

# A Novel $\text{CoNi}_7\text{O}_8/\text{MnO}_2$ Nanocomposite Supported on Ni Foam as Peroxymonosulfate Activator for Highly Efficient Singlet Oxygen Mediated Removal of Methylene Blue

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Table S1 The elemental composition in  $\text{CoNi}_7\text{O}_8/\text{MnO}_2/\text{NF}$  obtained by SEM-EDS analysis

Element	Mass content (%)
Ni	68.2
Mn	7.7
Co	7.0
O	17.0

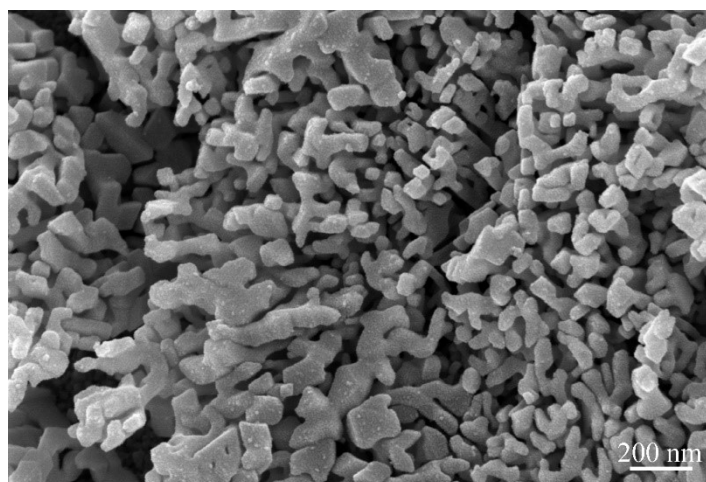


Fig. S1 SEM image of  $\text{CoNi}_7\text{O}_8/\text{NF}$

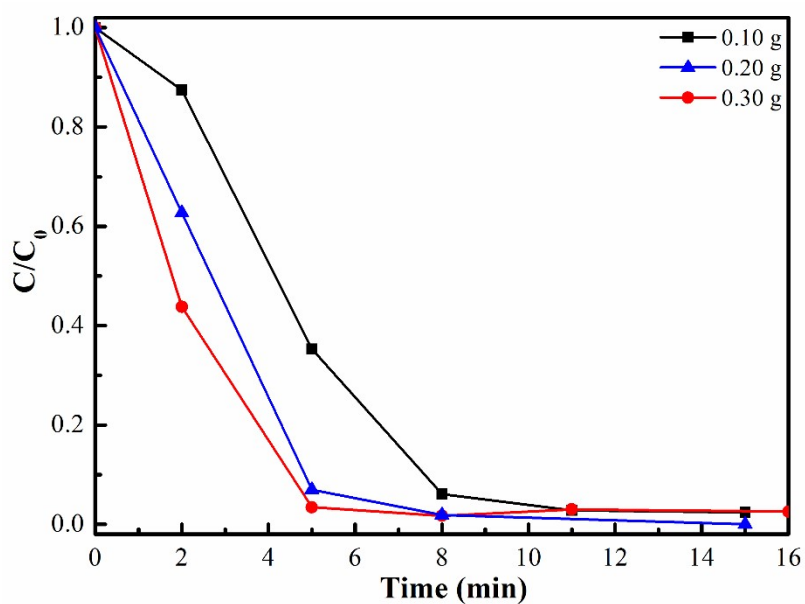


Fig. S2 Effect of  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$  content on MB removal by  $\text{CoNi}_7\text{O}_8/\text{MnO}_2/\text{NF}$   
 (Reaction conditions:  $[\text{MB}]_0 = 20 \text{ mg/L}$ ,  $[\text{PMS}]_0 = 0.5 \text{ g/L}$ , initial pH 5.9 and  $T = 30 \text{ }^\circ\text{C}$ )

