Supplementary Materials

Bimetal–Organic Framework-Derived CoMn@C Catalysts for Fischer–Tropsch Synthesis

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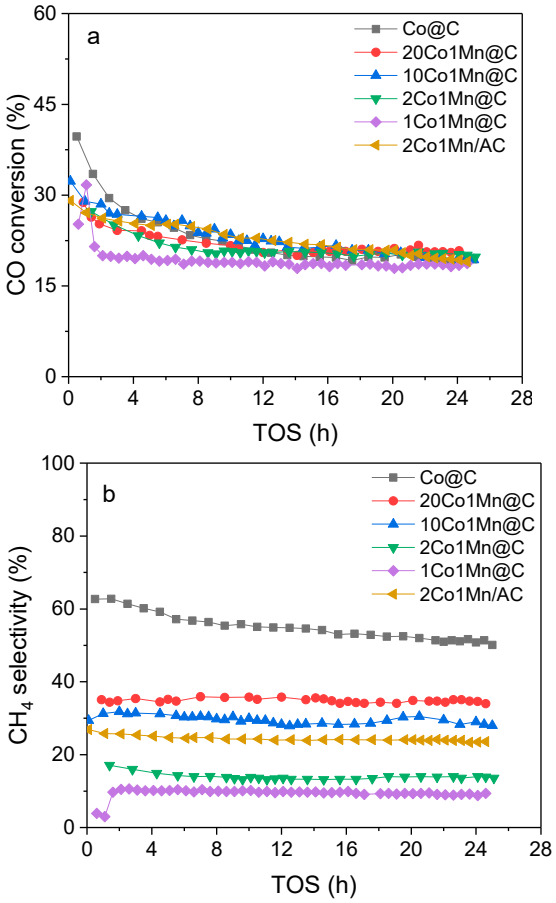

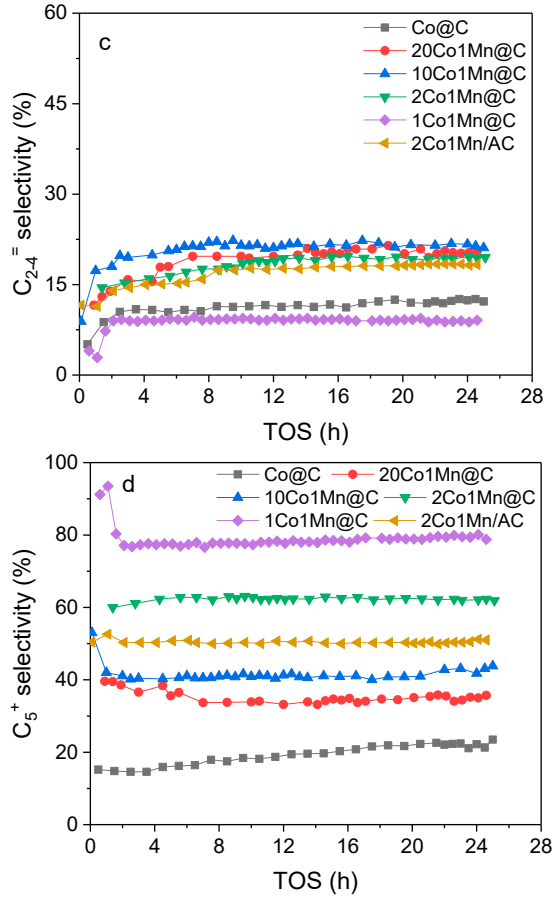

Figure S1. CO conversion (**a**), CH_4 (**b**), C_{2-4}= (**c**), and C_{5^+} selectivity (**d**) with time on stream (TOS) of the MOFs-derived and active carbon supported catalysts. Here, the GHSV = 5000 $mL \cdot g_{cat}^{-1} \cdot h^{-1}$ for Co@C, GHSV = 8000 $mL \cdot g_{cat}^{-1} \cdot h^{-1}$ for 20Co1Mn@C, 10Co1Mn@C and 2Co1Mn@C, GHSV = 2400 $mL \cdot g_{cat}^{-1} \cdot h^{-1}$ for 1Co1Mn@C, GHSV = 4500 $mL \cdot g_{cat}^{-1} \cdot h^{-1}$ for 2Co1Mn/AC. (235 ℃, 1 bar, and H_2/CO = 2).

