SUPPORTING MATERIALS

Pt-Y Supported on Magnesium-aluminum Composite Oxide Catalysts for Highly Selective Synthesis of 1,2-Pentanediol from Furfuryl Alcohol under Mild Conditions

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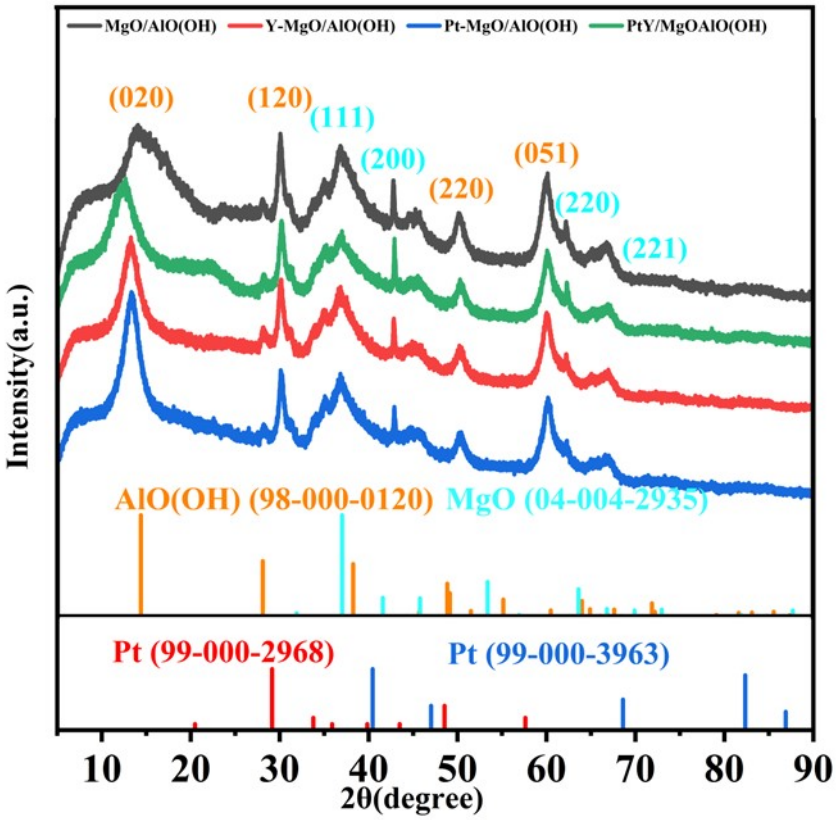

Figure S1 XRD patterns of the series of MAO, Y/MAO, Pt/MAO, Pt-Y/MAO catalysts.

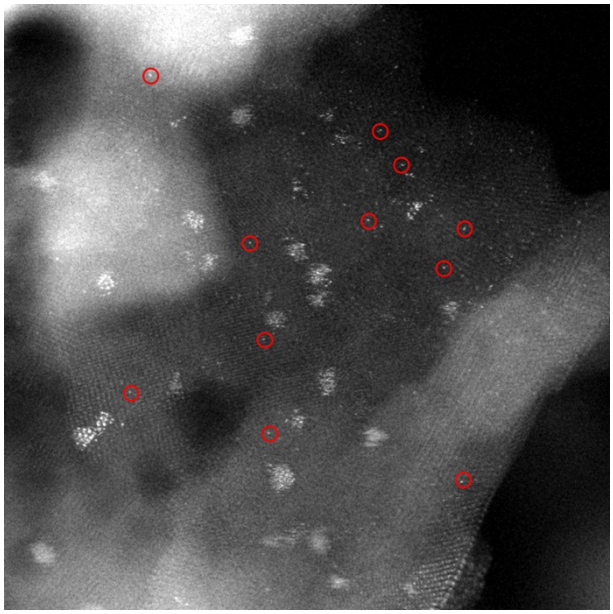

Figure S2 AC-HAADF-STEM images of 0.75Pt-0.45Y/ MAO catalysts.

