

Supplementary Information

The hydrogenation performance control of MoP and Ni₂P catalysts by electronegativity modification method

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Table S1. The element content of different catalysts measured by SEM-EDS.

Samples	Mo [wt%]	Ni [wt%]	P [wt%]	W [wt%]	Cu [wt%]
MoP	75.36	-	24.64	-	-
Mo ₈ WP ₉	60.81	-	19.73	19.46	-
Mo ₈ CuP ₉	70.08	-	22.28	-	7.64
Ni ₂ P	-	87.21	12.79	-	-
Ni ₃₈ W ₂ P ₂	-	66.08	19.99	14.29	-

Table S2. Results of EXAFS model fitting of different catalysts^a.

Samples	Element	Shell	R (Å)	CN	ss ² /10 ³	s ₀ ²	E ₀ /eV	R- factor(%)
MoP	Mo	Mo-P	2.45	5.7	3.73	0.93	0.3	0.22
		Mo-Mo	3.21	6.8	3.95	0.79	-0.7	0.22
Mo ₈ WP ₉	Mo	Mo-P	2.46	5.9	3.72	0.91	1.5	0.51
		Mo-Mo	3.21	7.3	4.56	0.72	-0.7	0.51
	W	W-P	2.45	5.5	2.94	0.81	7.5	0.89
		W-M	3.21	5.3	4.78	0.44	5.8	0.89
Ni ₂ P	Ni	Ni-P	2.24	2.4	9.09	0.53	0.7	0.37
		Ni-Ni	2.62	4.3	7.53	0.54	3.5	0.37
Ni ₃₈ W ₂ P ₂₀	Ni	Ni-P	2.24	4.1	8.94	0.54	0.8	0.32
		Ni-Ni	2.62	8.1	7.96	0.55	3.8	0.32
	W	W-P	2.46	4.6	8.61	1.15	5.7	0.19
		W-Ni	2.72	3.7	5.32	0.46	3.2	0.19

^aR: Interatomic distance; CN: Coordination number; ss²: Disorder factor. The errors in the fitted parameters are estimated to be within CN ± 10 %, R ± 0.02-0.05

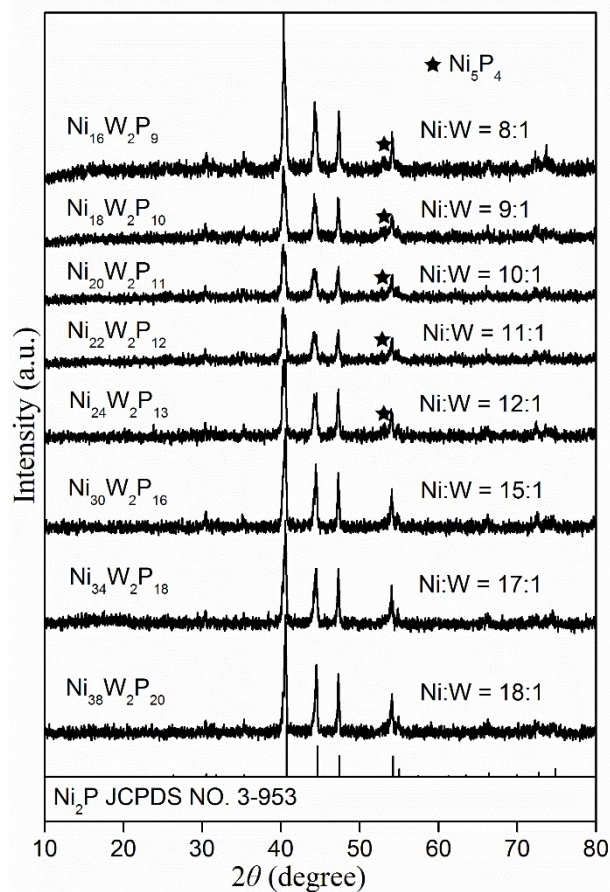


Figure S1. The XRD patterns of Ni-W-P catalysts with different Ni/W ratio.

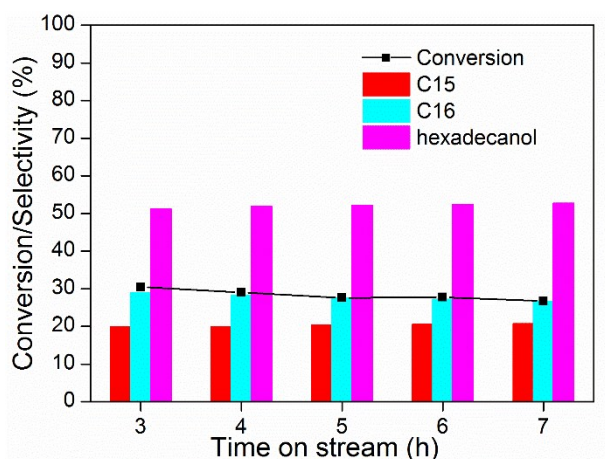


Figure S2. The methyl palmitate conversion and products selectivity of MoP catalysts (reaction conditions: 3 MPa, 300 °C, WHSV = 6 h⁻¹, H₂/oil = 1000).

