Electronic supplementary information
for

Role of mesopores in Co/ZSM-5 for the direct synthesis of liquid fuel by Fischer–Tropsch synthesis

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Table S1. Textural properties of the catalyst samples.

Catalyst	Specific surface area (m^2/g)			Pore volume (cm^3/g)		Pore size (Å)	
	Total[a]	Micro[b]	Meso[c]	Micro[d]	Meso[e]	Micro[f]	Meso[g]
Co/HZ-con-micro	289.6	254.1	35.5	0.10	0.08	5.5	55.9
Co/HZ-TD-meso	322.3	241.2	81.0	0.09	0.18	5.6	77.4
Co/HZ-BU-micro	324.9	304.3	20.6	0.12	0.05	5.5	48.6
Co/HZ-BU-meso	327.4	249.4	78.1	0.09	0.15	5.5	73.4
Co/NaZ-BU-micro	323.1	286.3	36.8	0.11	0.08	5.4	64.3
Co/NaZ-BU-meso	318.2	260.6	57.6	0.12	0.12	5.4	65.7
Co/Al_2O_3	109.6	n/a	109.6	0.30	0.35	10.5	99.6
Co/Al-MCM-41	544.8	534.1	10.6	0.24	0.21	9.9	28.0

[a] BET specific surface area
[b] t-Plot micropore area
[c] t-Plot External surface area
[d] t-Plot micropore volume
[e] BJH desorption cumulative volume of pores between 20 Å and 500 Å diameter
[f] Median pore width determined using the Horvath–Kawazoe method
[g] BJH Desorption average pore diameter between 20 Å and 500 Å

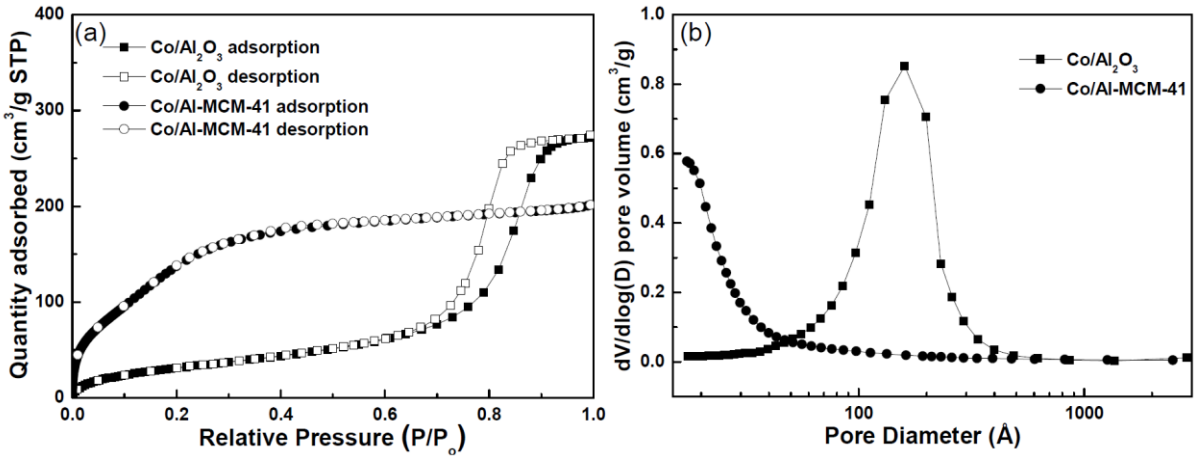

Figure S1. (a) Ar adsorption–desorption isotherm and (b) pore size distribution of Co/Al2O3 and Co/Al-MCM-41

