

Supplementary information for

# Oxygenate formation over K/ $\beta$ -Mo<sub>2</sub>C catalyst in the Fischer-Tropsch synthesis

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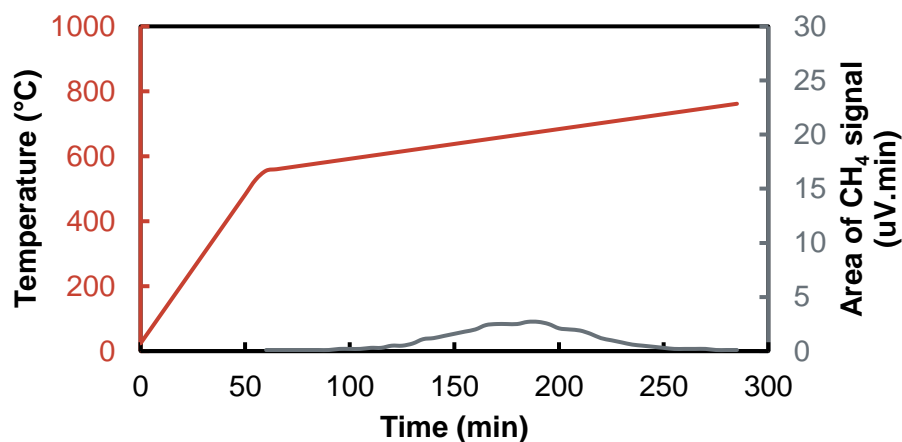


Figure S 1: TPH profile of sample prepared at 760°C. Red line is the temperature program and the grey line is the formation of CH<sub>4</sub> indicated with the area obtained from the GC-TCD.  $T_{\text{final}} = 800^{\circ}\text{C}$ , ramp rate  $<550^{\circ}\text{C} = 10^{\circ}\text{C}/\text{min}$ ;  $>550^{\circ}\text{C} = 1^{\circ}\text{C}/\text{min}$ ,  $\text{H}_2 \text{SV} \sim 9 \text{ L}/\text{h}/\text{g}_{\text{cat}}$ .

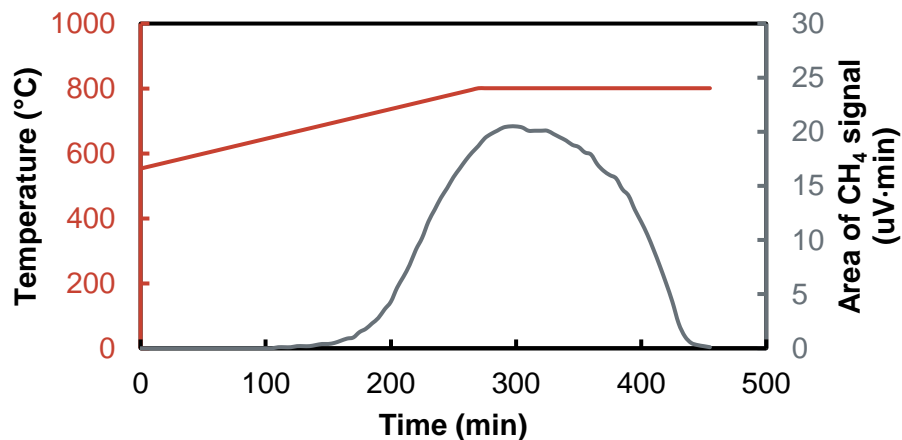


Figure S 2: TPH profile of sample prepared at 1000°C. Red line is the temperature program and the grey line is the formation of CH<sub>4</sub> indicated with the area obtained from the GC-TCD.  $T_{\text{final}} = 800^{\circ}\text{C}$ , ramp rate =  $1^{\circ}\text{C}/\text{min}$ ,  $\text{H}_2 \text{SV} \sim 9 \text{ L}/\text{h}/\text{g}_{\text{cat}}$ .

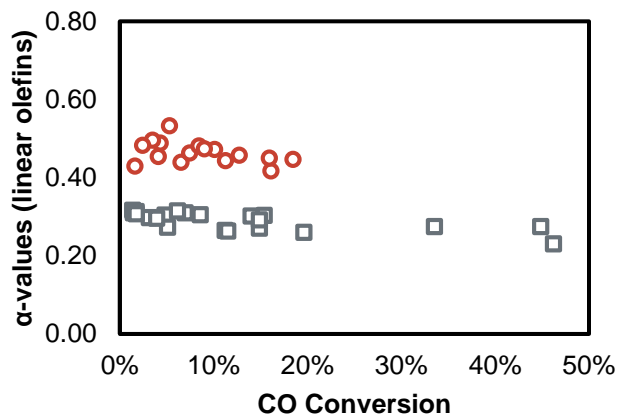


Figure S 3: Chain growth probability as a function of CO conversion towards linear olefins for promoted (red circles) and unpromoted (grey squares) samples.

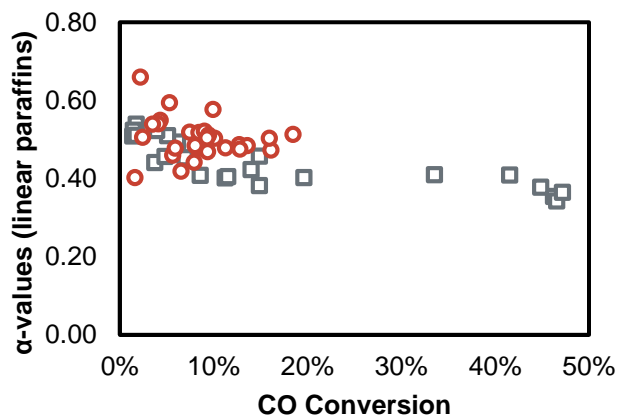


Figure S 4: Chain growth probability as a function of CO conversion towards linear paraffins for promoted (red circles) and unpromoted (grey squares) samples.

Table S 1: GC-TCD operating settings

Model: GC-Model Varian CP-4900

	Channel 1	Channel 2	Channel 3
Column	molesieve (MS5A)	PorapakQ	molesieve (MS5A)
Column length	20 m	10 m	10 m
Carrier gas	H <sub>2</sub>	H <sub>2</sub>	Ar
Injection time	350 ms	350 ms	350 ms
Injector temperature	-	80°C	-
Column oven temperature	80°C	60°C	-
Column pressure	1.5 bar	1 bar	1.5 bar
Stabilization time		5 s	
Sampling time		35 s	

Table S 2: GC-FID operating settings

Model: GC-Model Varian 3900			
Detector	Flame ionization detector (FID)		
Detector temperature	200°C		
Injector temperature	200°C		
Split ratio	7		
Column			
Column pressure	1.72 bar		
Flame gas	H2	30 ml/min	
Makeup gas	N2	25 ml/min	
Air flow	300 ml/min		
Temperature program	Ramp (°C/min)	Step (°C)	Time (min)
	-	-55	1.5
	9	0	0
	4	100	1
	4	200	2
	10	280	5
	20	150	-
Total time	80 min		
Coolant	CO2 (liquid)		