Supporting Information

Fabrication of bimetallic MOF-74 derived materials for high-efficient adsorption of iodine

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Table S1 Analysis of metal components in bimetallic MOF-74 system and pyrolyzed Mn-Ni-CX samples by ICP-AES.

Samples	Element	Wt.%
Mn-Zn-MOF-74	Mn	12.288
	Zn	10.157
Mn-Co-MOF-74	Mn	9.517
	Co	12.280
Mn-Ni-MOF-74	Mn	8.159
	Ni	12.790
Mn-Ni-C200	Mn	9.541
	Ni	15.279
Mn-Ni-C400	Mn	15.794
	Ni	25.318
Mn-Ni-C600	Mn	20.516
	Ni	33.417

Table S2 Comparison of adsorption effect of Mn-Ni-C400 and other materials in iodine solution and iodine vapor.

Materials	Adsorbed state of iodine	Adsorption capacity (mg g^{-1})	Reference
MOF-5	Solution	155	S1
Cu-MOF	Solution	144	S2
Mn-Ni-C400	Solution	210	This work
Cu-MOF	Vapor	610	S2
Ni-MOF	Vapor	640	S3
Mn-Ni-C400	Vapor	720	This work

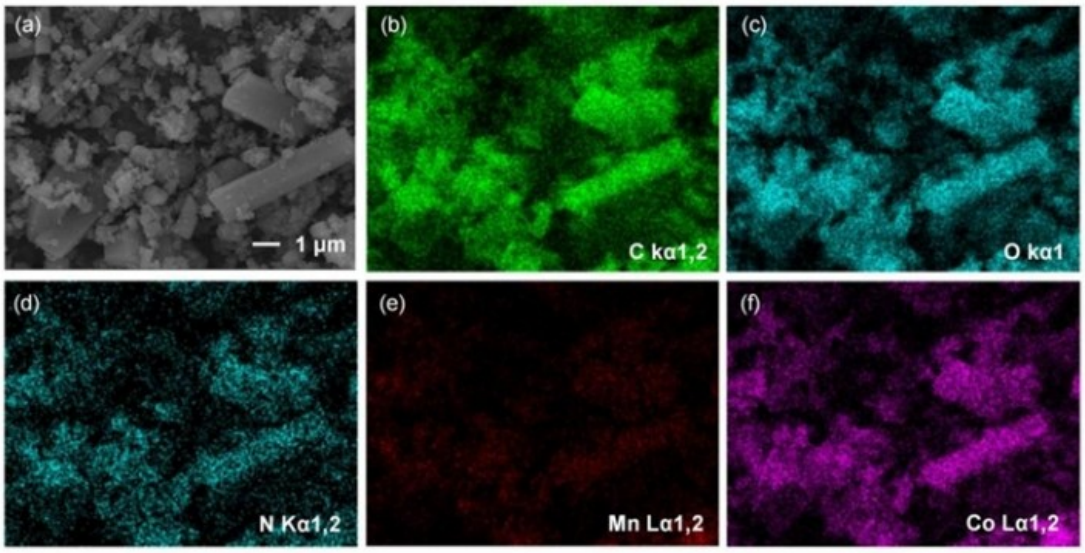

Fig. S1 (a) SEM images of Mn-Co-MOF-74. (b–g) EDX elemental distribution mapping images of Mn-Co-MOF-74.