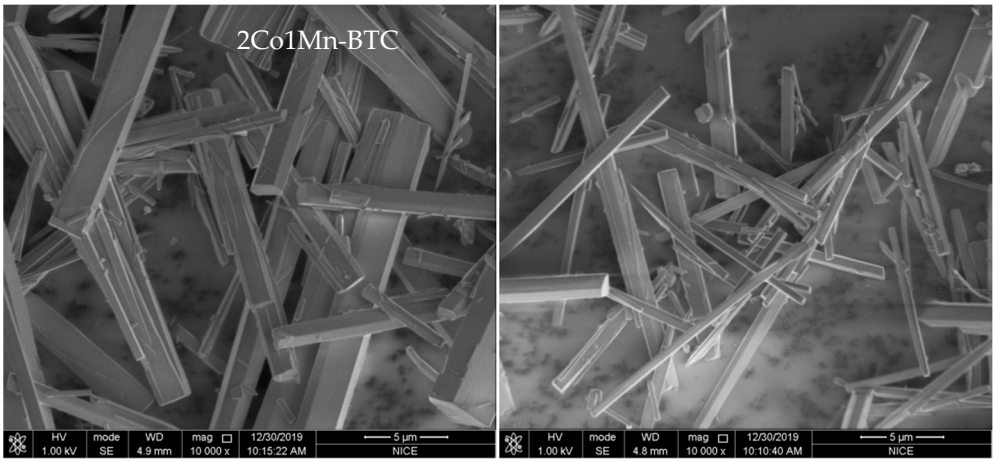

Figure S2. The SEM images for Co-BTC and 2Co1Mn-BTC.

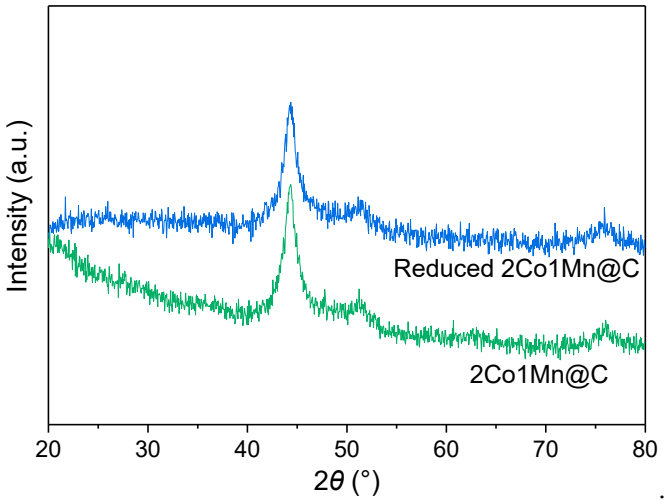

Figure S3. The XRD patterns for 2Co1Mn@C and reduced 2Co1Mn@C (reduction condition: 350 ℃ for 6 h under 10%H_2/Ar).

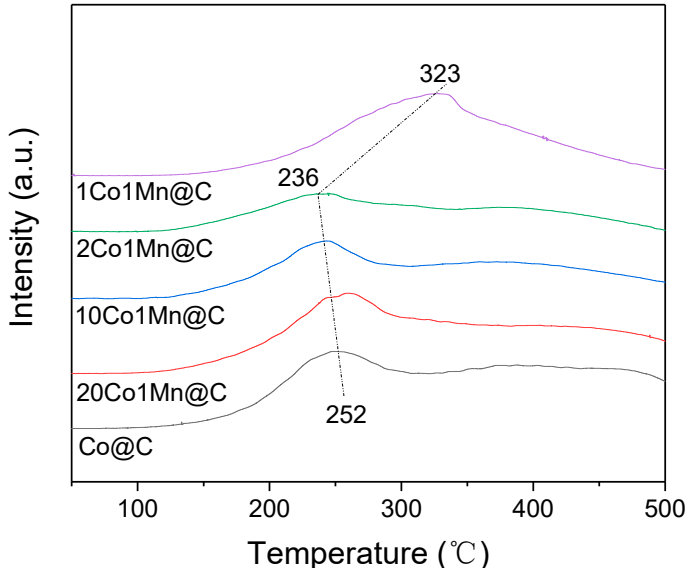

Figure S4. The H_2-TPR profiles for MOFs-derived catalysts.