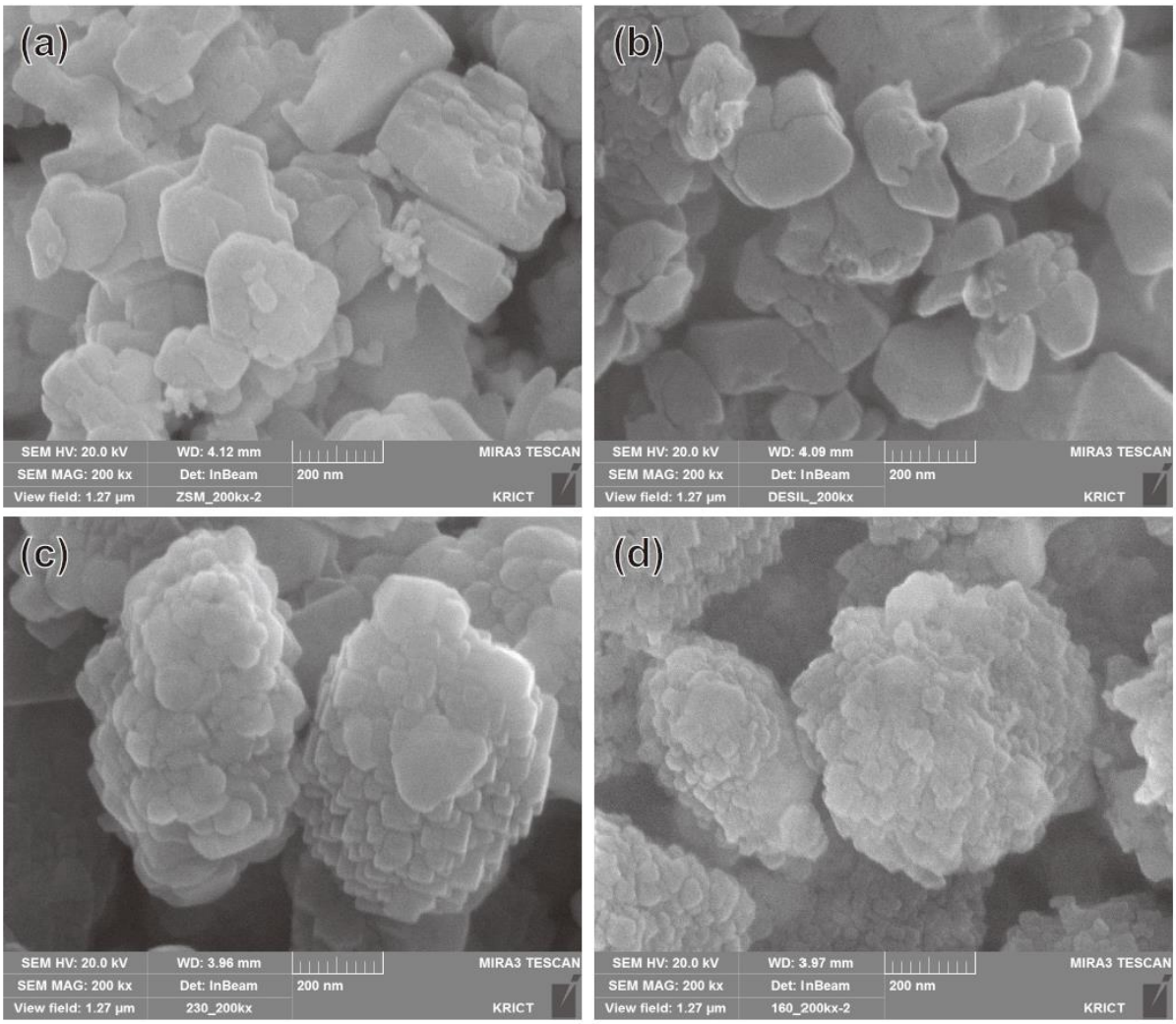

Figure S2. SEM images of (a) Co/HZ-con-micro, (b) Co/HZ-TD-meso, (c) Co/HZ-BU-micro, and (d) Co/HZ-BU-meso.

Table S2. Acid properties of the catalyst samples.

Catalyst	Acidity[a] (μmol NH_3/g)				Acidity[b] (μmol Py/g)			
	Weak	Middle	Strong	Total	C_B	C_L	B/L	Total
Co/HZ-con-micro	134	212	369	716	153	249	0.61	402
Co/HZ-TD-meso	98	220	313	631	91	115	0.79	206
Co/HZ-BU-micro	131	222	451	804	66	194	0.34	260
Co/HZ-BU-meso	109	170	414	693	52	138	0.38	190
Co/NaZ-BU-micro	113	200	116	430	51	91	0.57	142
Co/NaZ-BU-meso	132	214	117	463	71	94	0.75	165
Co/Al_2O_3	99	234	182	515	1	44	0.03	45
Co/Al-MCM-41	98	160	736	994	47	223	0.21	271

