

Construction and Excellent Photoelectric Synergistic Anticorrosion Performance of Z-Scheme Carbon Nitride/Tungsten Oxide Heterojunctions

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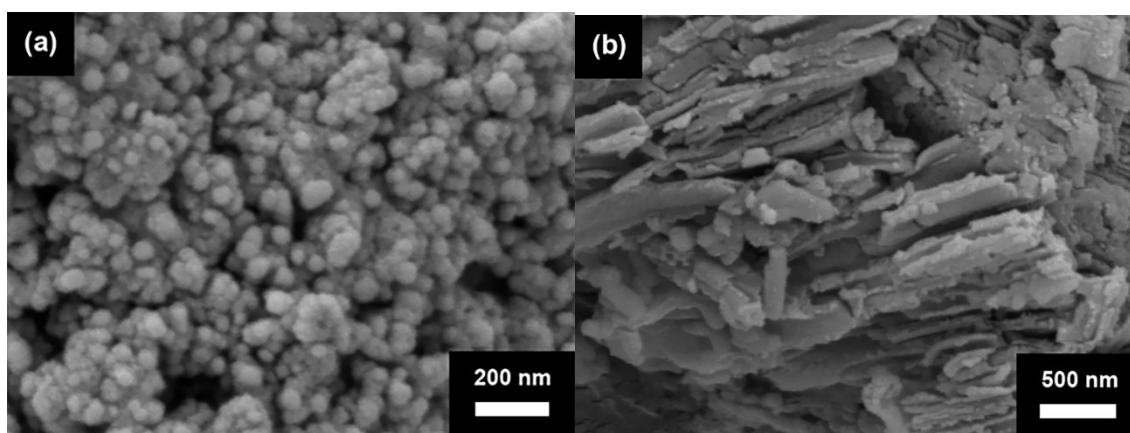


Figure S1. SEM images of (a) WO₃, (b) g-C₃N₄.

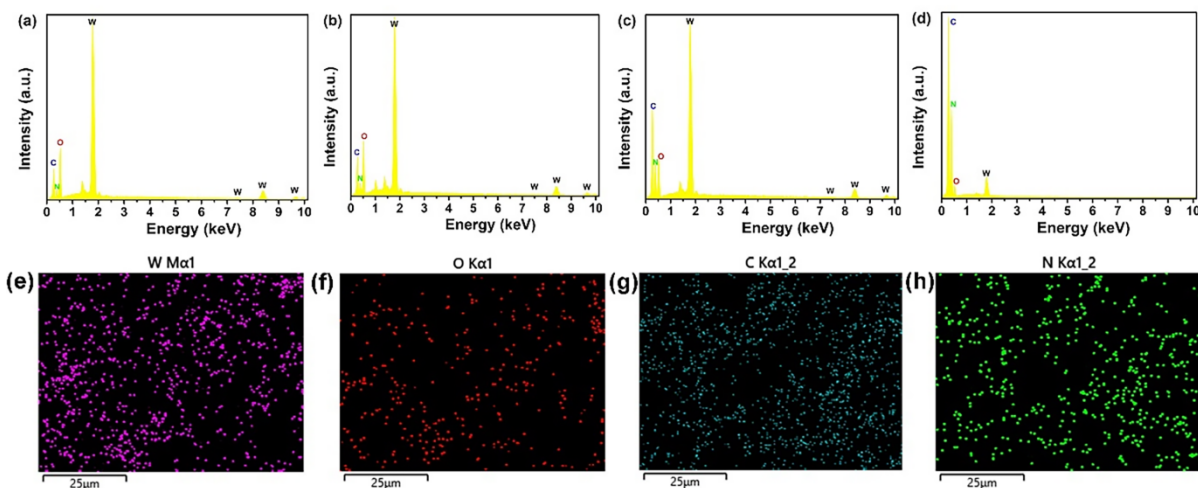


Figure S2. EDS patterns of (a) 15CN/WO, (b) 30CN/WO, (c) 60CN/WO and (d) 90CN/WO. EDS mapping images of 60CN/WO: (e) W, (f) O, (g) C and (h) N.