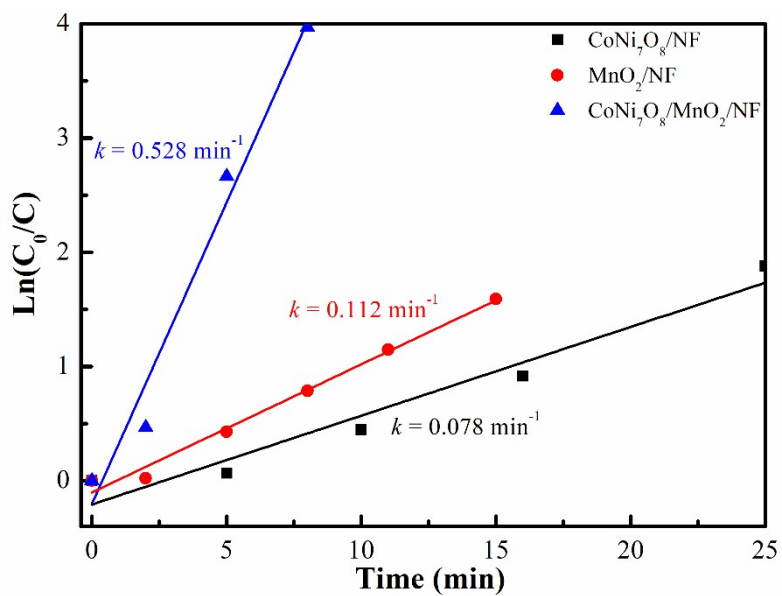


Fig. S3 The reaction kinetic curves of MB removal by different catalytic systems

Table S2 The comparison of catalytic performances of CoNi<sub>7</sub>O<sub>8</sub>/MnO<sub>2</sub>/NF with the previously reported catalysts

Catalysts	PMS dosage (g/L)	MB concentration (mg/L)	pH	Removal efficiency (%)	<i>k</i> (min <sup>-1</sup> )	Ref.
CoNi <sub>7</sub> O <sub>8</sub> /MnO <sub>2</sub> /NF	0.5	20	5.9	100 (15 min)	0.528	This work
Cu@Co-MOFs	0.614	64	5.0	100 (30 min)	0.109	[1]
FexOy/N-GN/CNTs	1.228	100	7.62	100 (20 min)	0.33444	[2]
Mn <sub>3</sub> O <sub>4</sub>	1.88	62	4.0	86.71 (20 min)	0.005	[3]
Ag-La <sub>0.8</sub> Ca <sub>0.2</sub> Fe <sub>0.94</sub> O <sub>3-δ</sub> (Ag-LCF)	0.368	10	/	90 (75 min)	/	[4]
CoFe <sub>2</sub> O <sub>4</sub>	0.3	20	6.3	97.9% (75 min)	0.114	[5]
CuFe <sub>2</sub> O <sub>4</sub> @GO	0.491	200	7.0	93.3% (30 min)	/	[6]