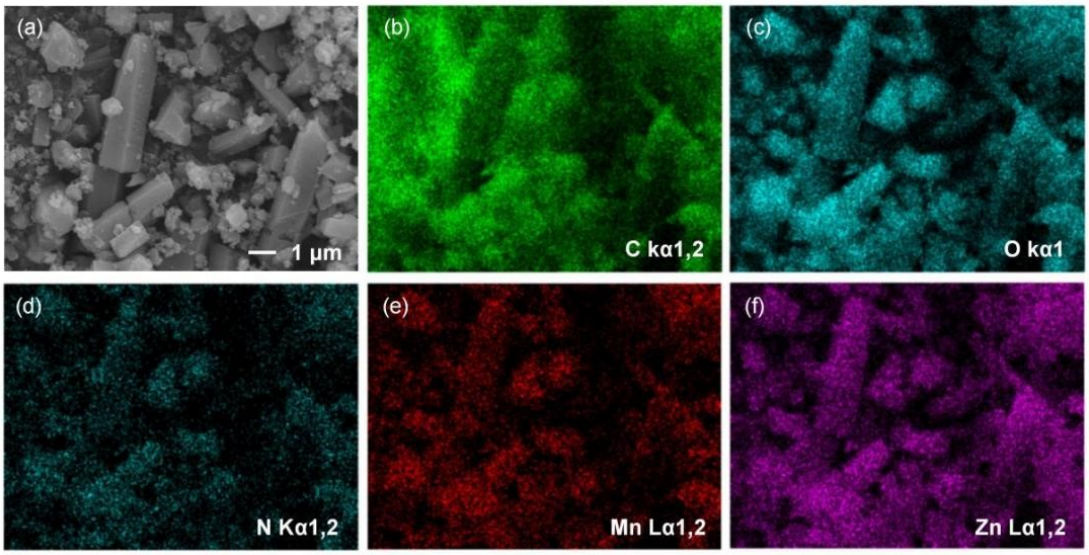

Fig. S2 (a) SEM images of Mn-Zn-MOF-74. (b–g) EDX elemental distribution mapping images of Mn-Zn-MOF-74.

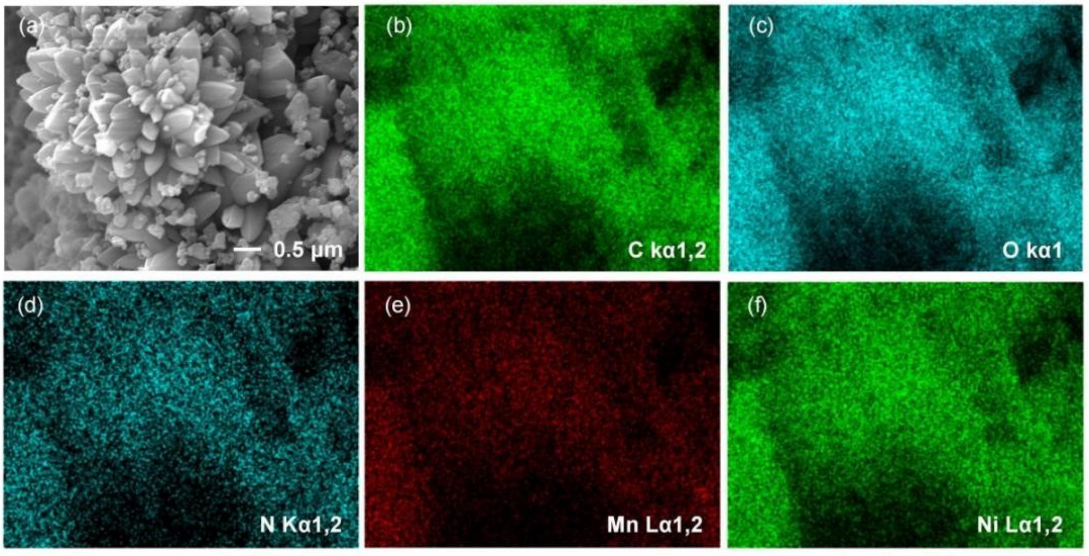

Fig. S3 (a) SEM images of Mn-Ni-C200. (b–g) EDX elemental distribution mapping images of Mn-Ni-C200.