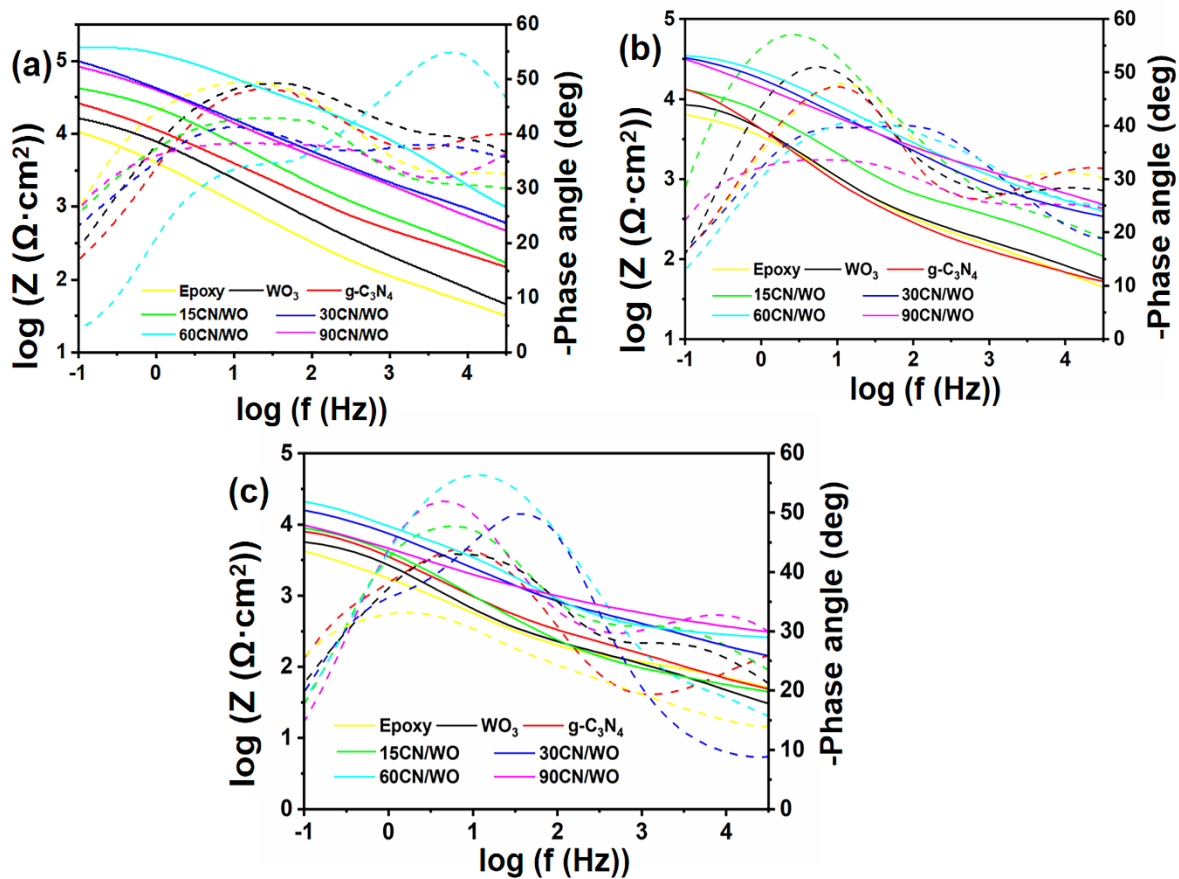


Figure S3. Bode curves (where the full line represents $\log(Z(\Omega \cdot \text{cm}^2))$ and the dotted line represents $-\text{Phase angle (deg)}$) of iron matrix covering epoxy resin system immersed in salt water for different time: (a) 6 h, (b) 24 h, (c) 48 h.