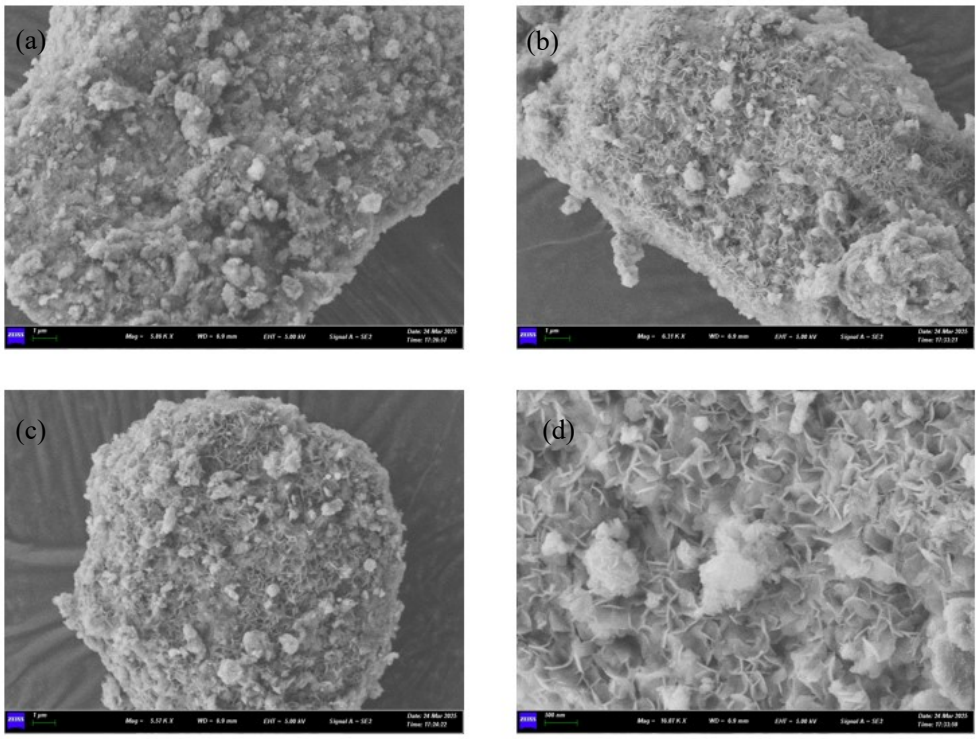

Figure S3 (a) (c)SEM images of MAO and (b) (d) 0.75Pt-0.45Y/ MAO catalysts.

