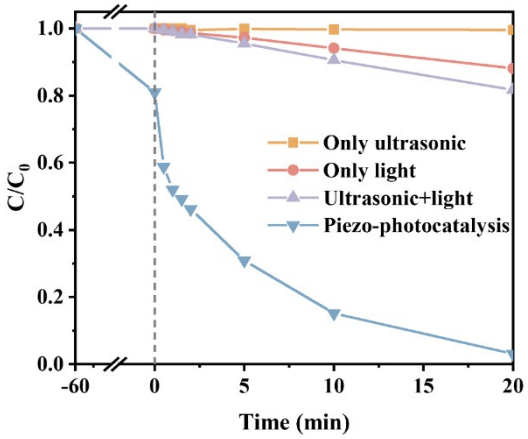

Figure S5. Degradation experiments without catalyst.

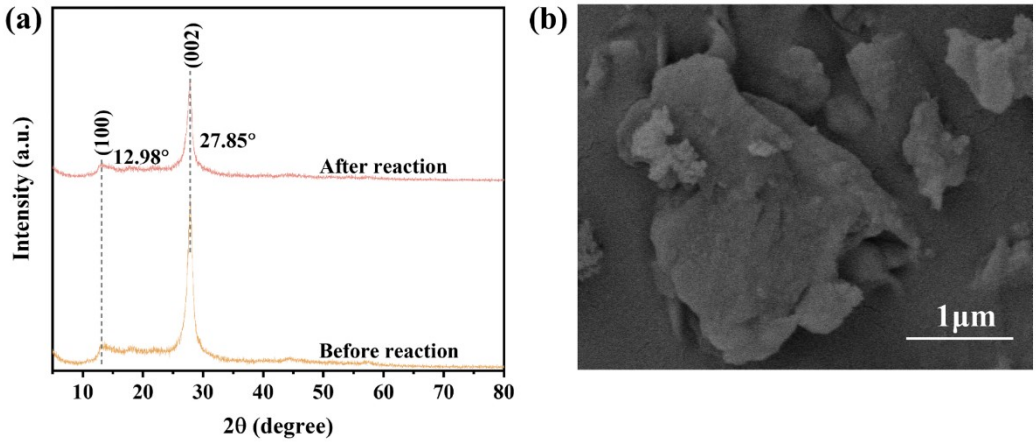

Figure S6. (a) XRD of E500-CN after reaction. (b) SEM of E500-CN after reaction.

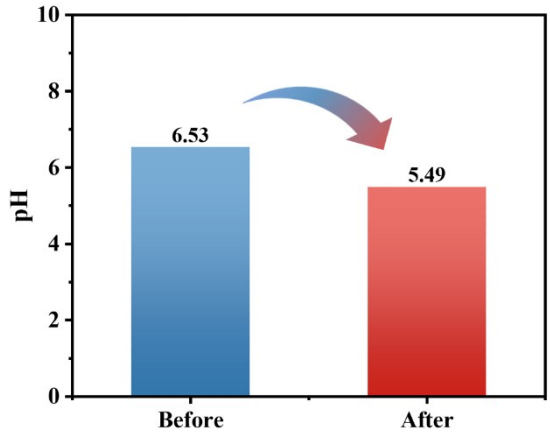

Figure S7. The pH variation during MB degradation by the piezo-photocatalysis process. Experimental conditions: $[catalyst]_0$ = 0.6 g/L, $[MB]_0$ = 10 mg/L.

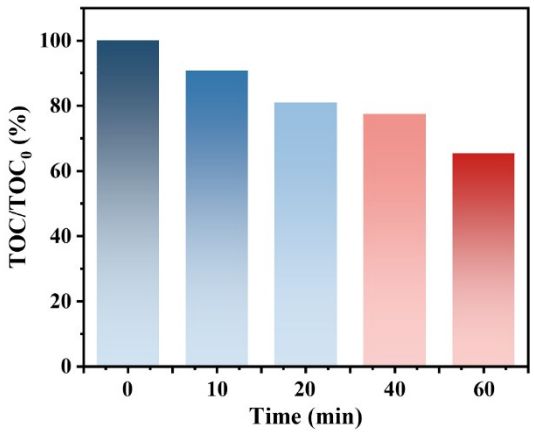

Figure S8. The change of TOC in the piezo-photocatalytic MB degradation system. Experimental conditions: $[catalyst]_0$ = 0.6 g/L, $[MB]_0$ = 10 mg/L.

