

Supporting Information

Selective Hydrogenolysis of 5-Hydroxymethylfurfural to 2,5-Dimethylfuran with high yield over Bimetallic Ru-Co/AC Catalysts

Table S1 Physical property of 5%Ru-1%Co/AC catalyst.

Entry	Catalyst	$S_{\text{BET}}(\text{m}^2/\text{g})$	$V_{\text{p}}(\text{cm}^3/\text{g})$	$d_{\text{p}}(\text{nm})$
1	5%Ru-1%Co/AC	1518.5	0.46	2.38
2	AC	1693.2	0.52	2.40

Table S2 Elemental contents of the catalysts analyzed by ICP

Entry	Catalyst	Content of Ru (wt.%)	Content of Co (wt.%)
1	5%Ru/AC	4.30	0
2	1%Co/AC	0	1.00
3	2.5%Ru-1%Co/AC	2.14	0.92
4	5%Ru-0.5%Co/AC	4.26	0.43
5	5%Ru-1%Co/AC	4.28	0.91
6	5%Ru-1%Co/AC	1.56	0.27
	(after 4 runs)		
7	5%Ru-5%Co/AC	4.24	4.11

Table S3 The effect of HMF concentration on the conversion of HMF to DMF

Entry	C _{HMF} (mg/ml)	C _{Catalyst} (mg/ml)	Conv. (%)	Yield (%)	Sel. (%)
1	22.08	2.5	99.3	85.9	86.6
2	11.04	1.25	98.7	97.9	99.2

Reaction conditions: THF, 20 mL, 200 °C, 1 MPa, 1.5 h.