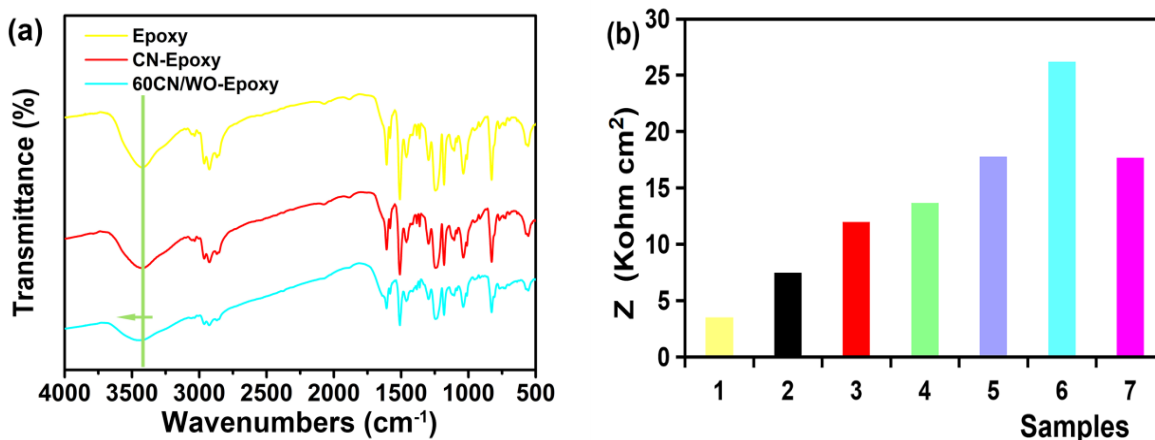


Figure S4. FT-IR spectra (a) of various epoxy resin systems. Histograms (b) of impedance values of all coatings after soaking in sodium chloride solution for 72 h: (1) Epoxy, (2) WO₃, (3) g-C₃N₄, (4) 15CN/WO, (5) 30CN/WO, (6) 60CN/WO and (7) 90CN/WO.