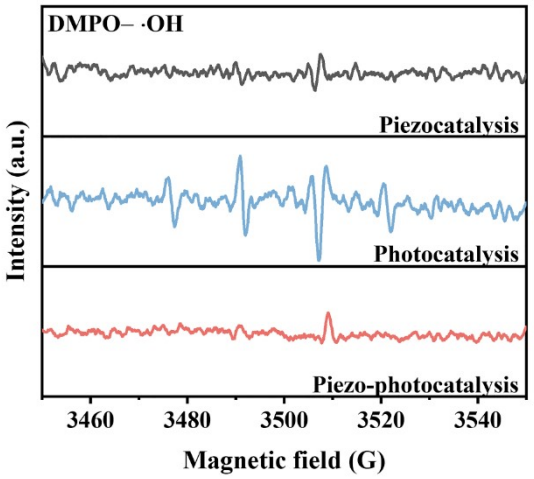

Figure S9. EPR spectra of DMPO-·OH in piezocatalysis, photocatalysis and piezo-photocatalysis of E500-CN.

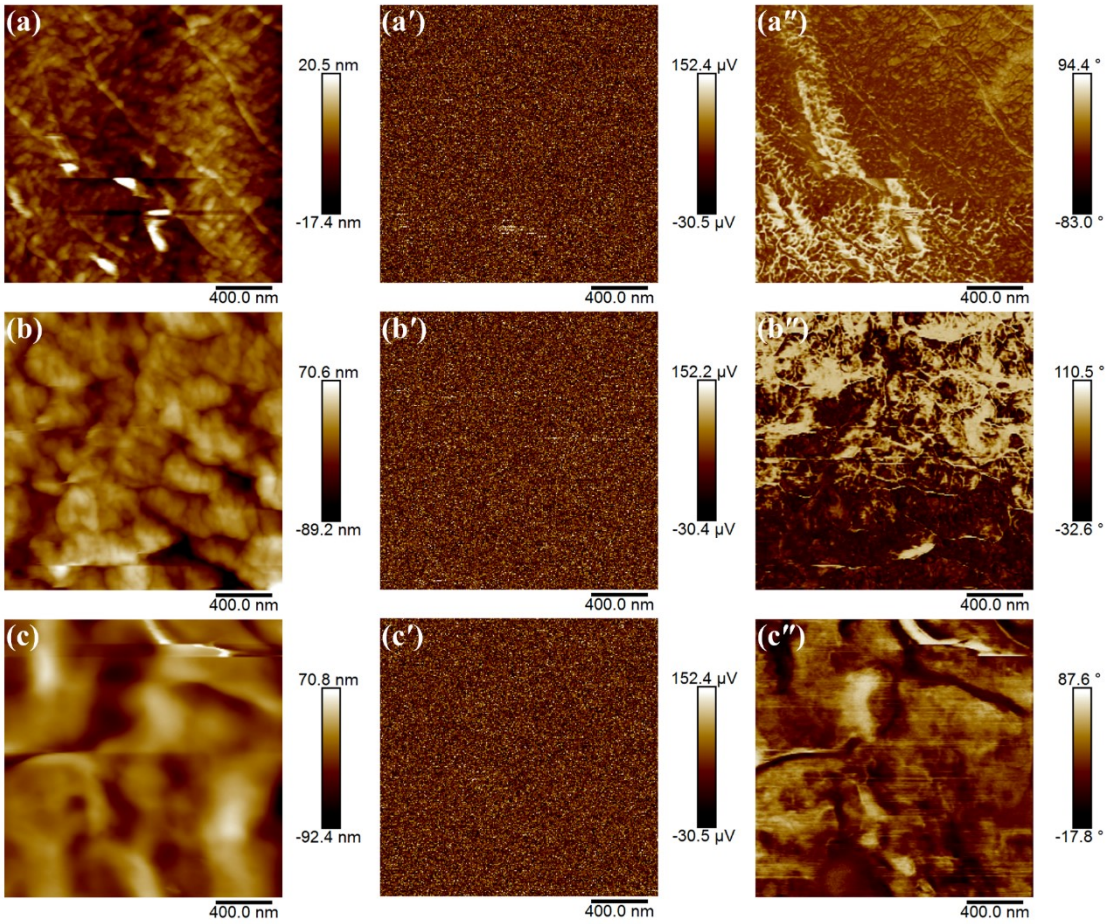

Figure S10. (a–c) PFM topographic images, (a'–c') amplitude images, (a''–c'') phase images of B-CN, E500-CN and E540-CN.