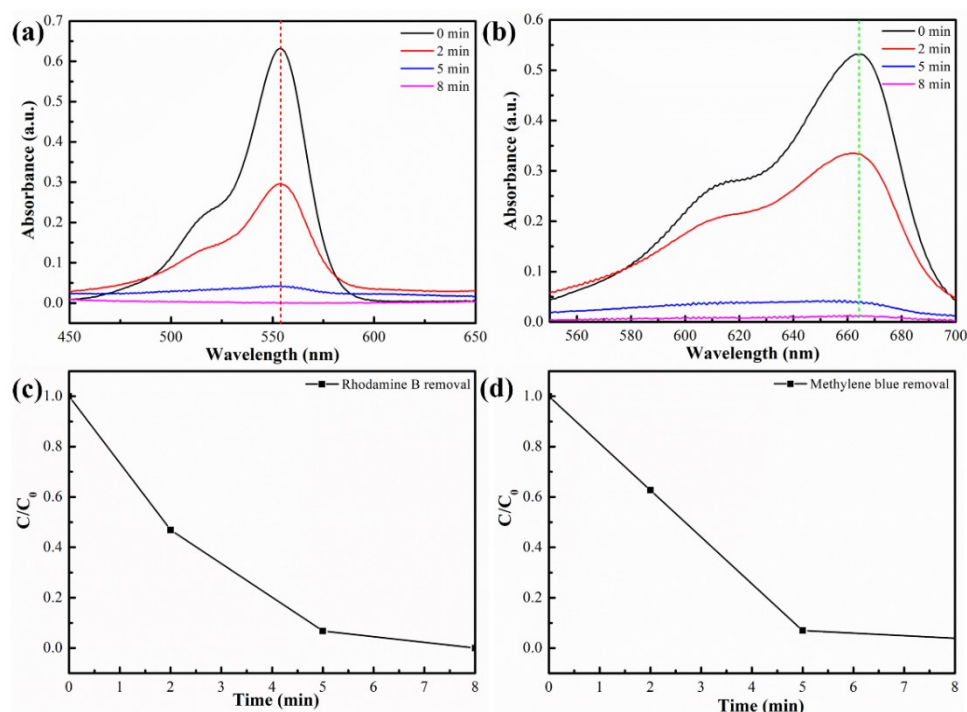


Fig. S4 Time-dependent UV-vis absorption spectra and corresponding removal efficiency curves of RhB (a, c) and MB (b, d)

(Reaction conditions: [MB]<sub>0</sub> and [RhB]<sub>0</sub> = 20 mg/L, [PMS]<sub>0</sub> = 0.5 g/L, initial pH 5.9 and *T* = 30

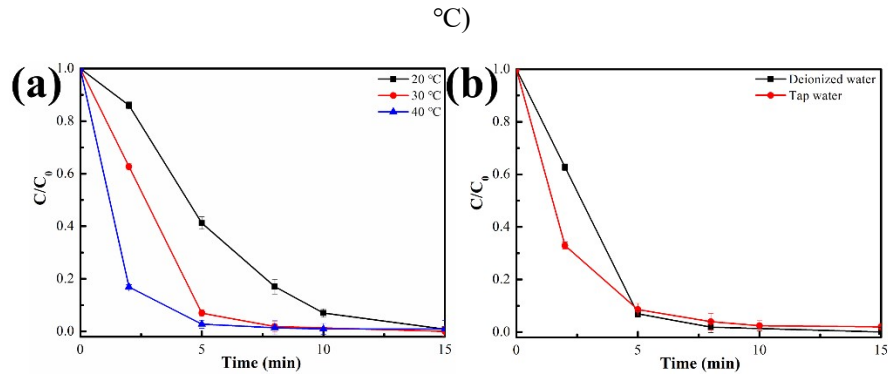


Fig. S5 Influences of temperature and water type on MB removal

(Reaction condition:  $[MB]_0 = 20$  mg/L,  $[PMS]_0 = 0.5$  g/L, initial pH 5.9 and  $T = 30$  °C)

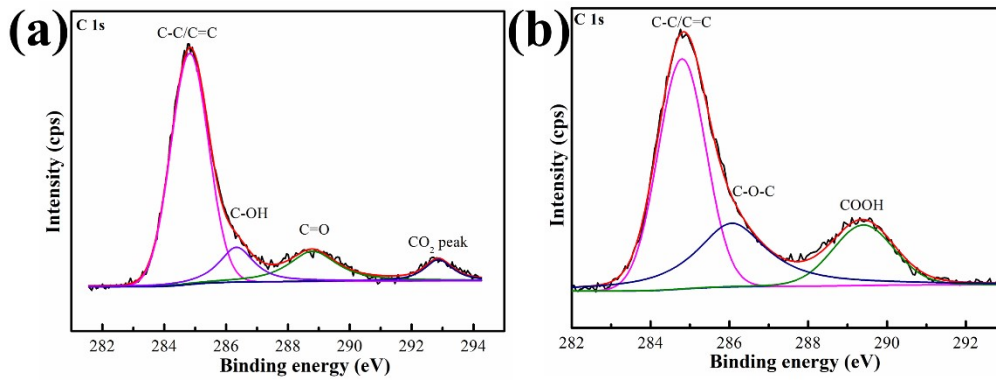


Fig. S6 High-resolution C 1s XPS spectra of fresh (a) and used (b)  $CoNi_7O_8/MnO_2/NF$