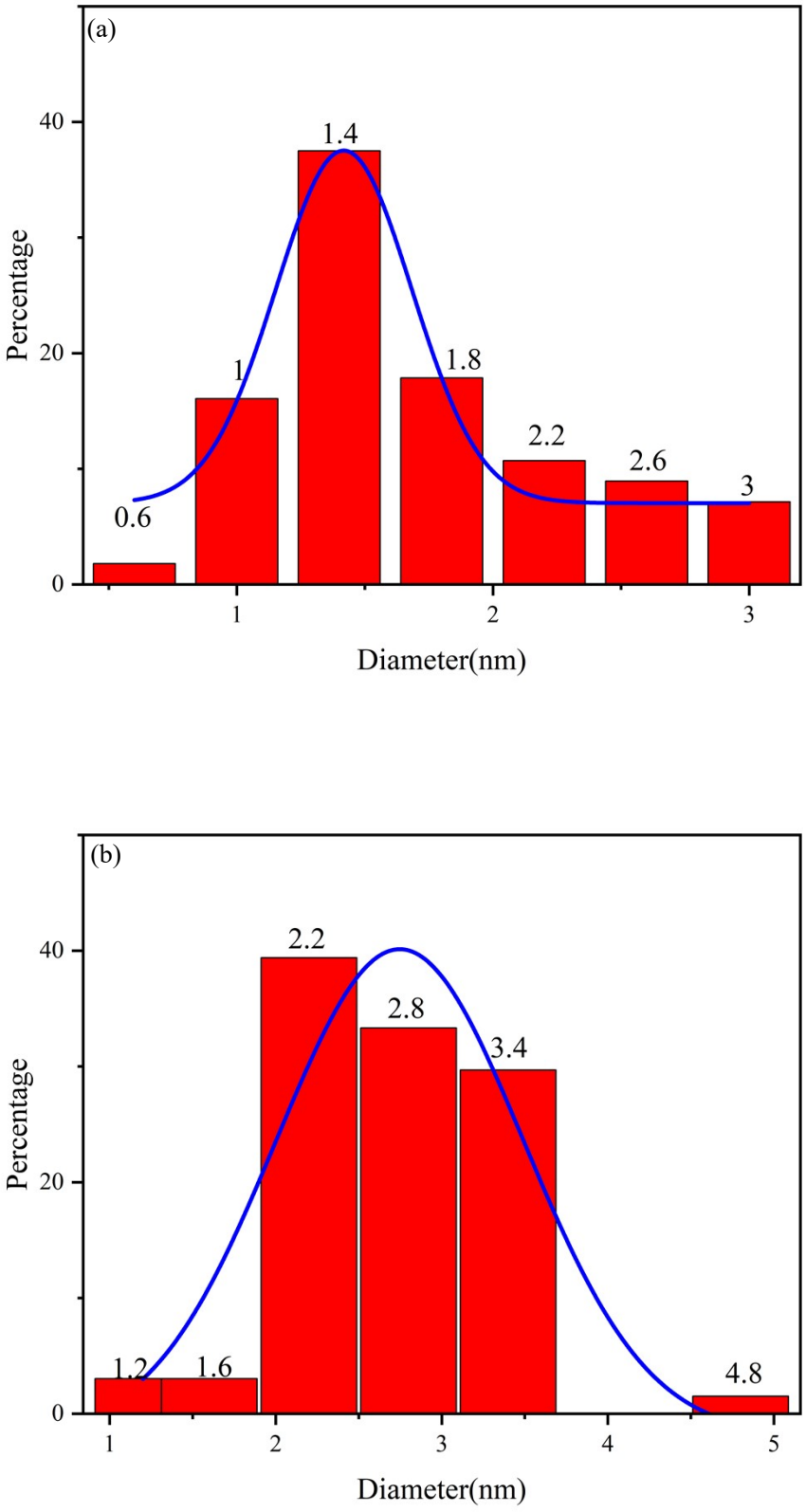

Figure S4 Particle size statistics on 0.75Pt/MAO (a) and 0.75Pt-0.45Y/MAO (b) catalysts

