Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Implementing Thermally-Excited-Catalytic Course Solely Using Ambient Heat Motivation for Efficient Abatement of Water Pollutants

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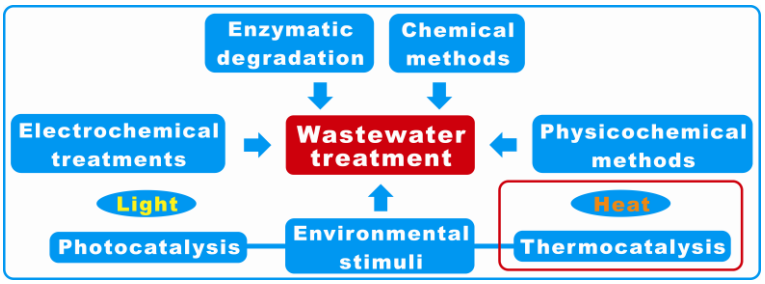

Figure S1‡ Traditional methods of wastewater treatment and proposed thermally-excited-catalytic pattern. 'Heat-responsive' in red-line square should be highlighted in this work.

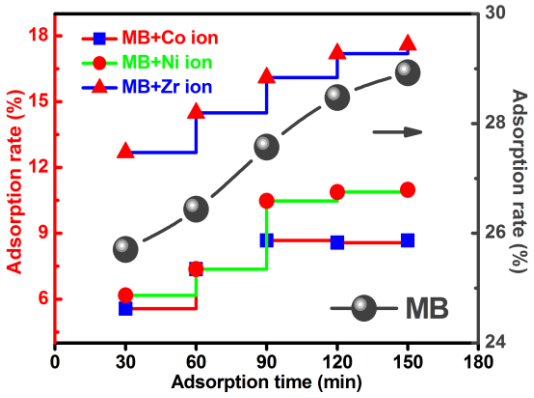

Figure S2‡ Dark adsorption capacity of MB adsorbed onto CNM under different dual-blend solution systems including the pure group (without any ions). The adsorption efficiency was tested every 30 min throughout the whole adsorption process.

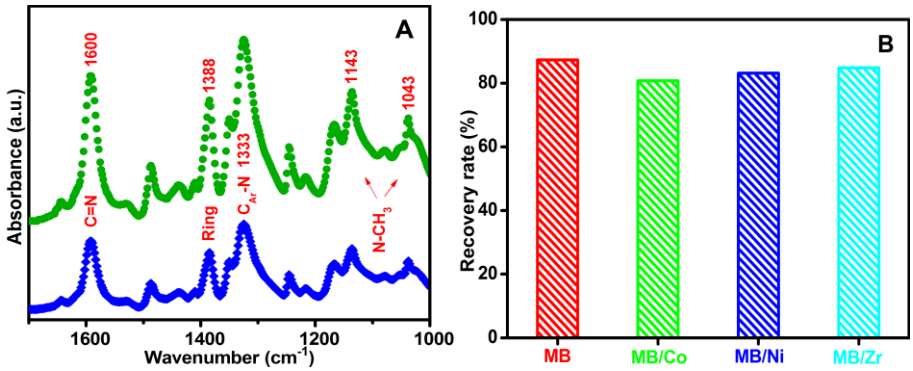

Figure S3‡ Recovery test of physical adsorption. A, FT-IR spectra of MB (green) and residual MB recovered (blue). **B**, Recovery rates of the corresponding groups. CNM of 500 mg was placed in 500 mL MB/ions solution of 50 mg/L (MB), strongly stirring until its equilibrium (2.5 h) in darkness, and then the solid powder was extracted from the solution through centrifugation, the residual catalysts were achieved by thoroughly rinsing with ethanol solvent (1 L), finally, the assembling solid was dried and collected to acquire FT-IR spectra for comparing with that of pristine MB.

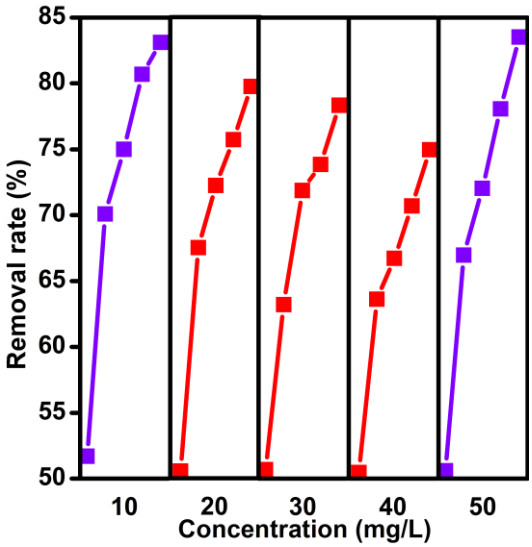

Figure S4‡ Removal rates of different concentrations of MB solutions by means of TEC degradation. Other influential factors such as dosage of catalyst, temperature, and pH value have been considered and applied under the optimal conditions in these solution systems.

