Supporting information

Hydrogenolysis of lignin-derived aryl ethers to monomers over a MOF-derived Ni/N-C catalyst

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Table S1

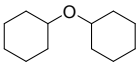
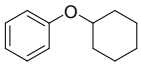
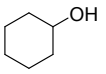
Surface element content of fresh and spent Ni/N-C-450 from XPS analyses

Sample	Content (atomic/%)[a]			
	C	N	O	Ni
fresh Ni/N-C-450	62.5	11.7	12.0	13.8
spent Ni/N-C-450	66.8	10.9	13.5	8.8

[a] Determined by XPS.

Table S2

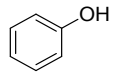
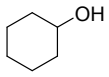
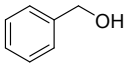
Effect of catalyst calcination temperature (CT) on DPE conversion

Entry	CT/°C	Conversion/%	Selectivity/%				
							
1	350	80.1	0	22.2	32.6	6.3	38.9
2	450	100.0	13.7	25.9	17.3	12. 9	30.2
3	550	73.0	7.5	24.7	30.7	7.7	29.4

Reaction conditions: 100 mg DPE, 20 mg Ni/N-C-X, 20 mL *n*-hexane, 3MPa H_2, 180 °C, 2 h.

Table S3

Hydrogenolysis of phenol and benzyl alcohol over Ni/N-C-450 catalyst

Substrate	Conversion（%）	Selectivity/%
	100.0	 100.0
	100.0	 100.0

Conditions: 100 mg benzene or benzyl alcohol, 30 mg Ni/N-C-450, 20 ml *n*-hexane, 0.5 MPa H_2 , 200 °C, 3h.

Table S4

The BDEs of C-O bonds in DPE and its hydrogenation products

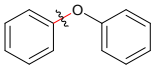
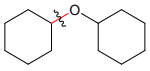
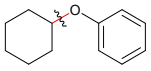
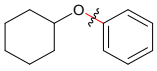
Compound				
BDEs (kJ mol^{-1})	352.6	362.5	299.5	428.4

Table S5

The relative content of Ni^0 and Ni^{2+} on fresh and spent Ni/N-C-450 from XPS analyses

Sample	Ni^0(%)[a]	Ni^{2+}(%)[a]
fresh Ni/N-C-450	40.9	59.1
spent Ni/N-C-450	29.5	70.5

[a] Calculated by semi-quantitative method based on integral area of fitted peaks in Ni2p regions.

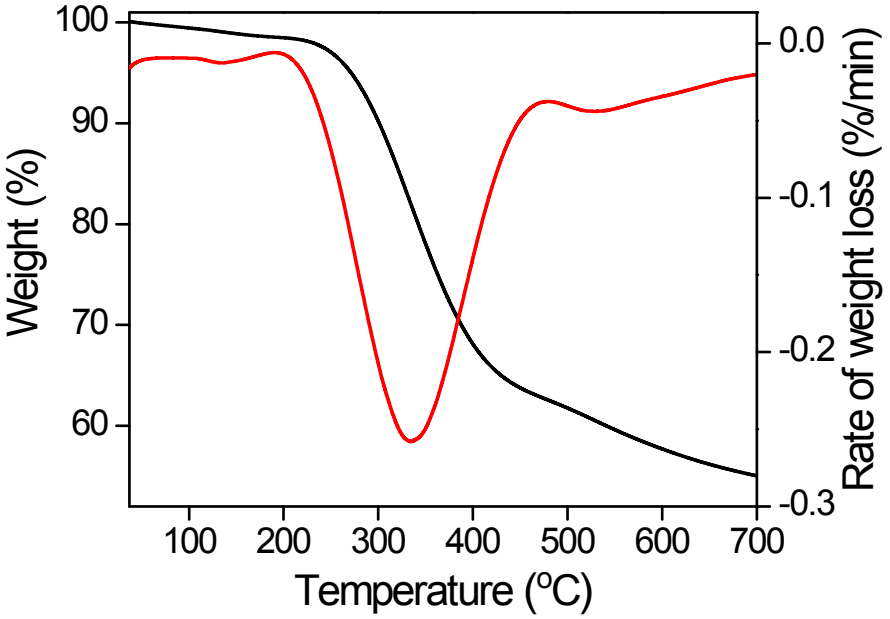


Fig. S1 TG and DTG curves of Ni-MOF.