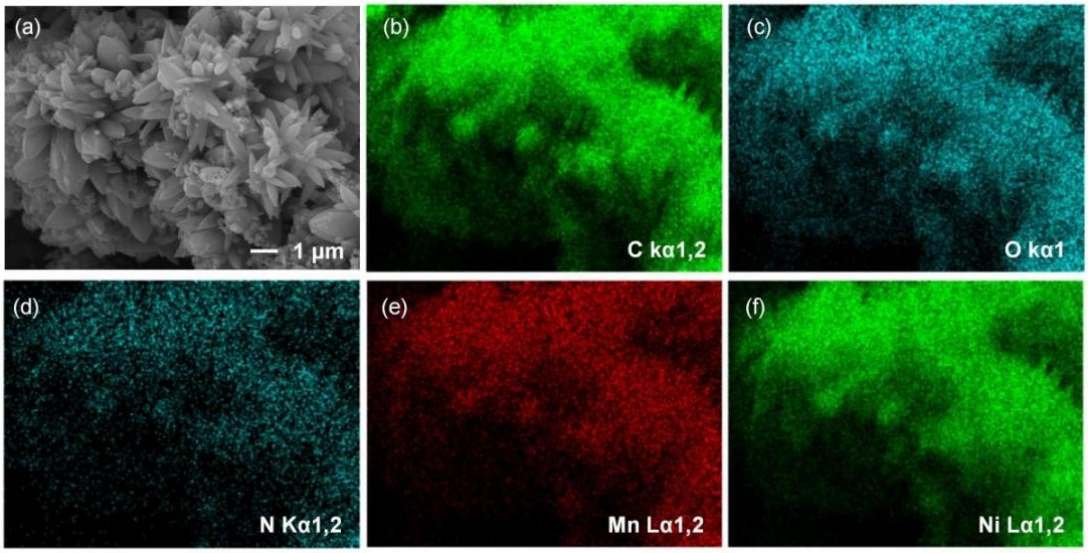

Fig. S4 (a) SEM images of Mn-Ni-C600. (b–g) EDX elemental distribution mapping images of Mn-Ni-C600.

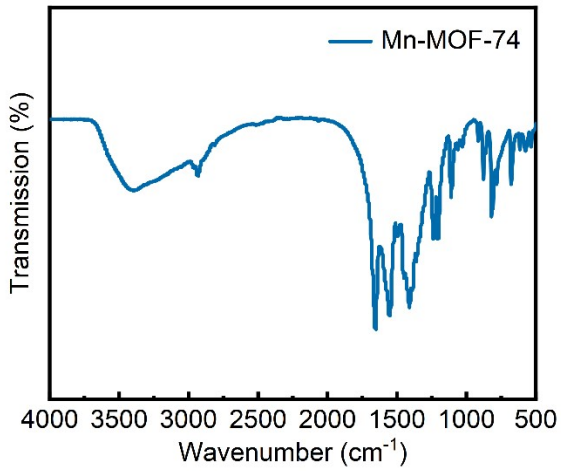

Fig. S5 FTIR spectrum of monometallic Mn-MOF-74.