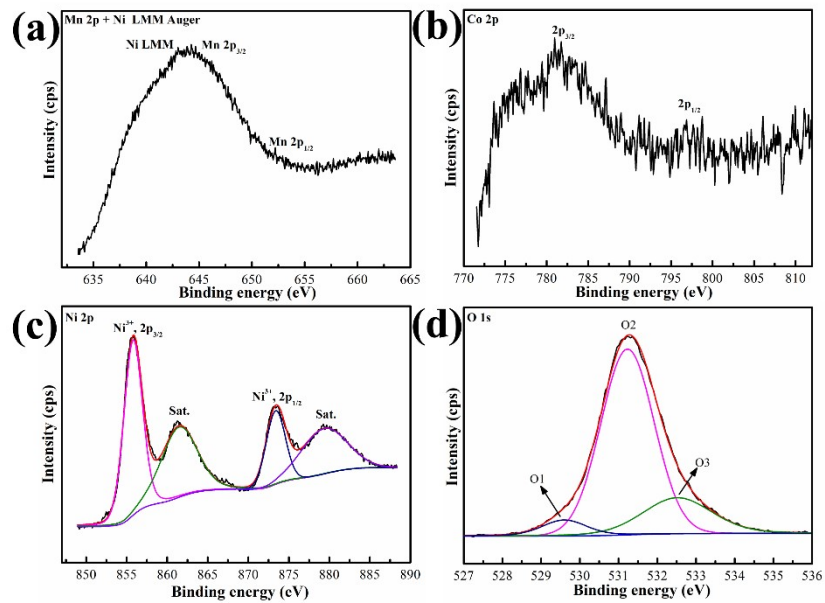


Fig. S7 High-resolution Mn 2p (a), Co 2p (b), Ni 2p (c) and O 1s (d) XPS spectra of used  $CoNi_7O_8/MnO_2/NF$

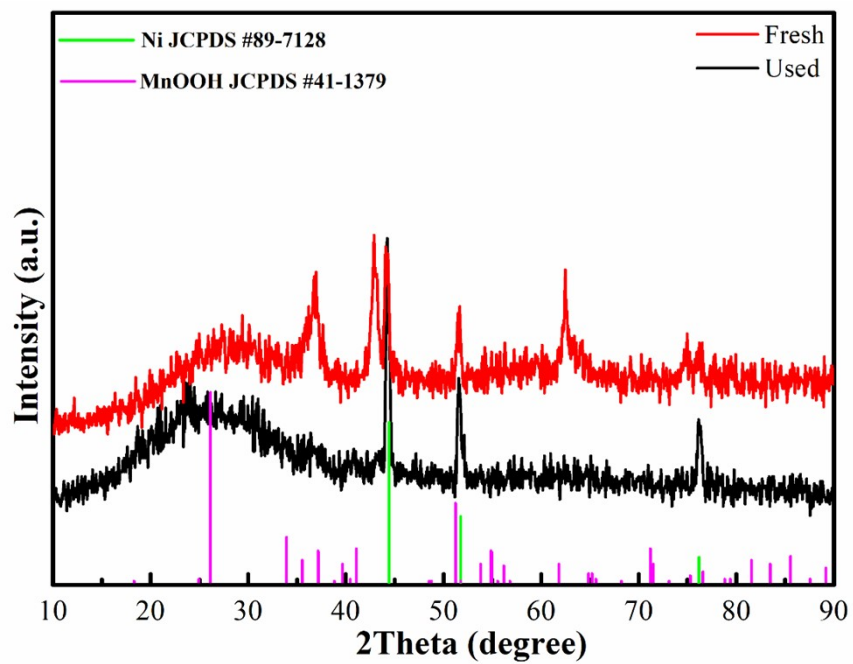


Fig. S8 XRD patterns of fresh and used CoNi<sub>7</sub>O<sub>8</sub>/MnO<sub>2</sub>/NF