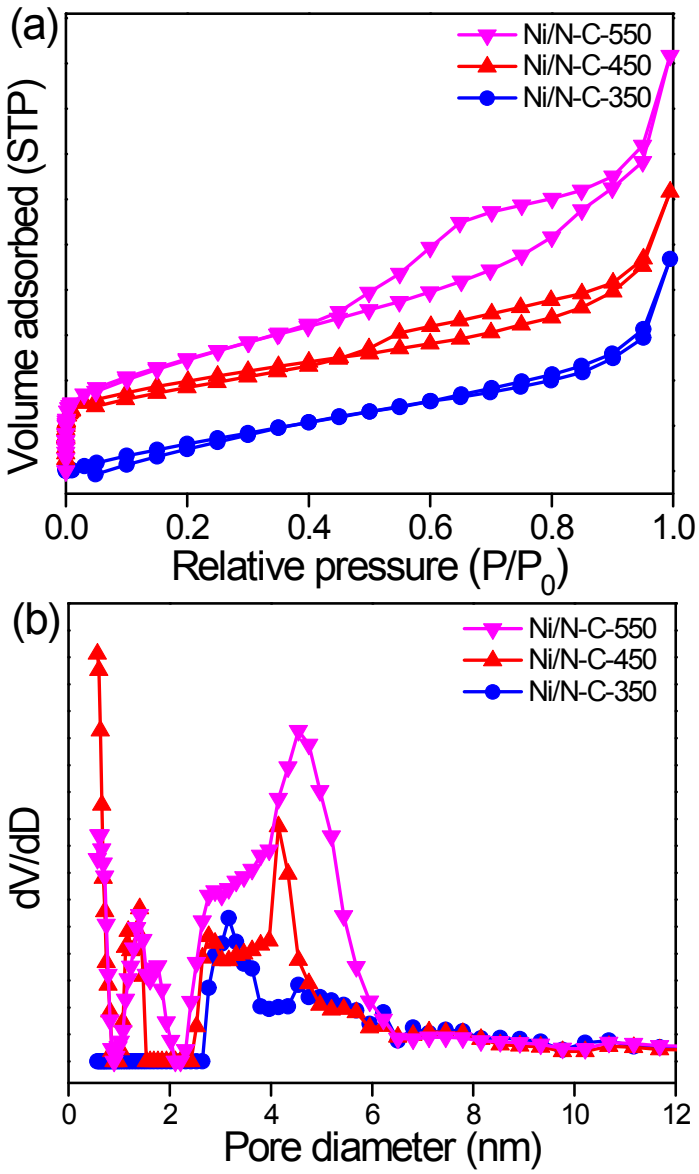


Fig. S2 (a) N_2 adsorption-desorption isotherms and (b) the pore size distribution curves of Ni/N-C-350, Ni/N-C-450 and Ni/N-C-550.