[a] Obtained using NH_3-TPD
[b] Obtained using Py-IR

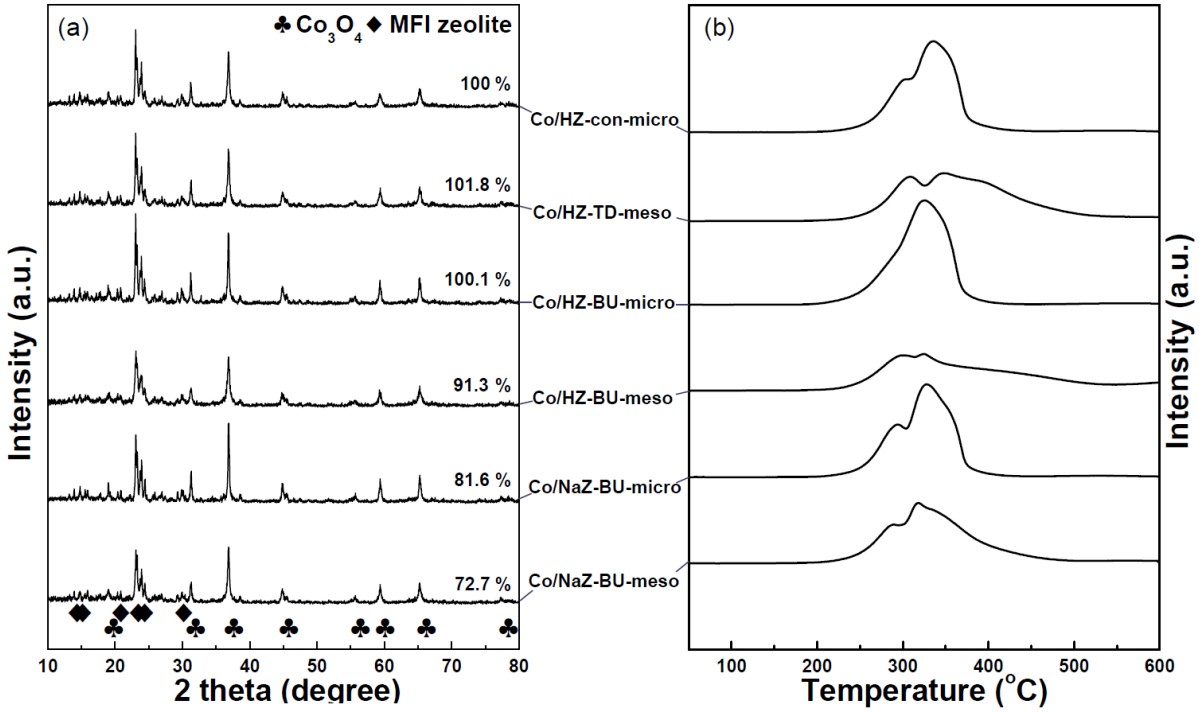

Figure S3. (a) XRD patterns and relative crystallinities, and (b) TPR profiles of ZSM-5-based catalyst samples.