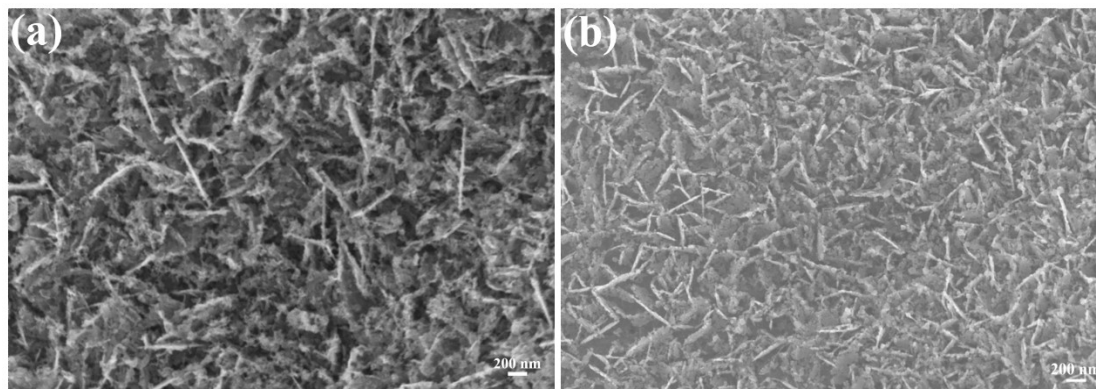


Fig. S9 SEM images of fresh (a) and used (b) CoNi<sub>7</sub>O<sub>8</sub>/MnO<sub>2</sub>/NF

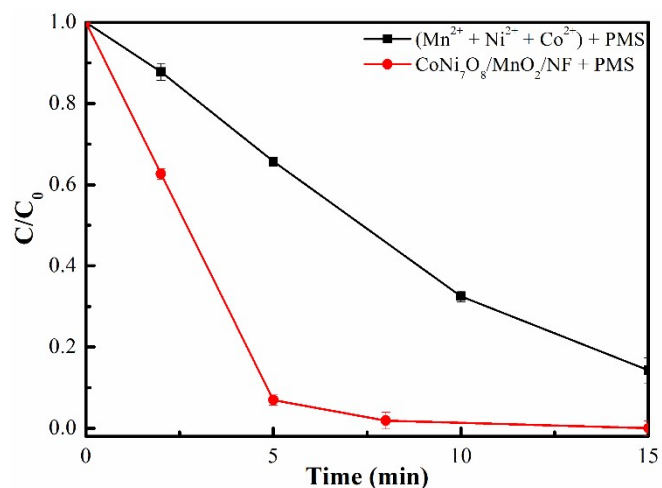


Fig. S10 The impact of homogeneous catalysis on MB removal

(Reaction conditions:  $[MB]^0 = 20 \text{ mg/L}$ ,  $[PMS]^0 = 0.5 \text{ g/L}$ , initial pH 5.9 and  $T = 30 \text{ }^\circ\text{C}$ )

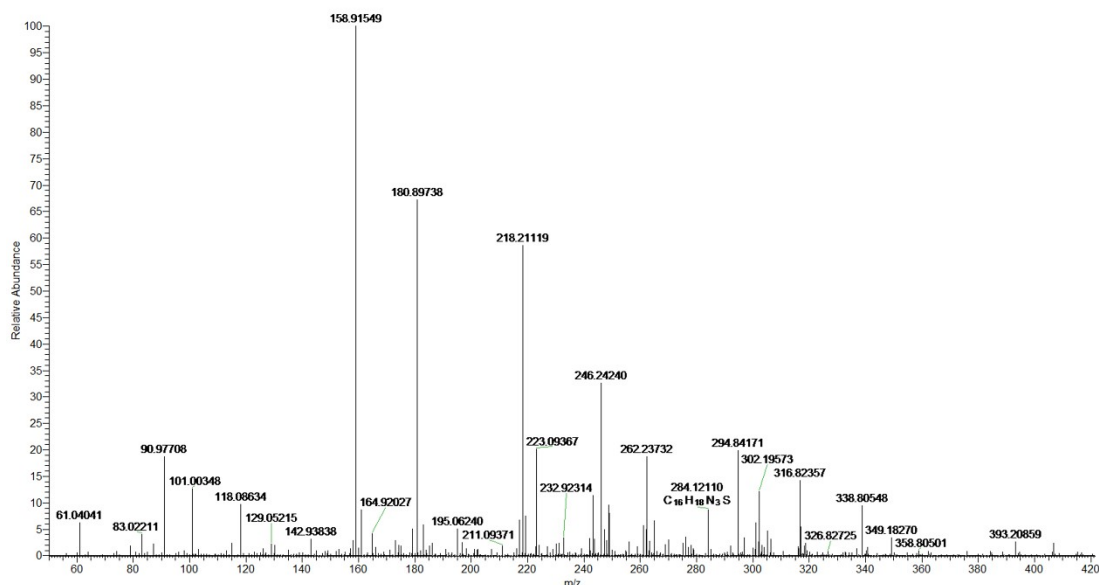


Fig. S11 LC-MS spectrum of MB degradation solution after reaction of 15min

## References

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