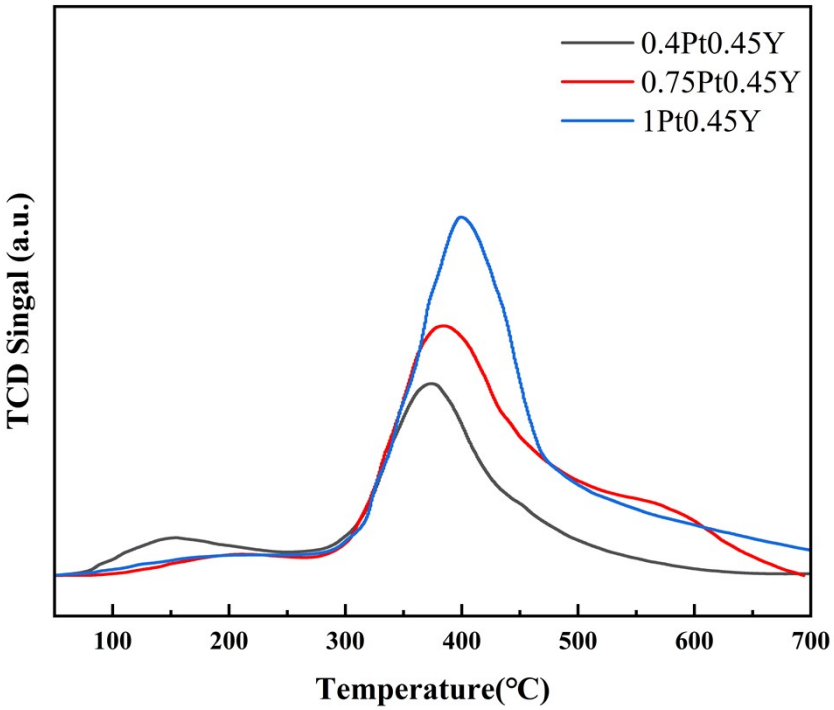

Figure S5 The H_2-TPD results of catalyst carriers with different Pt loading amounts

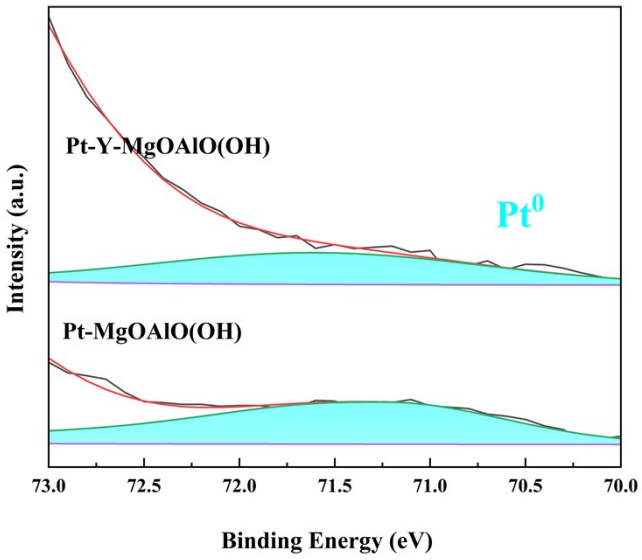

Figure S6 XPS spectra of Pt 4f on Pt-Y/MAO and Pt/MAO catalysts

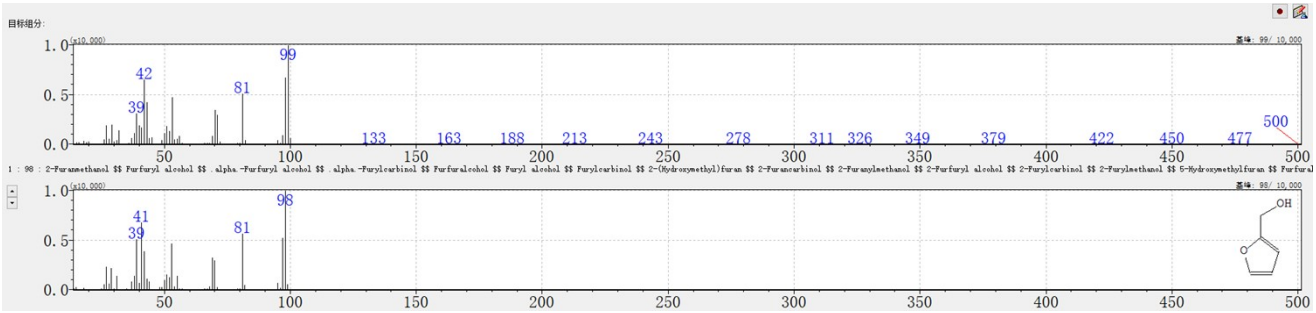

Figure S7 After stirring the furfuryl alcohol in D_2O for a period of time, the organic phase was taken for GC-MS analysis, and the results were obtained.