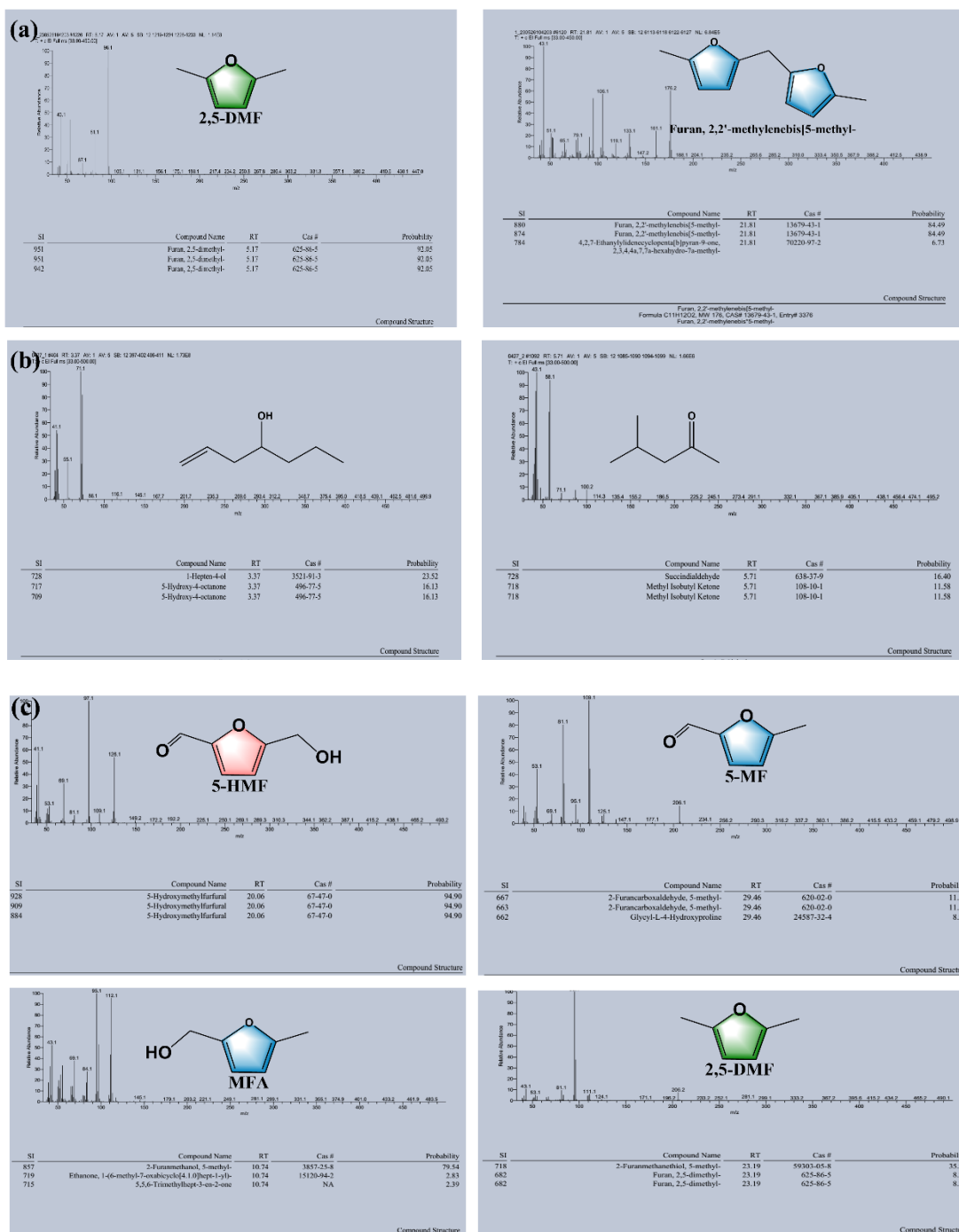


Fig. S1 GC-MS results of (a) the hydrogenolysis products of HMF over the catalysts

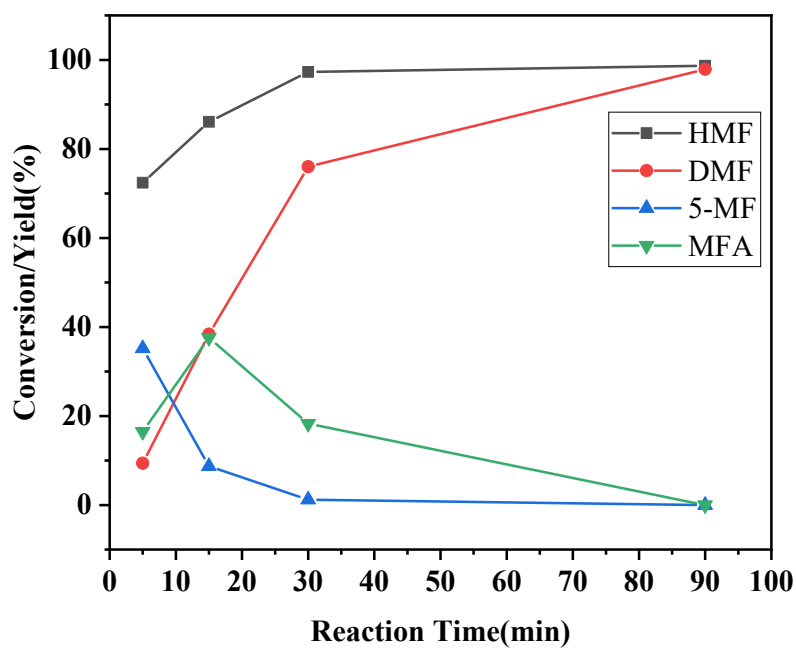


Fig. S2 The evolution of HMF and its products with the reaction time over 5%Ru-1%Co/AC catalyst

Reaction conditions: catalyst, 25 mg, HMF, 1.25 wt% relative to THF; THF, 20 mL.200 °C,1 MPa