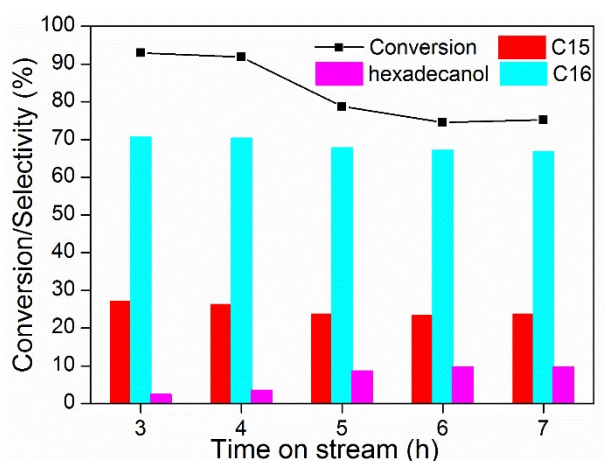


Figure S3. The methyl palmitate conversion and products selectivity of Mo₈WP₉ catalysts (reaction conditions: 3 MPa, 300 °C, WHSV = 6 h⁻¹, H₂/oil = 1000).

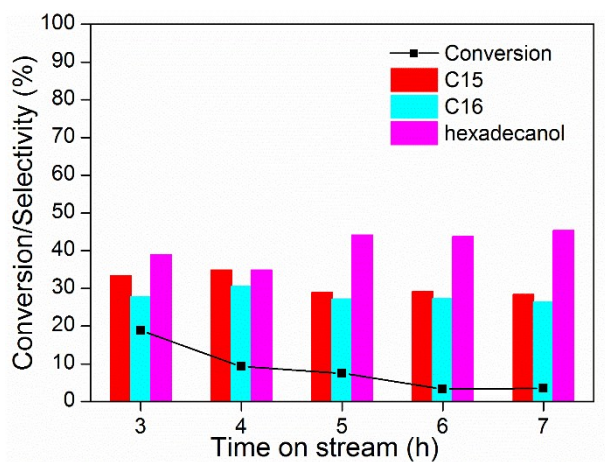


Figure S4. The methyl palmitate conversion and products selectivity of Mo₈CuP₉ catalysts (reaction conditions: 3 MPa, 300 °C, WHSV = 6 h⁻¹, H₂/oil = 1000).

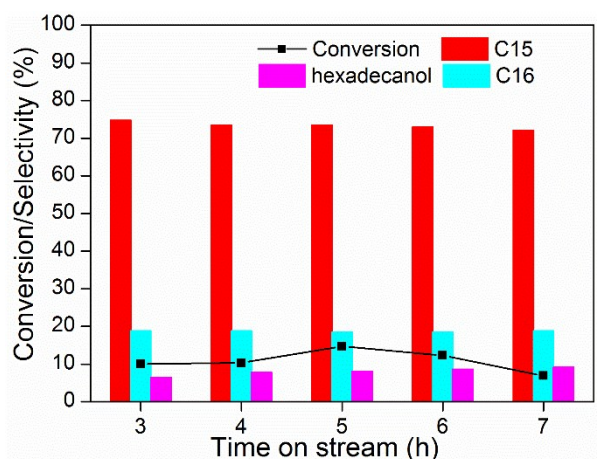


Figure S5. The methyl palmitate conversion and products selectivity of Ni₂P catalysts

(reaction conditions: 3 MPa, 370 °C, WHSV = 3 h⁻¹, H₂/oil = 1000).

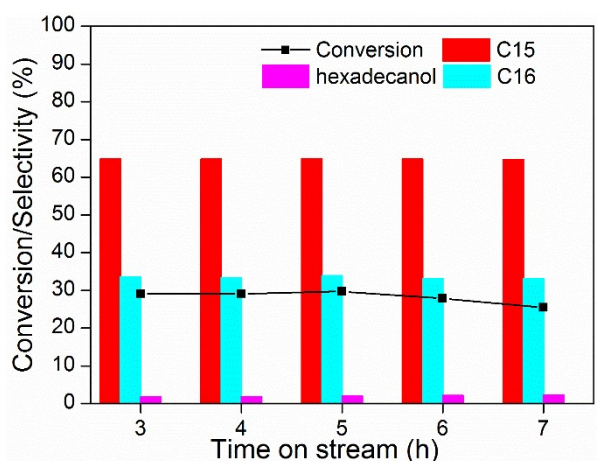


Figure S6. The methyl palmitate conversion and products selectivity of Ni₂P catalysts

(reaction conditions: 3 MPa, 370 °C, WHSV = 3 h⁻¹, H₂/oil = 1000).