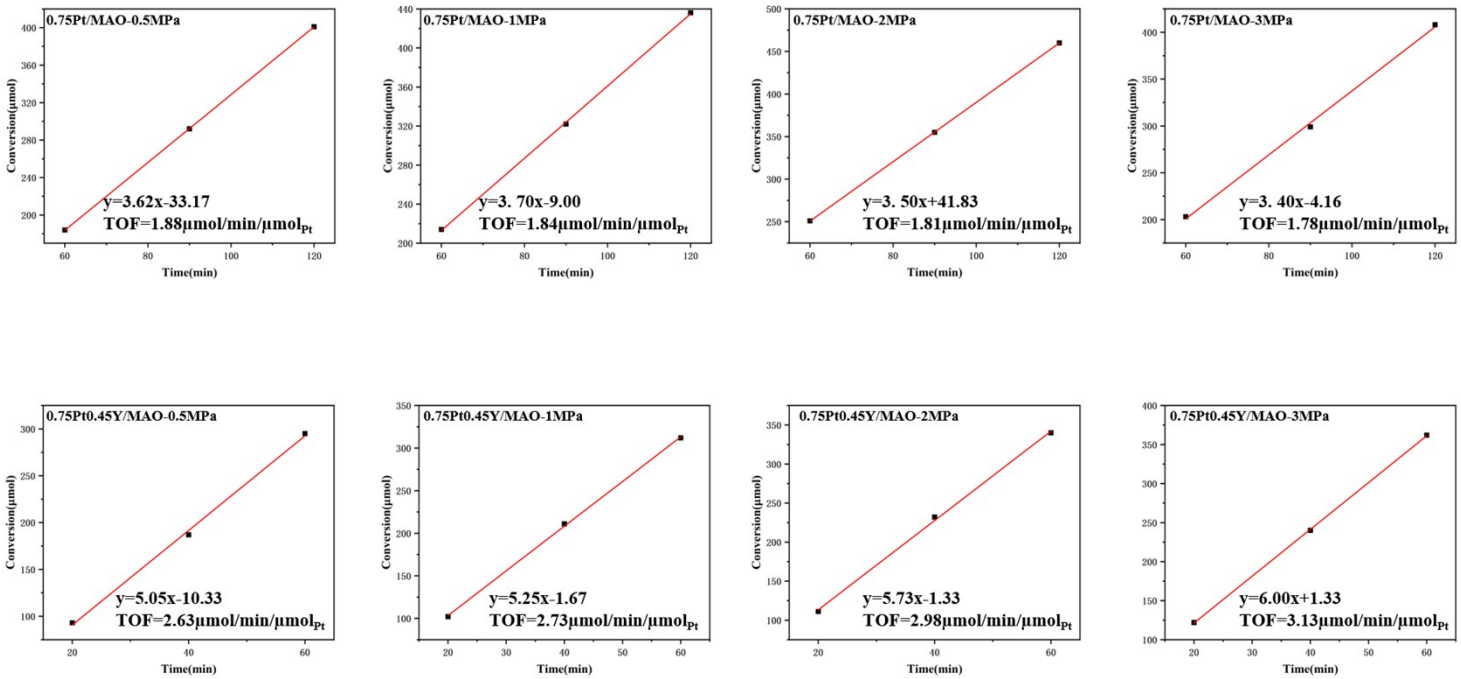

Figure S8 TOF values under different reaction pressure over 0.75Pt/MAO and 0.75Pt0.45Y/MAO catalysts. Reaction conditions: 50 mg of 0.75Pt/MAO or 50 mg of 0.75Pt0.45Y/MAO catalyst, 140 °C. For the hydrogen pressure effect: 0.1 g of FFA in 4 g of water, P_{H2}: 0.5, 1, 2, 3 MPa