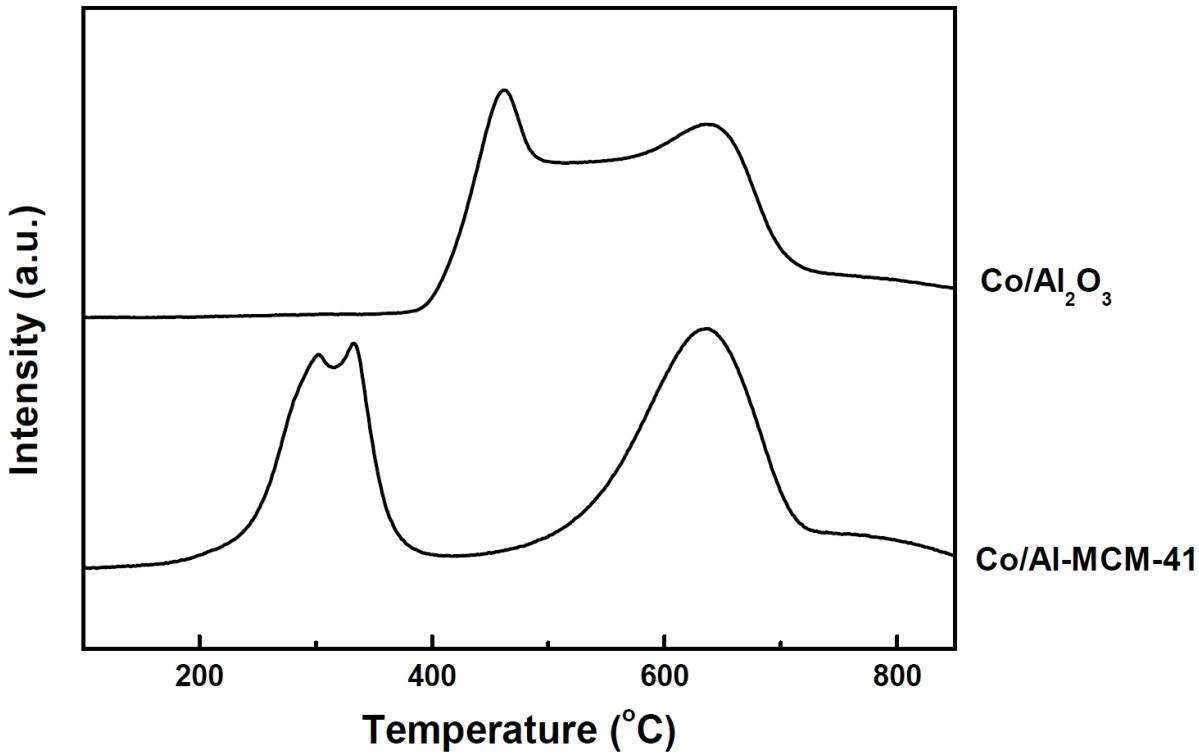

Figure S4. TPR profiles of Co/Al_2O_3 and Co/Al-MCM-41

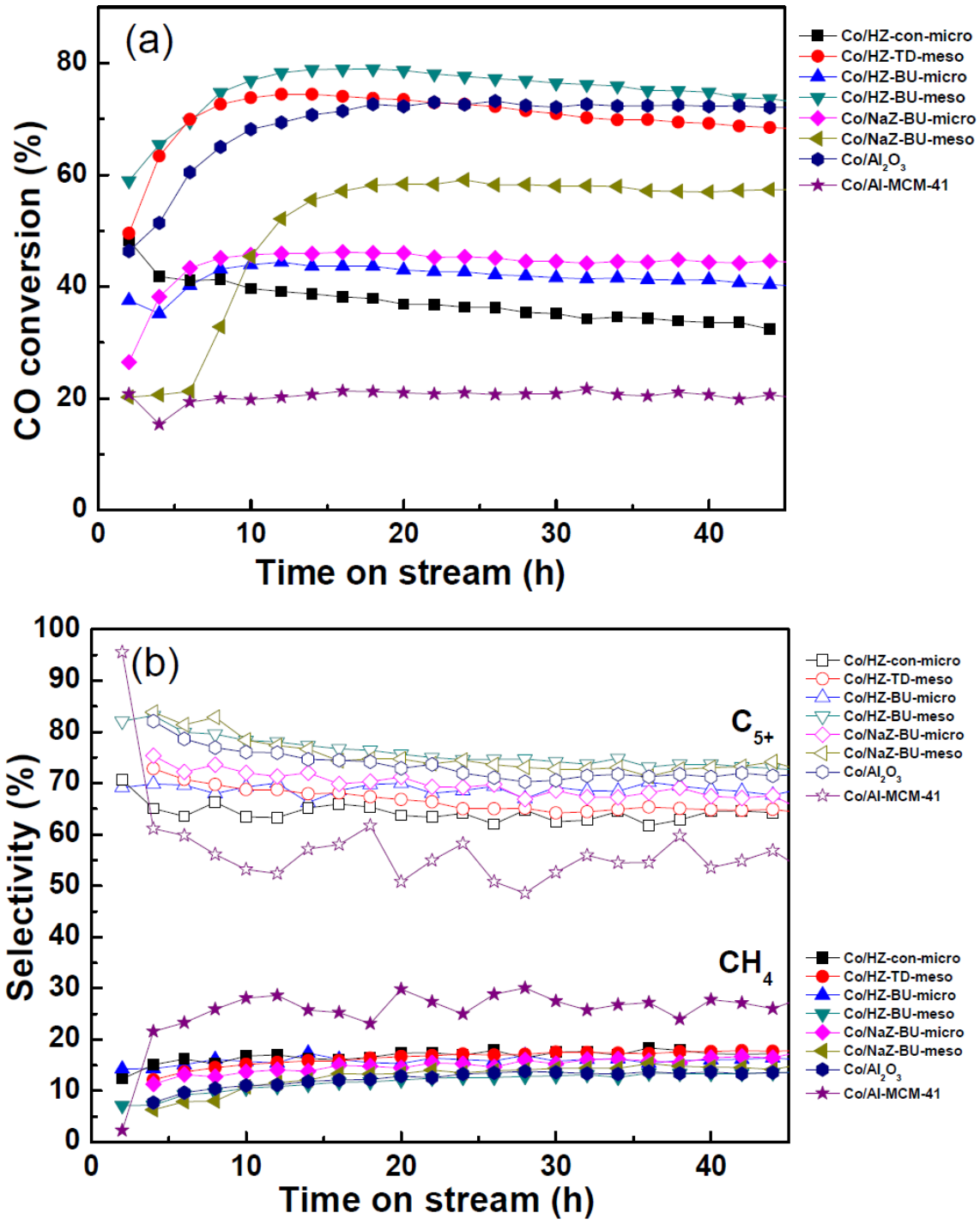

Figure S5. (a) CO conversion and (b) product selectivity as a function of time on stream for FTS catalysts prepared in the