Supplementary Information

Highly dispersed platinum and phosphomolybdic acid (PMo) on the UiO-66 metal-organic framework (MOF) for highly efficient and selective hydrogenation of nitroaromatics

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Table S1. Catalytic performance of the reported catalysts in the literature for nitroarenes hydrogenation

Reference	Substrate	Catalyst	Solvent	T (℃)	$P(H_2)$ (MPa)	t (h)	S (%)	Y (%)	TOF (h^{-1})
1	nitrobenzene	Co_3S_4/CN	methanol	60	3.0	3	>99	>98	-
2	nitrobenzene	Pd@P(QP-TVP)	H_2O	40	1.0	1	100	98.6	986
3	nitrobenzene	Co@NC-800	ethanol	110	3.0	3.0	99	>98	24[a]
3	2-chloronitrobenzene	Co@NC-800	ethanol	110	3.0	4	>99	98	-
3	p-nitrobenzonitrile	Co@NC-800	ethanol	110	3.0	4	>99	96	-
3	4-nitrobenzaldehyde	Co@NC-800	ethanol	110	3.0	6	>99	96	-
4	p-chloronitrobenzene	Ir-CoO_x@SiO_2	ethanol	45	0.1	1.75	98.2	97.5	-
4	p-bromonitrobenzene	Ir-CoO_x@SiO_2	ethanol	45	0.1	1.75	98.8	97.3	-
4	p-iodonitrobenzene	Ir-CoO_x@SiO_2	ethanol	45	0.1	2	100	99.7	-
4	p-nitrophenol	Ir-CoO_x@SiO_2	ethanol	45	0.1	2.75	100	86.4	-
4	p-nitroacetophenone	Ir-CoO_x@SiO_2	ethanol	45	0.1	0.75	100	99.1	-
5	3-nitrostyrene	PtSn@mSiO_2	toluene	80	2.0	9	>99	>98	676
6	3-nitrostyrene	CoNi@C	toluene	120	0.7	0.58	>97	>92	-
7	nitrobenzene	Ni-N-C_{60}	ethanol	80	1.0	0.33	99.9	99.5	1656
This Work	1, 3-dinitrobenzene	0.32%Pt-PMo@UiO-66	toluene	40	3.0	1.5	100	96.7	1708.8

T-reaction temperature; P-reaction pressure; t-reaction time; S-Selectivity to the target product of only one -NO_2 group hydrogenation; Y-Yield to the target product of only one -NO_2 group hydrogenation; TOF-turnover frequency; [a]TON-moles of nitrobenzene consumed divided by total moles of cobalt.

The used 0.32%Pt-PMo@UiO-66 catalyst has been characterized by XRD and XPS. The results are added in Fig. S1 and Fig. S2. As shown in Fig. S1, the structure and phase of the used 0.32%Pt-PMo@UiO-66 catalyst are basically unchanged. It also proves that the catalyst structure has excellent stability. The XPS characterization results of the used 0.32%Pt-PMo@UiO-66 are displayed in Fig. S2. It can be seen from Fig. S2a that there are three XPS fitting peaks of the C-C, C-O, and O-C=O species, with the binding energy of 284.8 eV, 286.2 eV and 288.7 eV (C 1s), respectively. The Zr 3d, Mo 3d and Pt 4f XPS results are shown in Fig. S2b-d. In general, the binding energy of Zr, Pt and Mo corresponding species are slightly changed, which may be caused by much electrons transferring between Pt and Mo, and some oxidation state Pt species being reduced during the reaction.