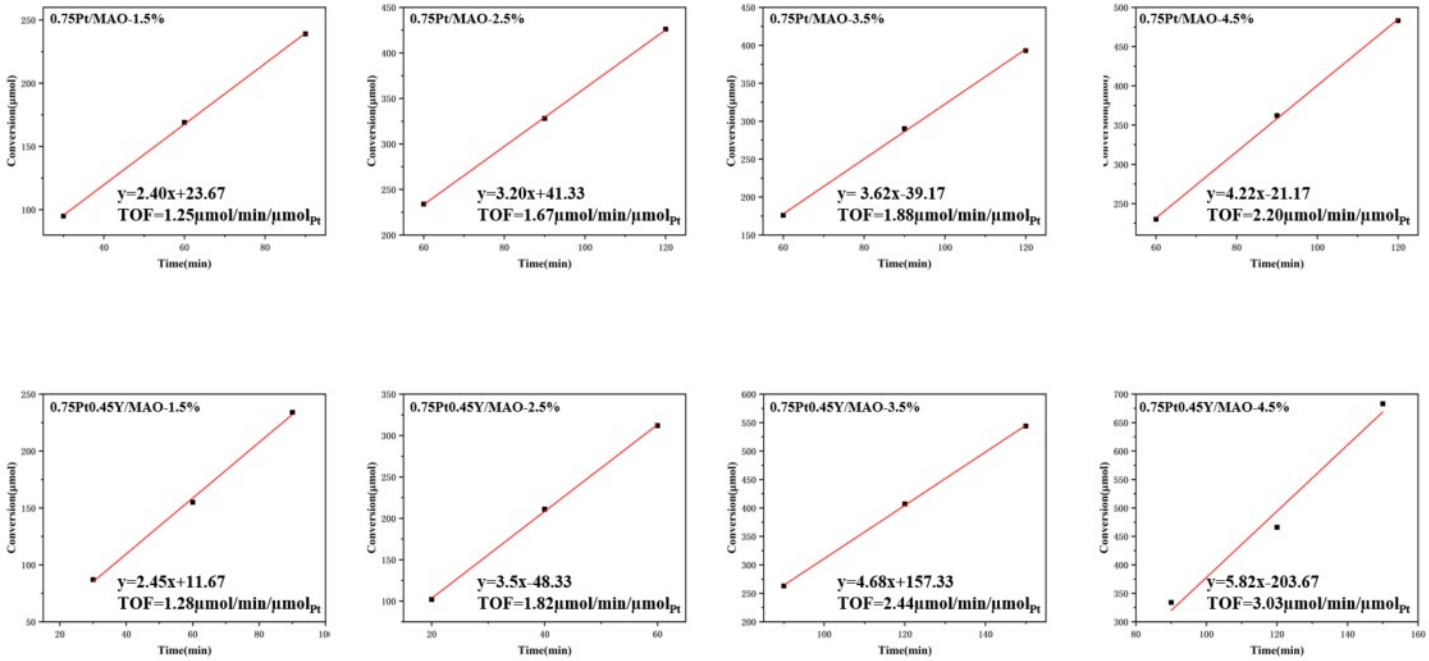

Figure S9 TOF values under different FFA concentration over 0.75Pt/MAO and 0.75Pt0.45Y/MAO catalysts. Reaction conditions: 50 mg of 0.75Pt/MAO or 50 mg of 0.75Pt0.45Y/MAO catalyst, 4 g of water, 1MPa H_2, C_{FFA}: 1.5%, 2.5%, 3.5%, 4.5%.