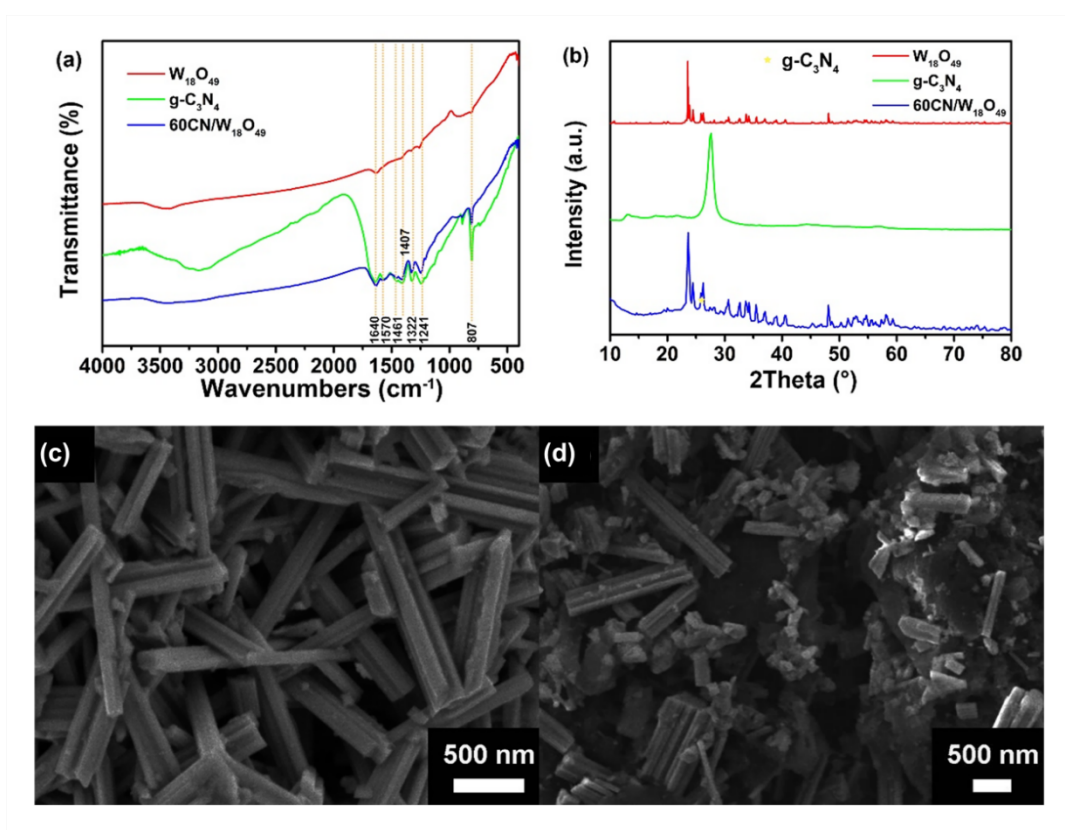


Figure S5. FT-IR spectra (a). XRD patterns (b) of W₁₈O₄₉, g-C₃N₄ and 60CN/W₁₈O₄₉ samples. SEM images of (c) W₁₈O₄₉, (d) 60CN/W₁₈O₄₉ pigments.