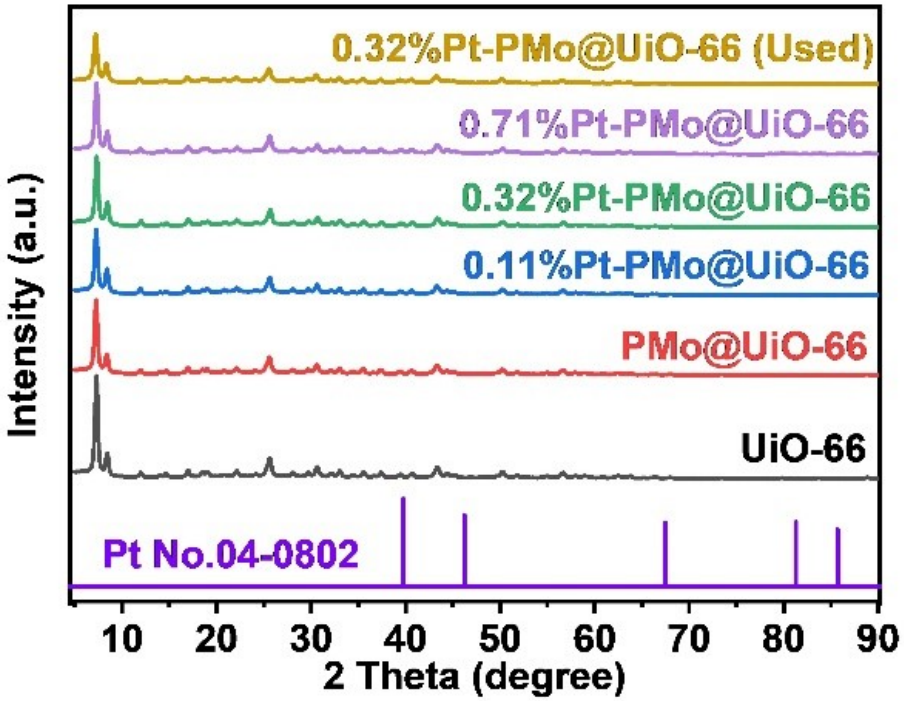

Fig. S1. XRD patterns of different samples.

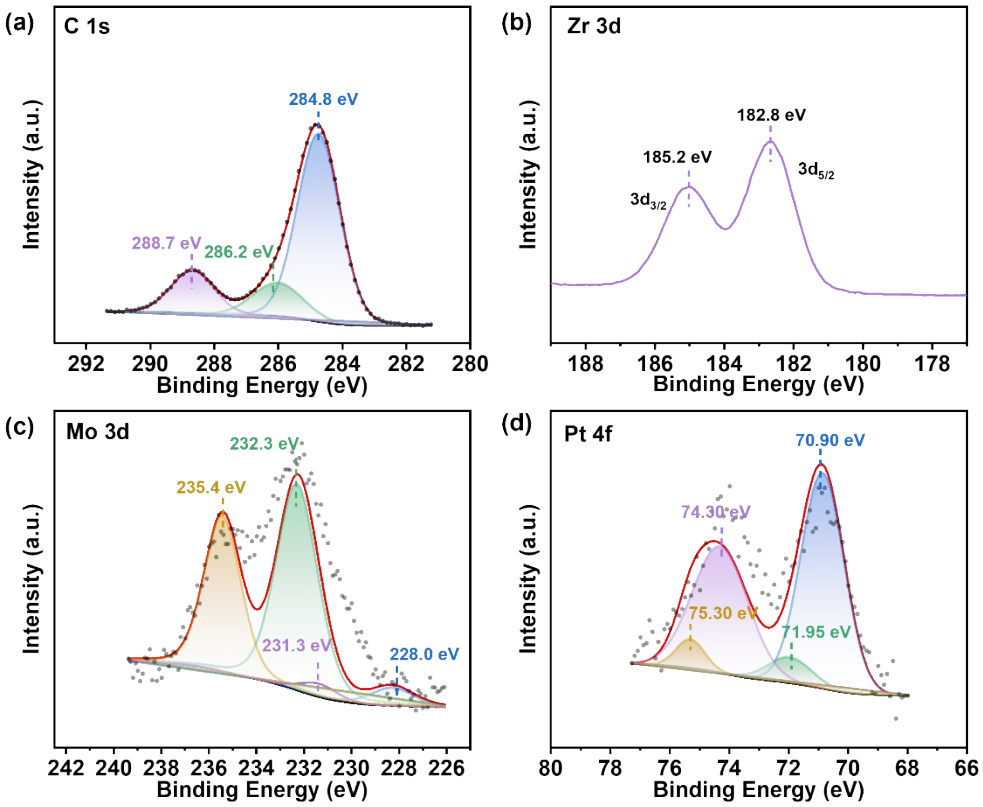

Fig. S2. (a) C 1s, (b) Zr 3d, (c) Mo 3d and (d) Pt 4f XPS spectra of the used 0.32%Pt-PMo@UiO-66 catalyst.

References

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