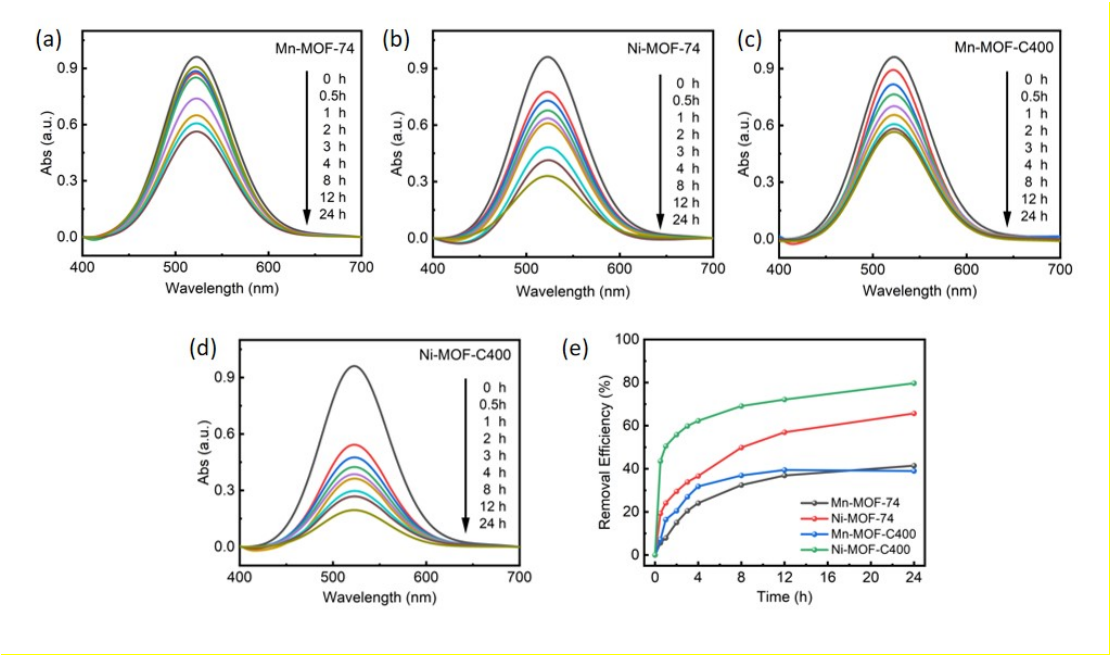

Fig. S6 UV-Vis spectra at different temperatures in iodine-cyclohexane solution at 0.001 mol/L concentration: (a) Mn-MOF-74, (b) Ni-MOF-74, (c) Mn-MOF-C400, (d) Ni-MOF-C400; (e) Removal efficiency.

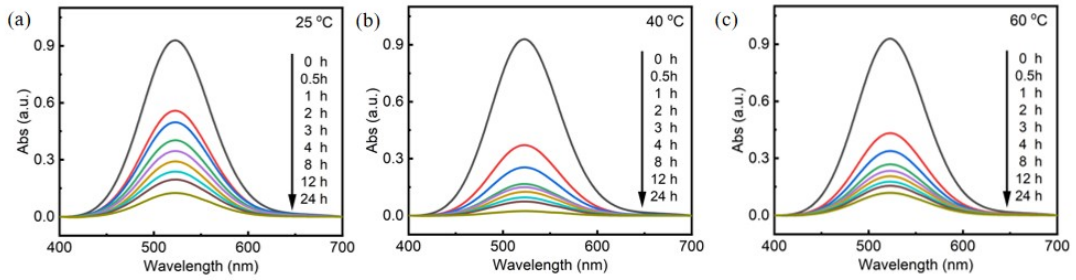

Fig S7 UV-Vis spectra at different temperatures in iodine-cyclohexane solution at 0.001 mol/L concentration: (a) Mn-Ni-C200, (b) Mn-Ni-C400, (c) Mn-Ni-C600.

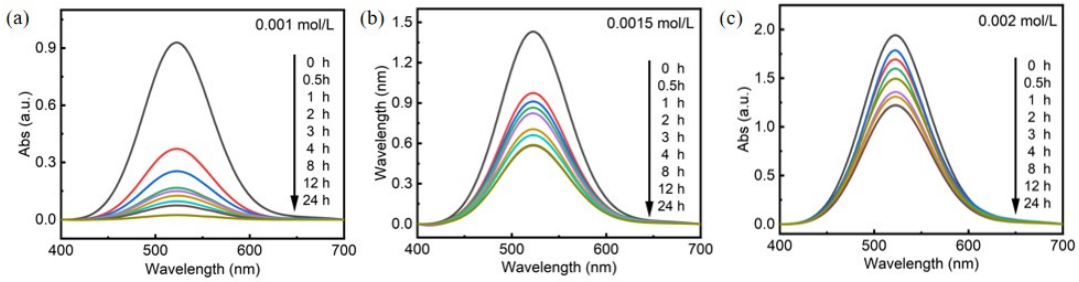

Fig S8 UV-Vis spectra of Mn-Ni-C400 solution with different concentrations of iodine-cyclohexane at 60 °C: (a) 0.001 mol L^{-1}, (b) 0.0015 mol L^{-1}, (c) 0.002 mol L^{-1}.