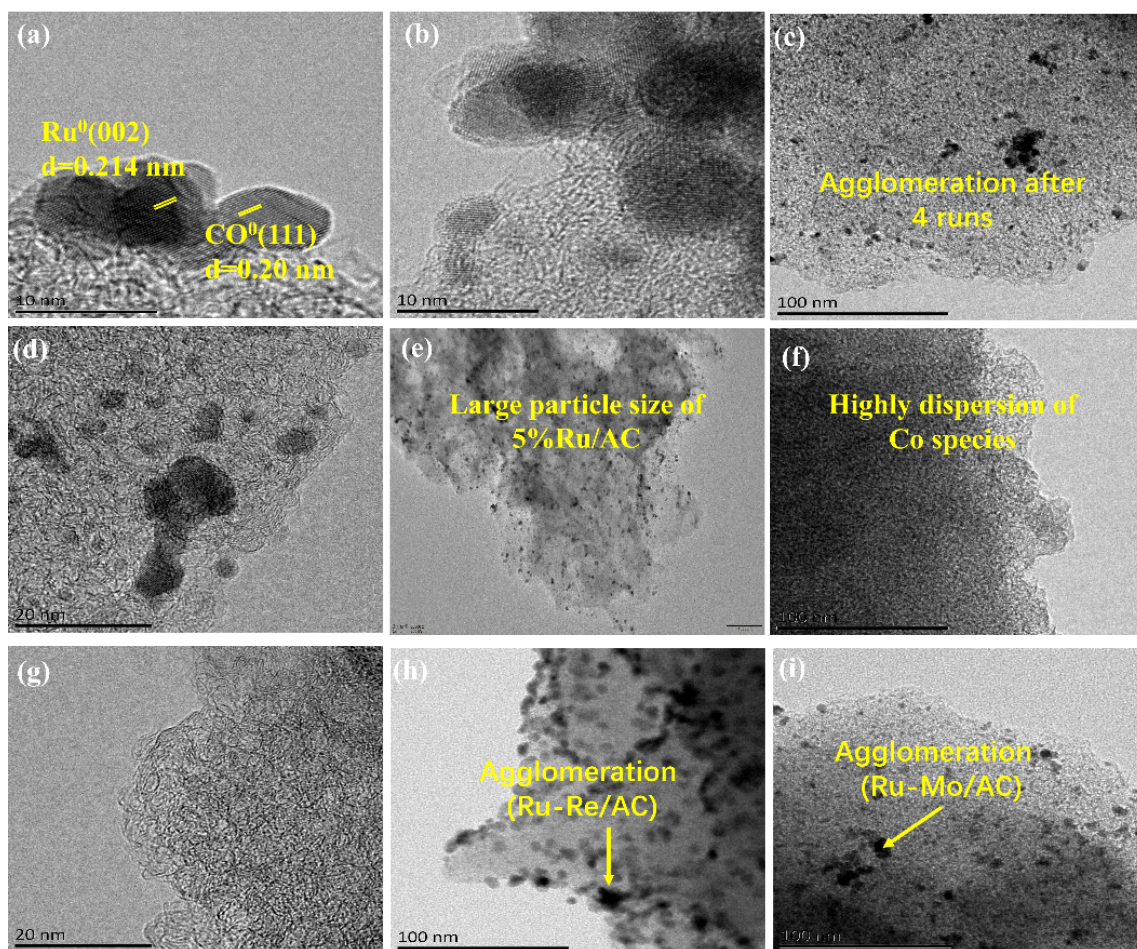


Fig. S3 TEM images of (a, b) 5%Ru-1%Co/AC, (c, d) 5%Ru-1%Co/AC (after 4 runs), (e)5%Ru/AC, (f,g) 1%Co/AC, (h) 5%Ru-1%Re/AC, and (i) 5%Ru-1%Mo/AC