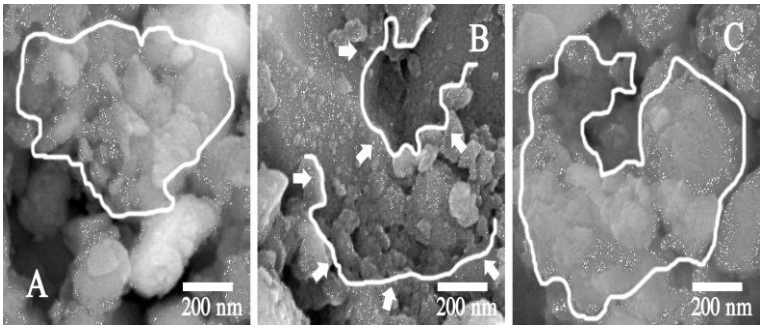

Figure S5‡ Morphological changes of CNM surface adsorbed with MB in TEC degradation progress. A, Original catalyst surface. **B**, Catalyst surface in adsorbing MB equilibrium stage. **C**, Catalyst surface after the degradation course.

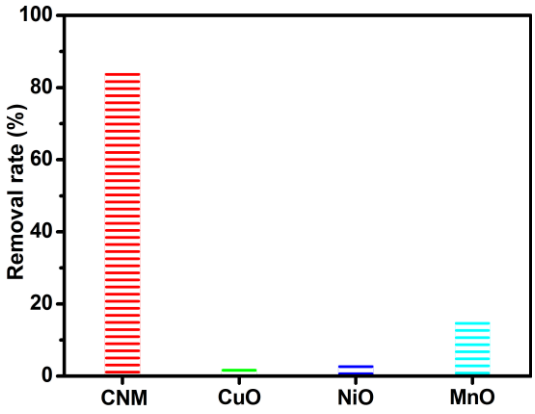

Figure S6‡ Degradation effect comparison. Comparing CNM with Cu, Ni and Mn oxides in tackling with organic pollutants. Note: Removal rate of degradation are calculated after excluding the respective adsorption amount.

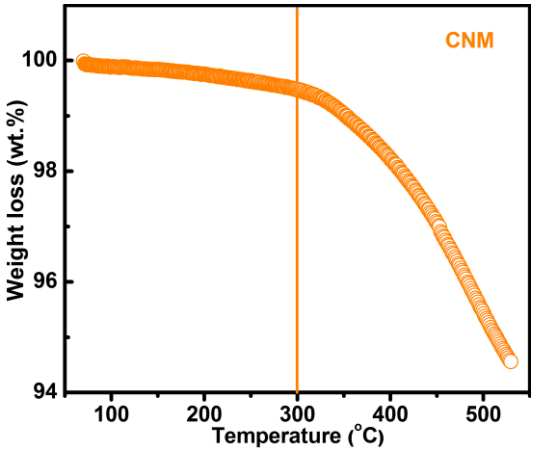

Figure S7‡ TG profiles of CNM. In the temperature ranging from near room temperature to 550 ℃.

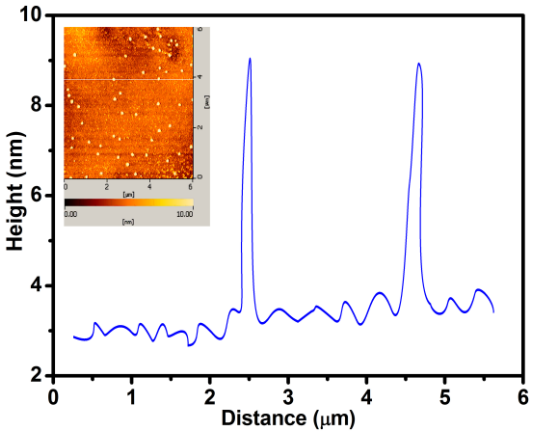

Figure S8‡ Line profile of pattern from AFM analysis of CNM.

Table S1‡ Composition contents of CNM obtained from XRF analysis.

CuO/%	NiO/%	MnO/%	SiO_2/%	CaO/%
17.91	16.83	64.32	0.69	0.06

Table S2‡ Detailed information on control tests without any CNM after experiencing dark treatment of 60 h.

Type	Removal rate (%) after the degradation process of 60 h				
	10 mg/L	20 mg/L	30 mg/L	40 mg/L	50 mg/L
MB	0.82	0.91	1.07	1.19	1.24
MB/Co	0.71	0.80	0.89	0.94	1.06
MB/Ni	0.65	0.68	0.71	0.78	0.83
MB/Zr	0.61	0.63	0.67	0.70	0.77