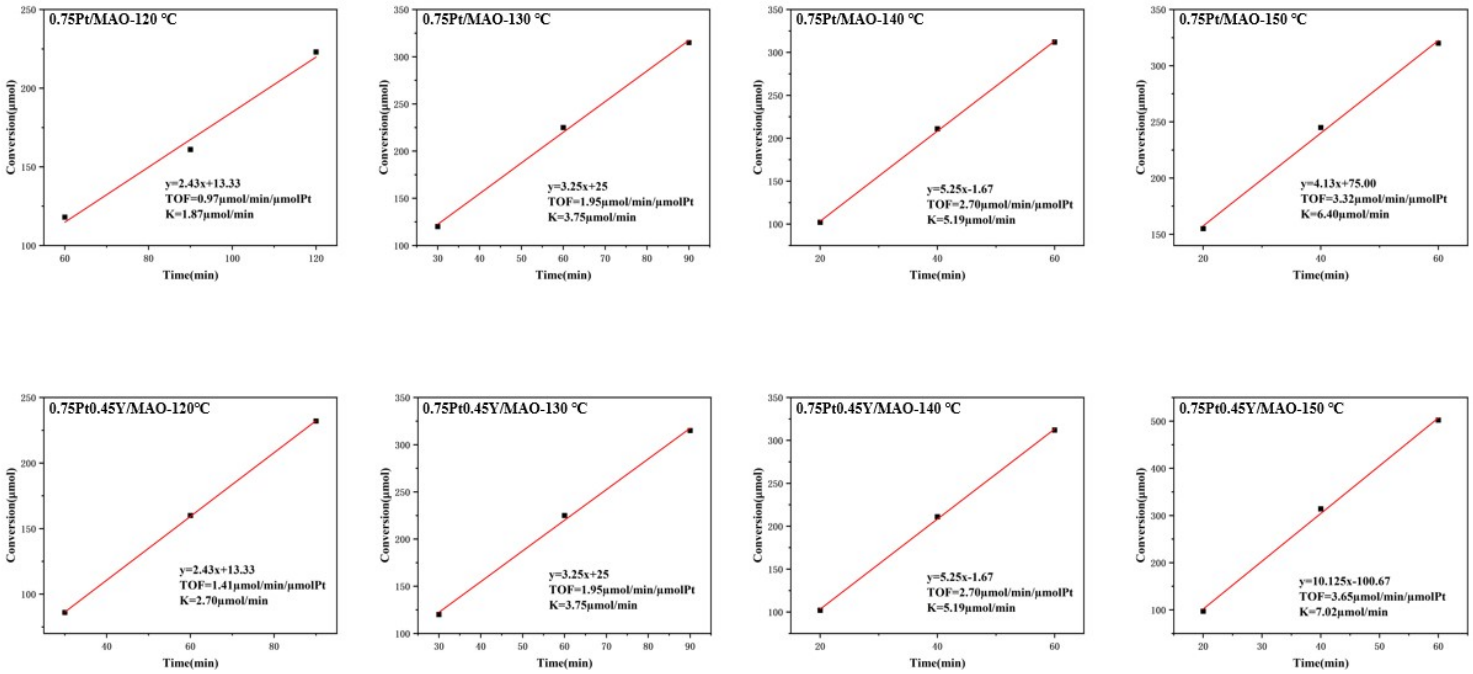

Figure S10 TOF values under different temperature over 0.75Pt/MAO and 0.75Pt0.45Y/MAO catalysts. Reaction conditions: 0.1 g of FFA in 4 g of water, 1 MPa H_2, 50 mg of 0.75Pt/MAO, temperature range of 120–150 °C or 50 mg of 0.75Pt0.45Y/MAO, temperature range of 120–150 °C

