

Supporting Information

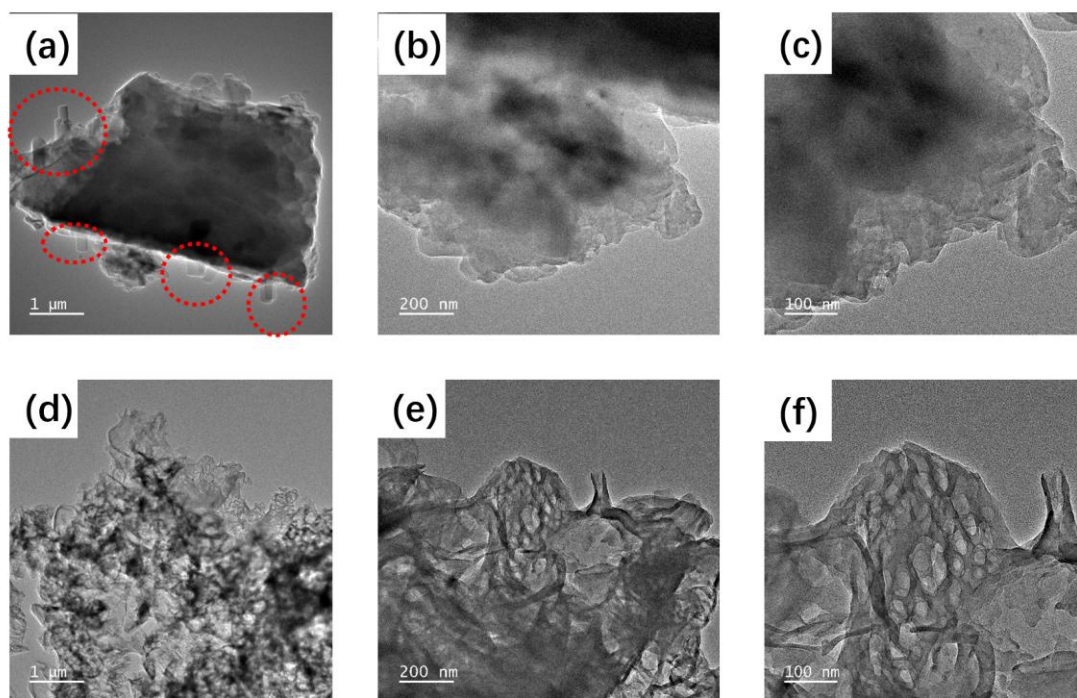


Figure S1 TEM images of (a-c) CN-M and (d-f) CN-U catalysts

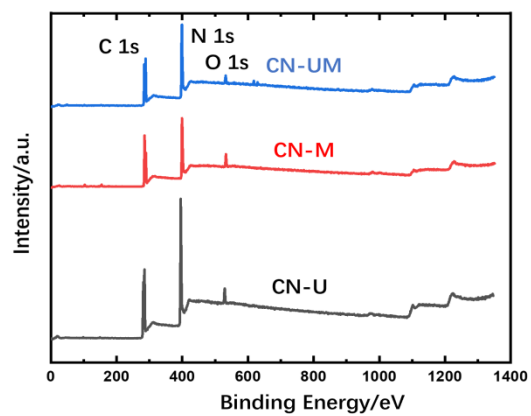


Figure S2 XPS full spectra of CN-U, CN-M and CN-UM catalysts

Table S1 Element contents and species percentages after peak fitting based on XPS results for catalysts

Sampl es	Elements	Percentage /at.%	Species	Percentage /at.%*	Percentage/ at.%#	Others
	C	60.86	C-C	57.65	35.09	C/N=1.77 ^{\$}
			N=C-N	38.78	23.60	
			C-NH _x	3.57	2.17	
CN-U	N	34.48	N-H _x	12.88	4.44	N _{2C} /N _{3C} = 1.72
			N _{3C}	31.84	10.97	
			N _{2C}	55.28	19.06	
	O	4.66	C-O	4.50	0.21	
			H ₂ O	75.38	3.51	
			O ₂ ads	20.11	0.94	
	C	53.53	C-C	39.93	21.37	C/N=1.25 ^{\$}
			N=C-N	52.52	28.11	
			C-NH _x	7.55	4.04	
CN-M	N	42.91	N-H _x	13.49	5.79	N _{2C} /N _{3C} = 1.81
			N _{3C}	33.62	14.43	
			N _{2C}	52.89	22.70	
	O	3.56	C-O	10.32	0.37	
			H ₂ O	55.98	1.99	
			O ₂ ads	33.70	1.20	
	C	55.78	C-C	49.05	27.36	C/N=1.36 ^{\$}
			N=C-N	48.44	27.02	
			C-NH _x	2.52	1.41	
CN- UM	N	41.04	N-H _x	12.71	5.22	N _{2C} /N _{3C} = 3.14
			N _{3C}	21.57	8.85	
			N _{2C}	65.72	26.97	
	O	3.18	C-O	24.31	0.77	
			H ₂ O	51.71	1.64	
			O ₂ ads	23.99	0.76	