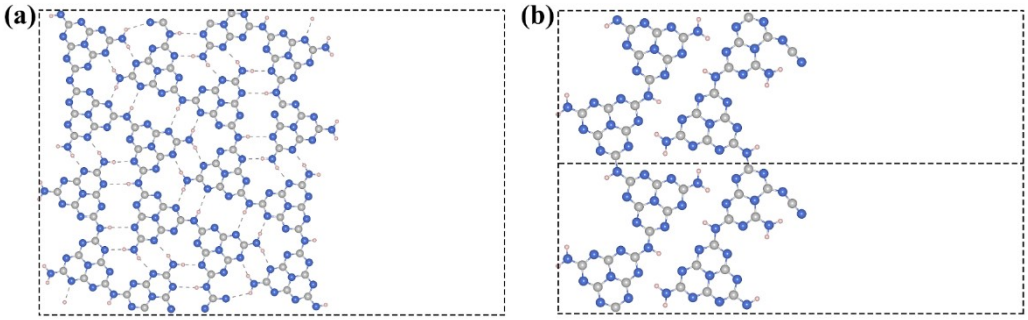

Figure S11. The atomic structure of (a) E500-CN with hydrogen bonds and (b) E540-CN with cyano. H, C, and N atoms are denoted by small yellow, large white, and light blue balls, respectively.

Table S1. The degradation efficiencies for MB in different catalytic systems.

Catalysts	Pollutants	Catalyst dosage (g/L)	Removal efficiencies	Reactions conditions	Ref.
E500-CN	MB; 10 ppm	0.6	20 min - 97%; k_{obs} = 0.152 min^{-1}	300 W Xe lamp; ultrasonic cleaner (120 W, 40 kHz)	This work
carbon-rich CN	MB; 5 ppm	0.5	k_{obs} = 0.0454 min^{-1}	ultrasonic cleaner (150 W, 40 kHz)	[1]
Bi_2MoO_6	MB; 10 ppm	0.5	k_{obs} = 0.0196 min^{-1}	ultrasonic cleaner (150 W, 40 kHz)	[2]
ZnO/g-C_3N_4-Ni foam	MB; 10 ppm	-	80 min - 99%	300 W Xe lamp; mechanical agitator	[3]
α-Fe_2O_3/PVDF	MB; 1 ppm	0.35	60 min - 99.5%; k_{obs} = 0.052 min^{-1}	250 W mercury lamp; ultrasonic cleaner (250 W, 18 kHz)	[4]
PVDF/$BiFeO_3$	MB; 1 ppm	0.25	45 min - 93%; k_{obs} = 0.065 min^{-1}	250 W mercury lamp; ultrasonic cleaner (360 W, 40 kHz)	[5]
Ag_2S/ZnO	MB; 1 ppm	-	120 min - 100%	simulated solar light (320-800 nm, 80 mW/cm^2); ultrasonic cleaner (45 kHz)	[6]
ZnO/CuS	MB; 5 ppm	2	20 min - 100%; k_{obs} = 0.182 min^{-1}	500 W Xe lamp (200-1100 nm); ultrasonic probe (200 W)	[7]
ZnO/ZnS	MB; 5 ppm	-	50 min - 60.7%	UV irradiation; ultrasonic cleaner	[8]
ZnO/ZnS/MoS_2	MB; 10 ppm	0.2	50 min - 87.14%; k_{obs} = 0.0411 min^{-1}	300 W Xe lamp; mechanical agitator	[9]
Ag_3PO_4/ZnO	MB; -	-	30 min - 98.16%; k_{obs} = 0.1341 min^{-1}	300 W Xe lamp (λ > 420 nm); ultrasonic cleaner (50 W, 40 kHz)	[10]

Reference

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