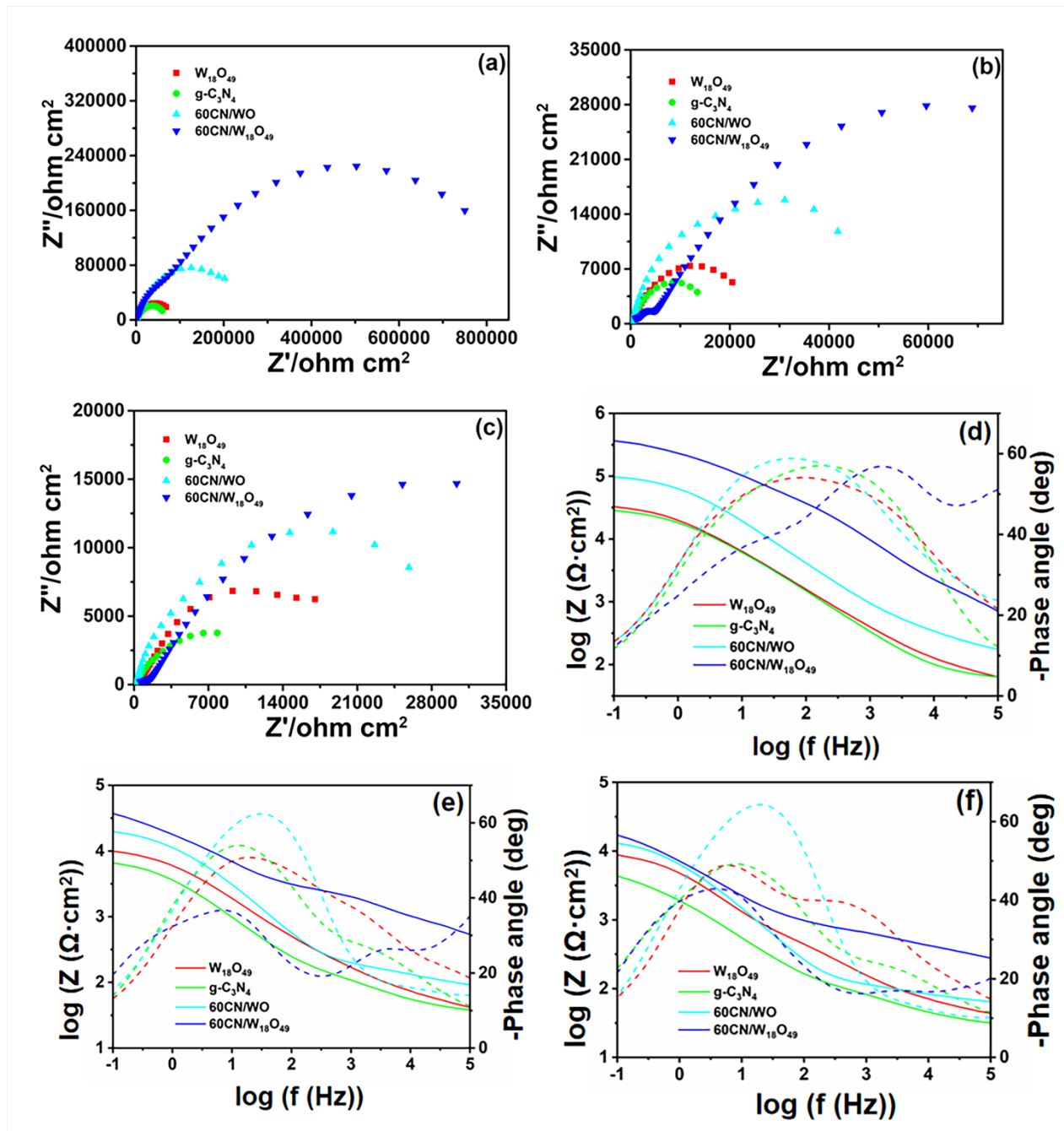


Figure S6. Nyquist plots of coatings after immersion in NaCl model for different times: (a) 5 h, (b) 24 h, (c) 48 h. Bode plots (where the full line represents $\log(Z(\Omega \cdot \text{cm}^2))$) and the dotted line represents -Phase angle (deg) of different coatings after corrosion for different times: (a) 5 h, (b) 24 h, (c) 48 h.

Table S1. The chemical composition of iron substrate.

Elements	Fe	C	Si	Mn	P	S	Cu	others
Wt.%	98.00	0.20	0.30	0.50	0.06	0.04	0.30	0.60

Table S2. The Zeta value of CN/WO heterojunctions.

Sample	15CN/WO	30CN/WO	60CN/WO	90CN/WO
Zeta potential (mV)	-46.55	-38.95	-19.36	-28.44

Table S3. Polar and dispersive forces of pure epoxy resin and 60CN/WO heterojunction coatings.

Sample	Polar force (kJ·mol ⁻¹)	Dispersion force (kJ·mol ⁻¹)
Epoxy	32.99	2.40
60CN/WO	19.16	3.67

Table S4. EIS parameters with W₁₈O₄₉, g-C₃N₄, 60CN/WO and 60CN/W₁₈O₄₉ coatings after immersion in NaCl solution for 72 h.

Sample	W ₁₈ O ₄₉	g-C ₃ N ₄	60CN/WO	60CN/W ₁₈ O ₄₉
Model	R(QR)(QR)(CR)			
$R_s/\text{ohm}\cdot\text{cm}^2$	61.26	41.86	122.40	189.80
$Y_1/\text{ohm}^{-1}\cdot\text{cm}^{-2}\cdot\text{s}^{-n}$	8.15×10^{-5}	7.76×10^{-5}	2.33×10^{-5}	2.50×10^{-5}
n_1	0.46	0.69	0.84	0.69
$R_c/\text{ohm}\cdot\text{cm}^2$	133.10	6842.00	2.61×10^4	3.61×10^4
$Y_2/\text{ohm}^{-1}\cdot\text{cm}^{-2}\cdot\text{s}^{-n}$	6.52×10^{-5}	1.00×10^{-5}	5.26×10^{-5}	1.25×10^{-5}
n_2	0.77	0.52	0.49	0.60
$R_{ct}/\text{ohm}\cdot\text{cm}^2$	1.20×10^4	72.06	438.90	249.80
$C_f/\text{F}\cdot\text{cm}^{-2}$	4.92×10^{-5}	9.66×10^{-4}	4.00×10^{-5}	1.10×10^{-5}
$R_f/\text{ohm}\cdot\text{cm}^2$	1707.00	2304.00	1658.00	368.90
Chi-Squared	3.97×10^{-4}	9.06×10^{-5}	2.45×10^{-4}	1.21×10^{-4}
$Z/\text{ohm}\cdot\text{cm}^2$	9.58×10^3	6.01×10^3	2.06×10^4	2.26×10^4