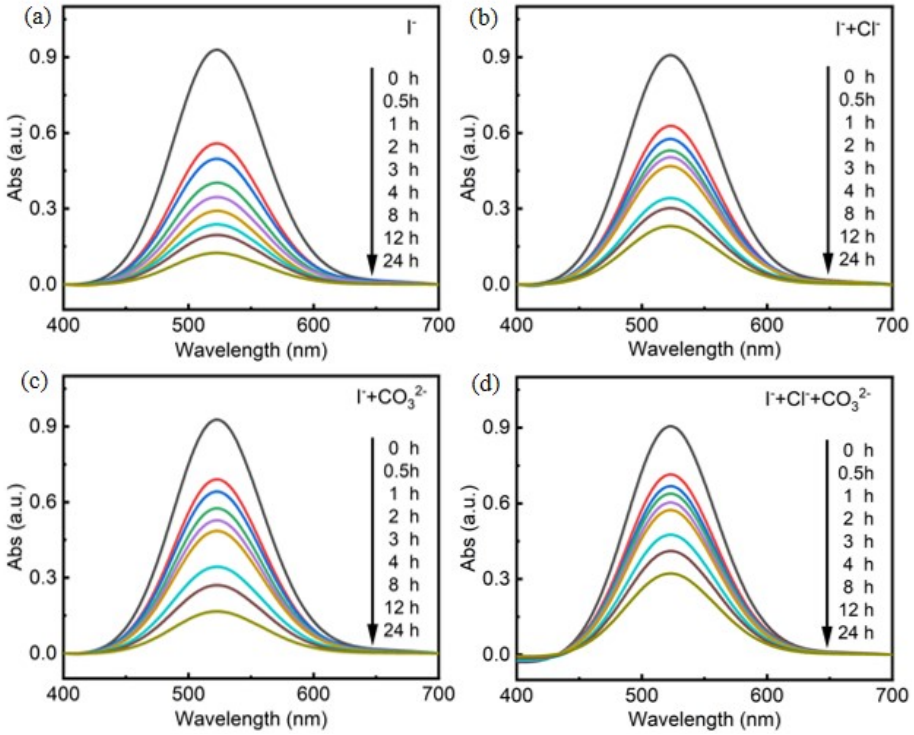

Fig S9 UV-Vis spectra of Mn-Ni-C400 with 0.001 mol L^{-1} iodine solution added to different interfering ions at 60 °C: (a) I^-, (b) I^- and Cl^-, (c) I^- and CO_3^{2-}, (d) I^- and Cl^- and CO_3^{2-}.

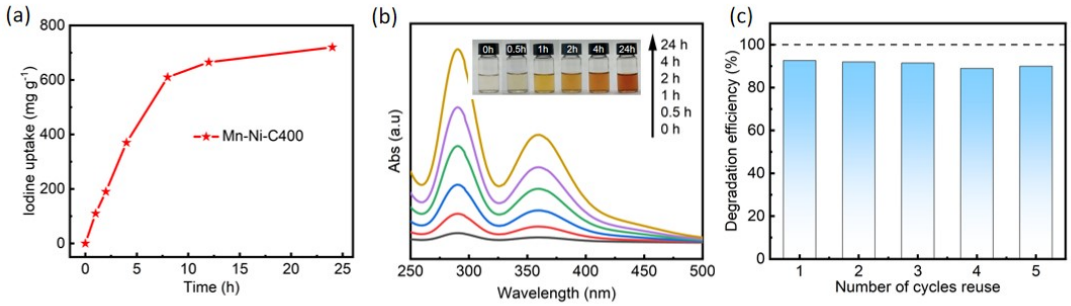

Fig. S10 (a) Iodine vapor experiment of Mn-Ni-C400; (b) The desorption experiment of Mn-Ni-C400@I; (c) Recyclability of Mn-Ni-C400 (after desorption with anhydrous ethanol) for iodine vapor capture.

Reference:

S1 R. L. Yu, Q. F. Li, T. Zhang, Z. L. Li and L. Z. Xia, *Process Saf. Environ*., 2023, **174**, 770−777.

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