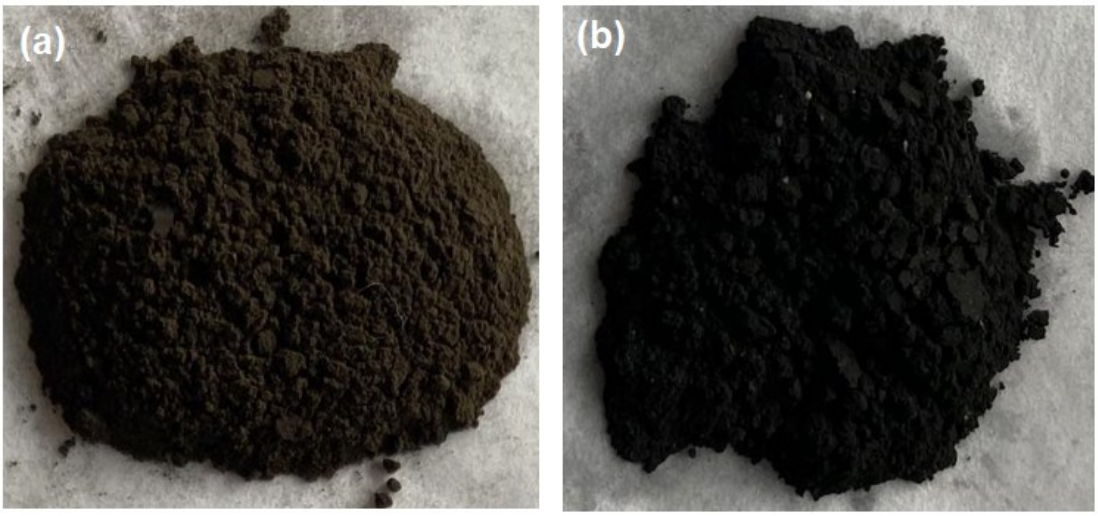


Fig. S3 Photographs of (a) Ni-MOF, (b) Ni/N-C-450 catalyst.

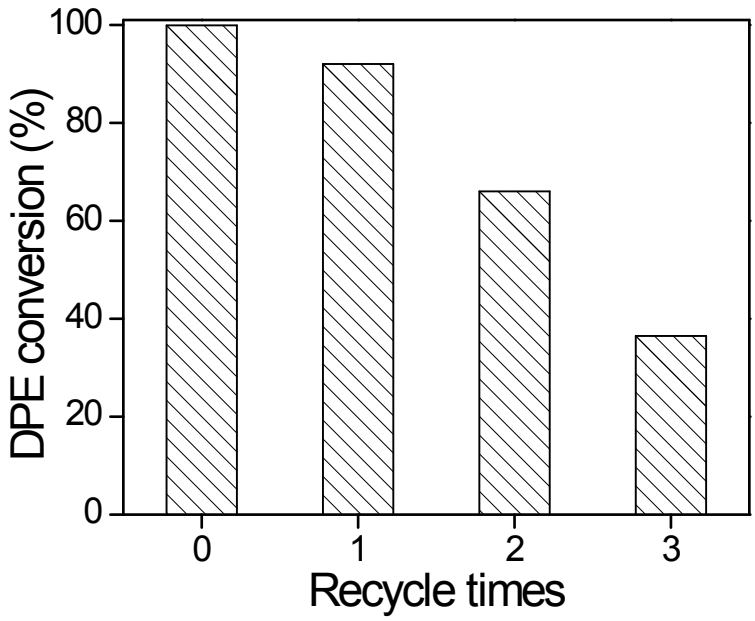


Fig. S4 DPE conversion over different recycled Ni/N-C-450 catalyst.

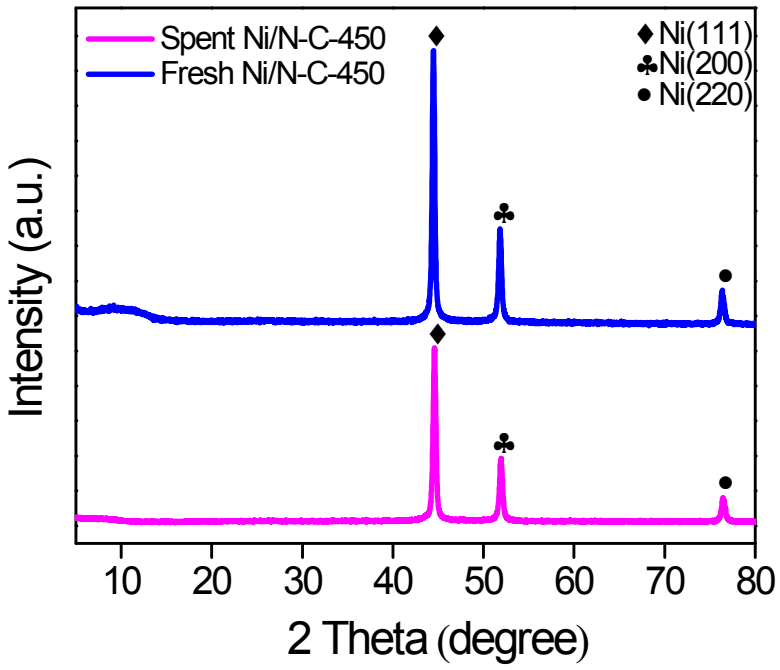


Fig. S5 XRD patterns of fresh and spent Ni/N-C-450 catalyst.