*: Percentage of the species in the element after peak fitting

#: Percentage of the species in the sample based on the percentages in the element and the element content in the sample

\$: C/N ratio based on XPS results

Table S2 Contents of C, N and O obtained by chemical analysis for catalysts

Samples	C/wt.%	N/wt.%	O/wt.%	C/N atomic ratio
CN-U	33.76	38.61	14.25	1.02
CN-M	29.18	40.05	16.77	0.85
CN-UM	33.02	42.97	16.59	0.90

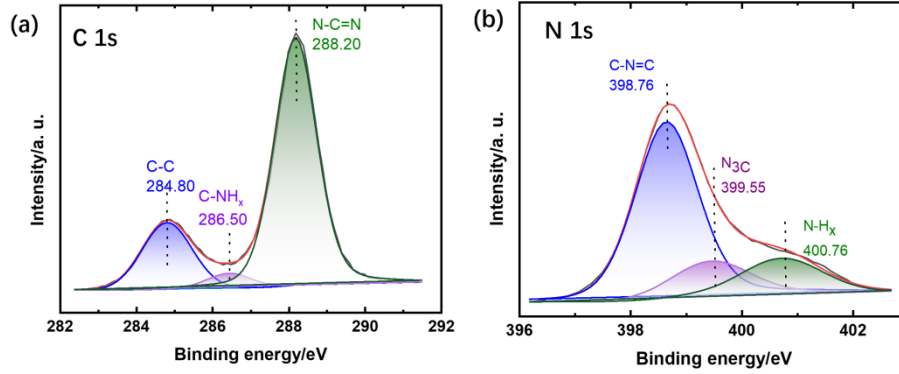


Figure S3 XPS fine spectra of (a) C1s and (b) N1s of CN-M-O catalyst prepared under unsealed conditions

Table S3 Element contents by XPS analyses and the corresponding species percentages after peak fitting for CN-M-O catalyst

Sample	Element	Content/ at%	Species	Content/ at%*	Content/ at%#	Other
CN-M-O	C	45.85	C-C	21.47	9.84	C/N=0.90
			N=C-N	74.15	34.00	
			C-NH _x	4.38	2.01	
CN-M-O	N	51.10	N-H _x	15.62	7.98	
			N ₃ C	13.96	7.13	
			N ₂ C	70.41	35.98	
CN-M-O	O	3.05	C-O	16.51	0.50	
			H ₂ O	60.82	1.86	
			O ₂ ads	22.67	0.69	

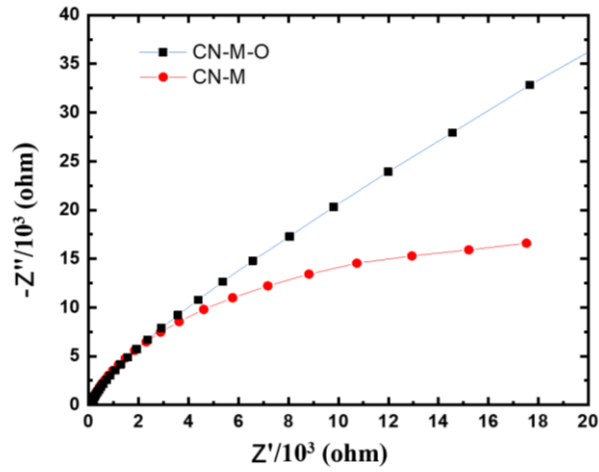


Figure S4 EIS spectra of CN-M and CN-M-O catalysts

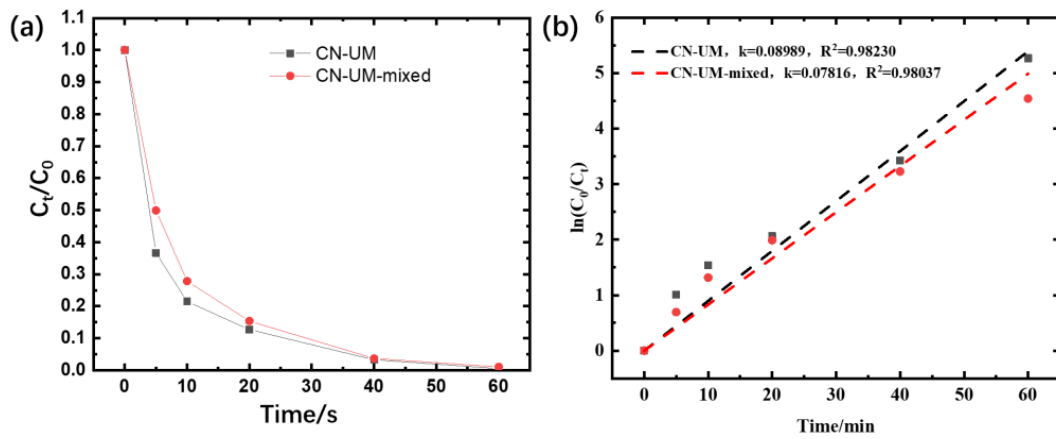


Figure S5 (a) Degradation efficiencies and (b) degradation rate constants of TC by CN-UM and CN-UM-mixed catalysts coupling with PS under the modulated sunlight irradiation