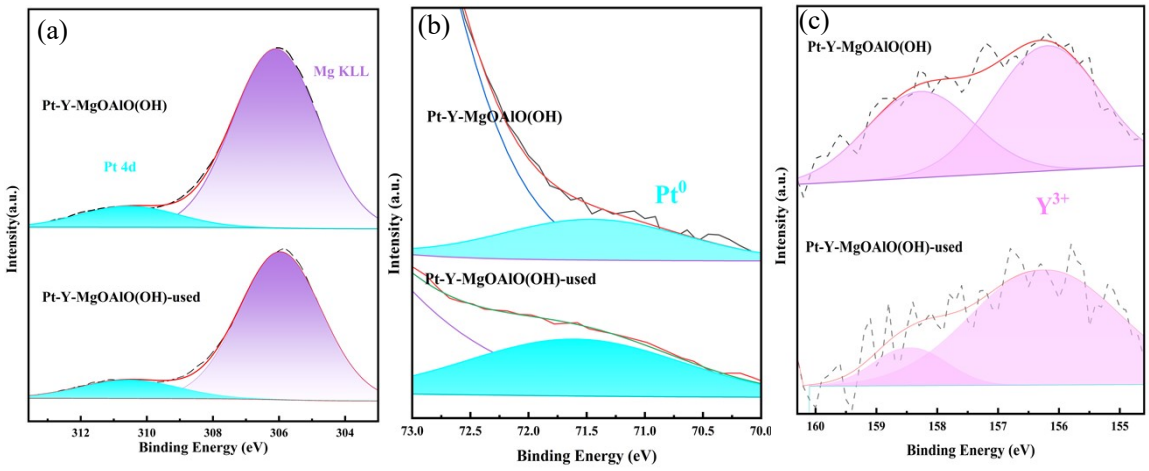

Figure S11 XPS (a) Pt 4d, (b) Pt 4f and (c) Y 3d spectra of different Pt–Y/MAO catalysts.

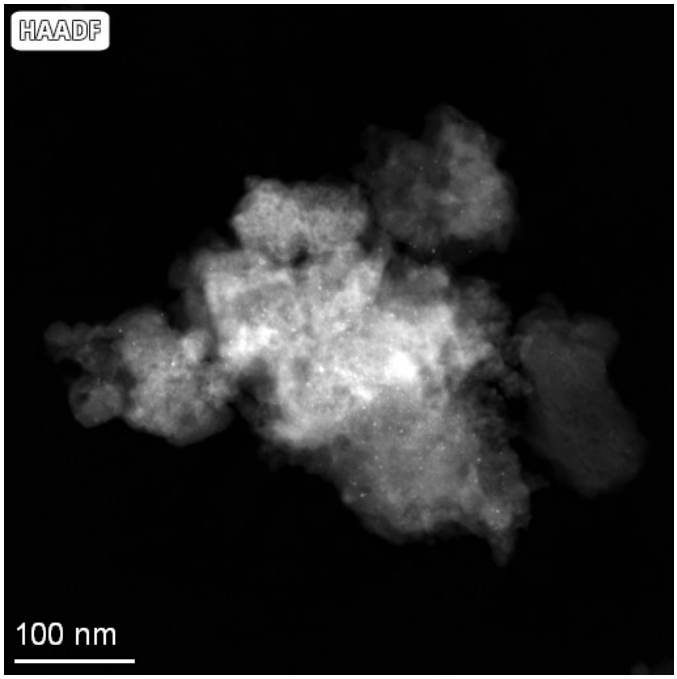

Figure S12 HRTEM image of used 0.75Pt-0.45Y/MAO catalyst

Table S1 The amount of Pt、Y in the impregnation solution.

Catalyst	Concentration of Pt	Concentration of Y
0.75Pt/MAO	0.712%	-
0.75Pt0.45Y/MAO	0.715%	0.478%

Table S2 Basic physical-chemical properties of different catalysts

Catalyst	H_2 uptake ($\mu mol_{H2}\ g_{cat}^{-1}$)	Total alkali content	CO Cumulative Quantity ($\mu mol_{CO}\ g_{cat}^{-1}$)
0.45Y/MAO	95.7	-	-
0.75Pt/MAO	431	6.56	12.19
0.75Pt0.45Y/MAO	196	4.02	9.51

Table S3 Catalytic performance of the 0.75Pt0.45Y/MAO catalyst for the THFA hydrogenolysis.

Entry	Conversion (%)	Selectivity (%)	
		1,2-PeD	1,5-PeD
1	0	0	0

Reaction conditions: 0.1 g THFA in 4 mL H_2O, 50 mg catalyst, 1 MPa H_2 and 140 °C for 6h.

Table S4. Carbon balance for FFA hydrogenolysis over 0.75Pt0.45Y/MAO catalyst

Reaction conditions	Conversion (%)	Selectivity (%)				Carbon balance (%)
		1,2-PeD	1,5-PeD	THFA	Other	
1	100	80.3	10	7.6	2	97.9

Table S5. Comparison of conversion rates between catalyst in excess and catalyst in insufficient amount in a fixed-bed reactor

Entry	catalyst (g)	Conversion (%)
1	1	90
2	2	100