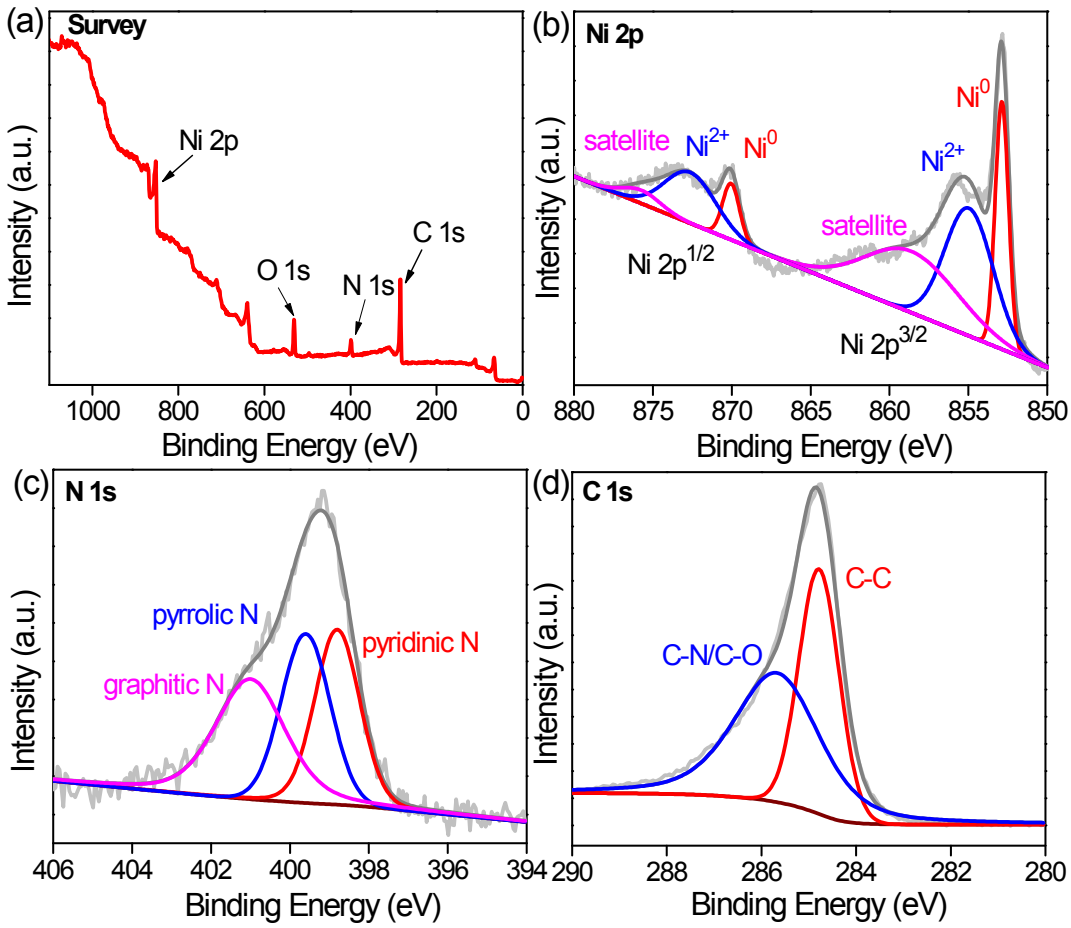


Fig. S6 XPS spectra of spent Ni/N-C-450 catalyst: (a) survey, (b) Ni 2p, (c) N 1s, and (d) C 1s.