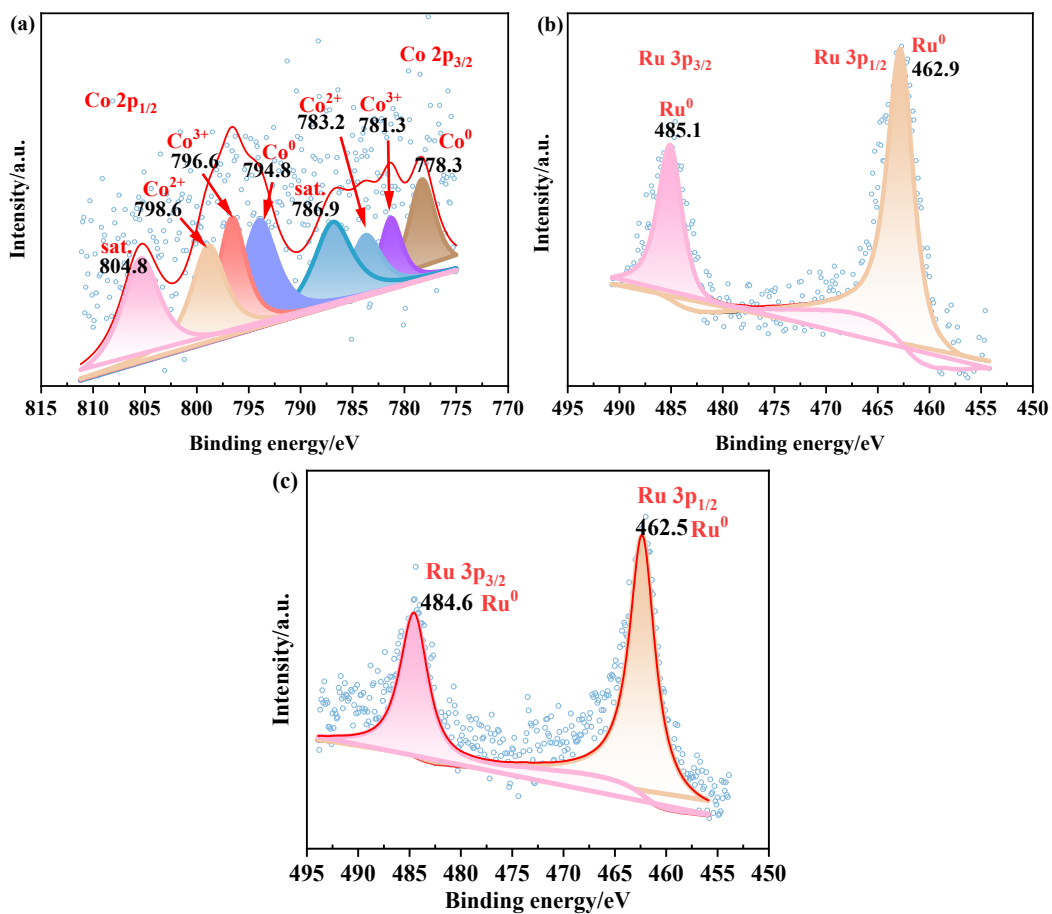


Fig. S4 (a) Co 2p XPS of 5%Ru-1%Co/AC-C-300, (b) Ru 3p XPS of 5%Ru-1%Co/AC-400, and
(c) Ru 3p XPS of 5%Ru-1%Co/AC-200

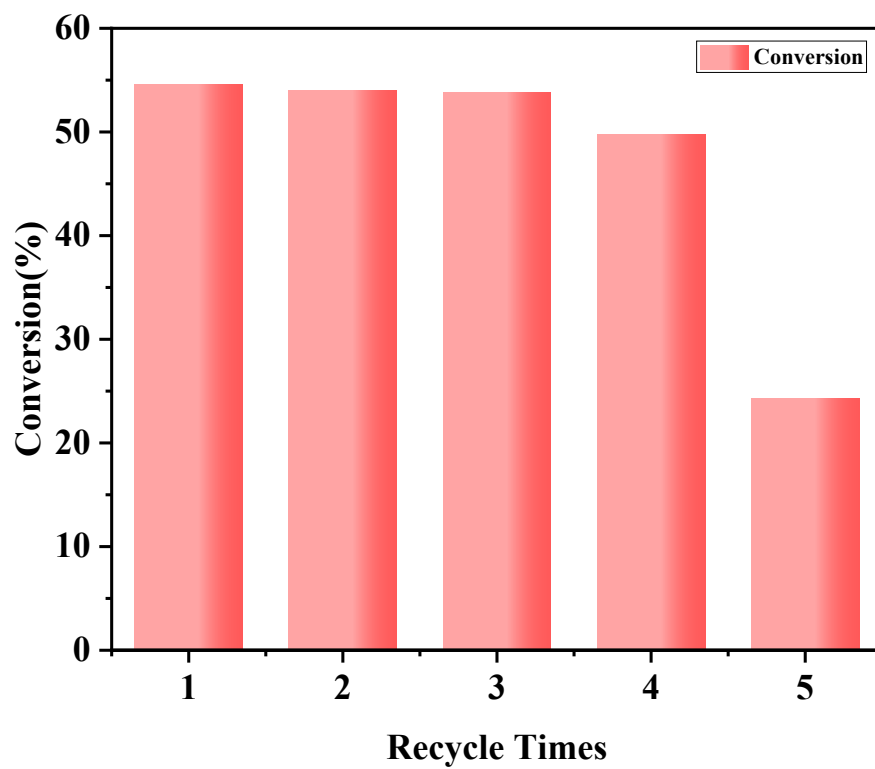


Fig. S5 Recyclability and reusability of 5%Ru-1%Co/AC

Reaction conditions : catalyst, 25 mg; HMF, 1.25 wt% relative to THF; THF, 20 mL, 80

°C, 0.25 MPa, 0.5 h