present study. Reaction conditions: $H_2/CO = 2$, T = 240 ˚C, P = 2 MPa, space velocity = 4,000 mL/g_{cat}/h

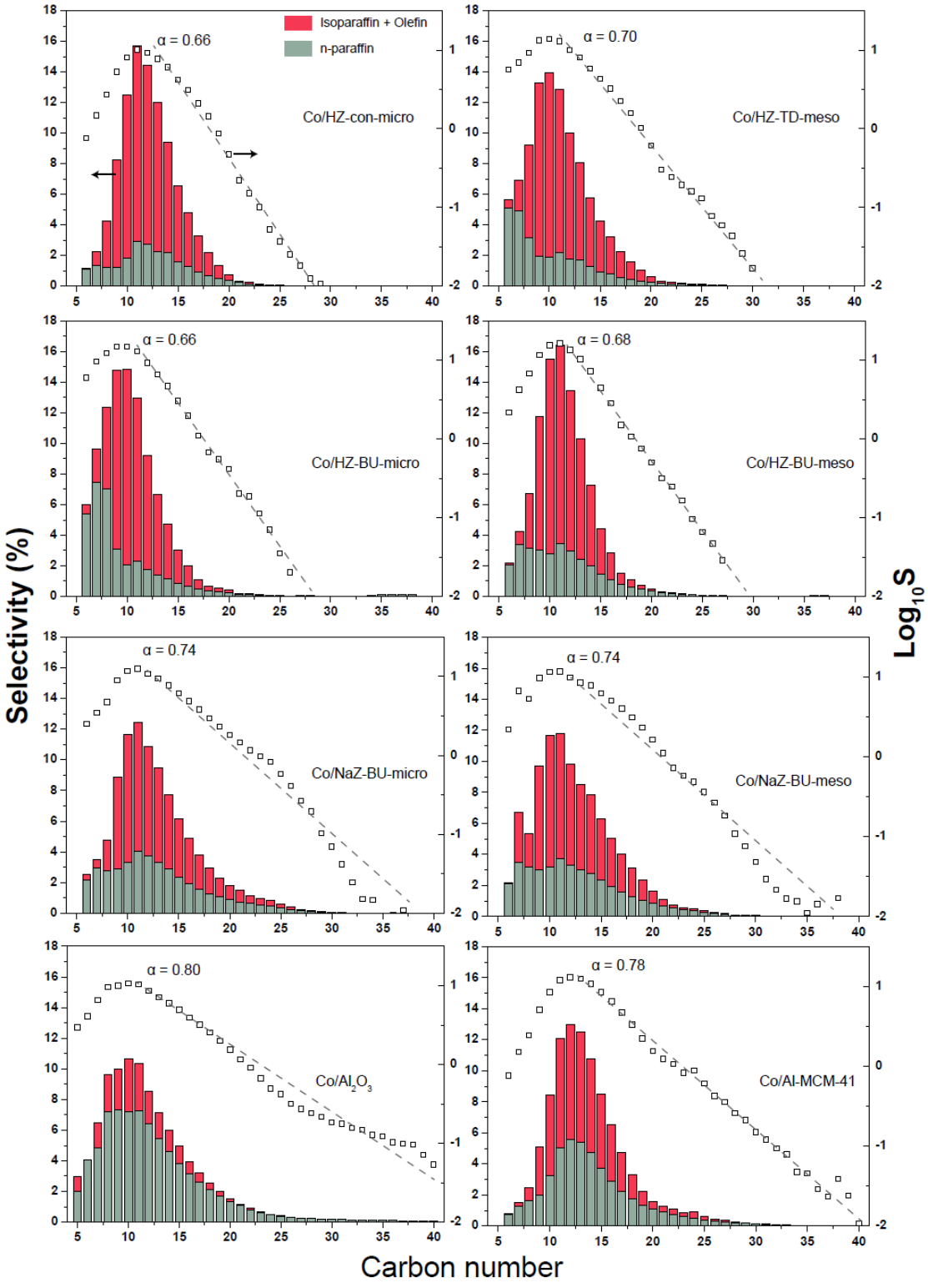

Figure S6. Hydrocarbon distribution in the liquid products obtained using catalysts prepared in the present study.