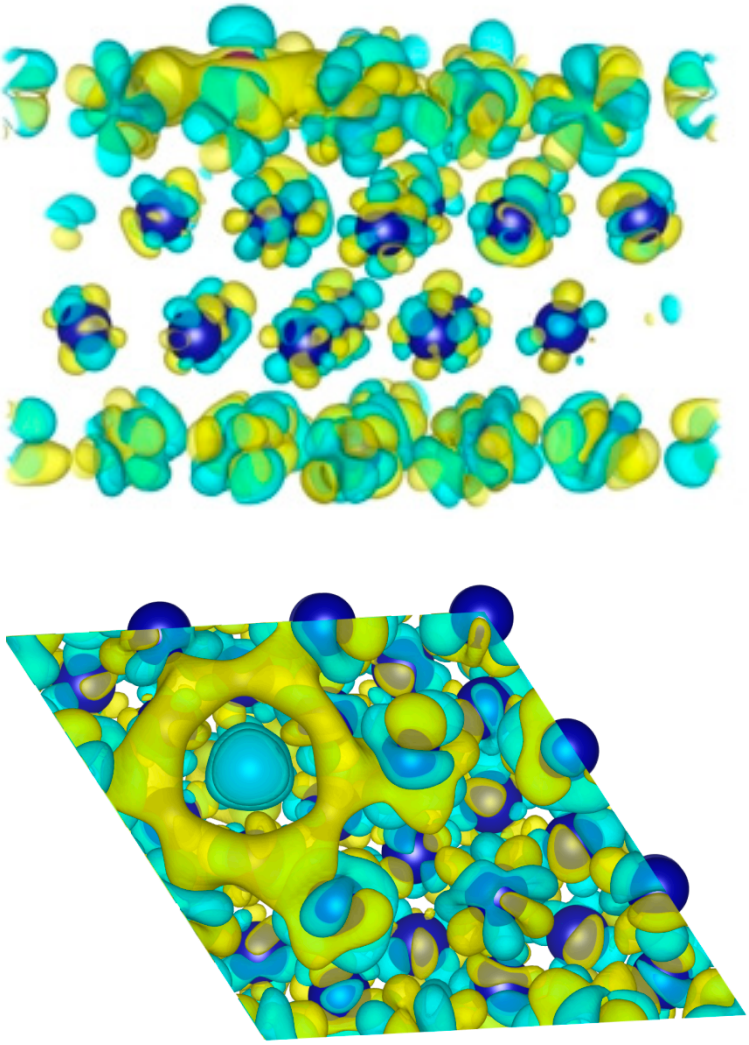

Figure S5. Calculated electron distribution of Mn-in-Co(111), side view (top) and top view (bottom). Blue and purple spheres represent Co and Mn, respectively. The cyan and yellow colors represent the depletion and accumulation of charge.

Table S1. Surface elemental composition and atomic ratio measured by XPS, and Mn/Co molar ratio calculated by ICP-MS.

Sample	Element content (at%)[a]				Mn/Co molar ratio[a]	Content (wt.%)[b]		Mn/Co molar ratio[b]
	Co 2p	Mn 2p	C 1s	O 1s		Mn	Co	
Co@C	**4.90**	-	84.08	11.02	0.0	-	57.4	0.0
20Co1Mn@C	5.86	0.57	81.87	11.69	0.10	1.7	52.7	0.03
10Co1Mn@C	4.87	0.82	83.51	10.80	0.17	3.2	49.9	0.07
2Co1Mn@C	3.76	2.09	79.08	15.07	0.56	11.6	40.0	0.31
1Co1Mn@C	4.08	2.89	76.85	16.18	0.71	15.4	33.0	0.50

a: XPS result.
b: ICP-MS result.

Table S2. Surface area, crystallite sizes calculated by Scherrer equation and TOF of MOFs-derived catalysts with different Mn/Co molar ratio.

Sample	S_{BET} (m^2/g)	Crystallite size (nm)	TOF (10^{-3} s^{-1})
Co@C	169.7	8.6	3.48
20Co1Mn@C	141.0	7.4	5.26
10Co1Mn@C	148.0	7.8	5.77
2Co1Mn@C	125.5	7.3	6.91
1Co1Mn@C	109.2	8.9	-