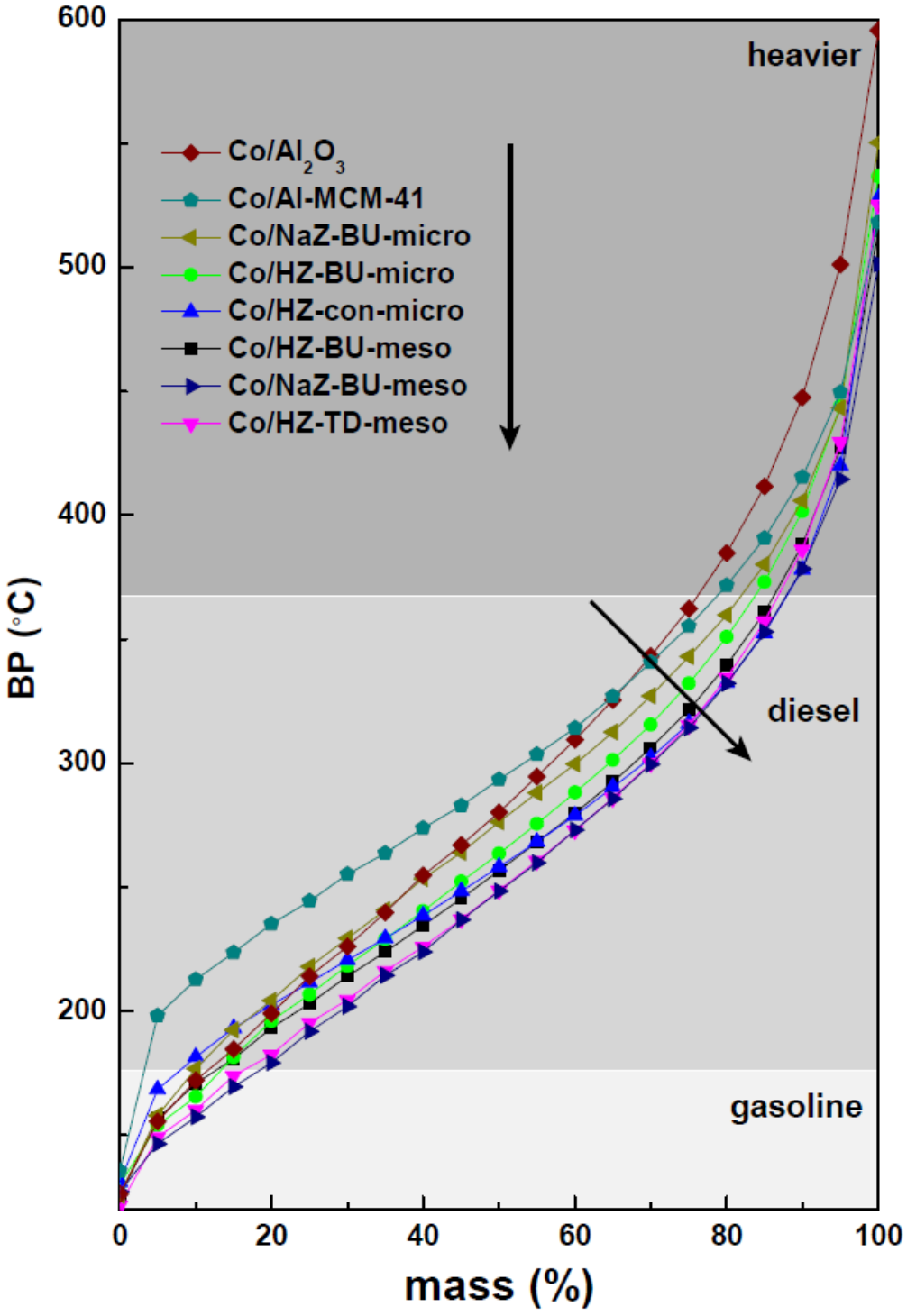

Figure S7. Simulated distillation curved of the liquid products