

Investigating the influence of acid sites in continuous methane oxidation with N₂O over Fe/MFI zeolites - *Supplemental information*

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Tables and Figures

Table S1. Methane oxidation at 300 °C over Fe-SIL-1 catalysts prepared with different Fe deposition methods.

Catalyst	Conversion ^a (%)		Selectivity ^a (%)					STY _{MeOH} ^b (μmol/g/h)
	N ₂ O	CH ₄	MeOH	CO	CO ₂	C ₂ H ₄	DME	
SIL-1	-	-	-	-	-	-	-	-
0.5 wt.% Fe-SIL-1 (hydrothermal)	1.5	0.21	0.2	74.3	17.9	-	-	0.28
0.5 wt.% Fe-SIL-1 (CVI)	-	-	-	-	-	-	-	-
0.5 wt.% Fe-SIL-1 (SSIE)	-	-	-	-	-	-	-	-

^a Values at 1 h; ^b STY_{MeOH}: space time yield of methanol; Reaction conditions: 0.44 g catalyst; Pellet Mesh size = 600 μm ; V = 0.9 ml; 2 h; Feed mixture: 20% CH₄ + 2% N₂O with Ar balance; Flow rate = 55 ml min⁻¹; P(total) = 1 atm; GHSV= 3600 h⁻¹.

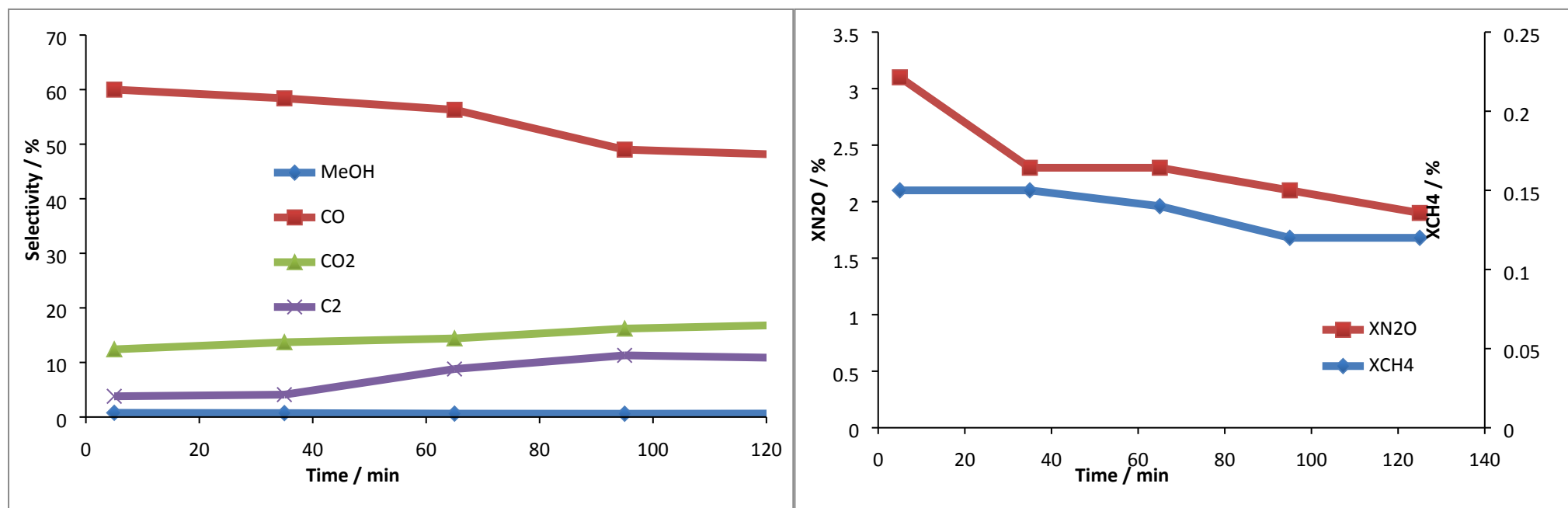


Fig. S1 Time online data for methane oxidation at 300 °C for H-ZSM-5; (a) Product selectivity in the gas phase. (b) CH₄ and N₂O conversion

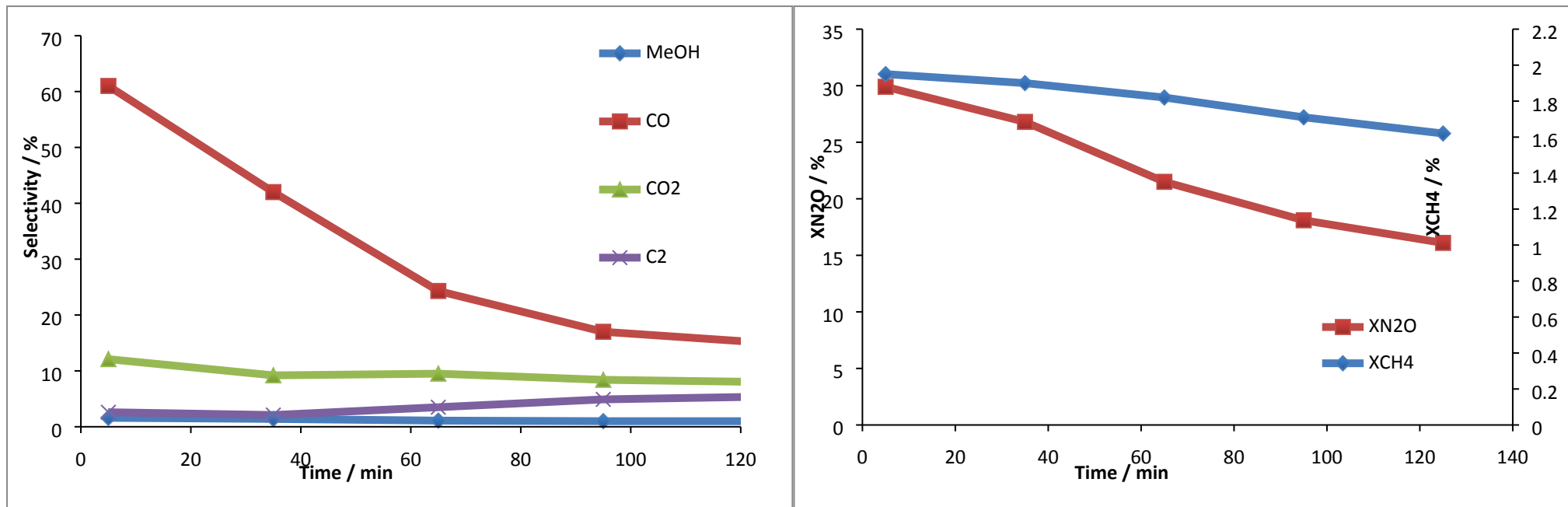


Fig. S2 Time online data for methane oxidation at 300 °C for Fe-ZSM-5 (550 °C); (a) Product selectivity in the gas phase. (b) CH₄ and N₂O conversion

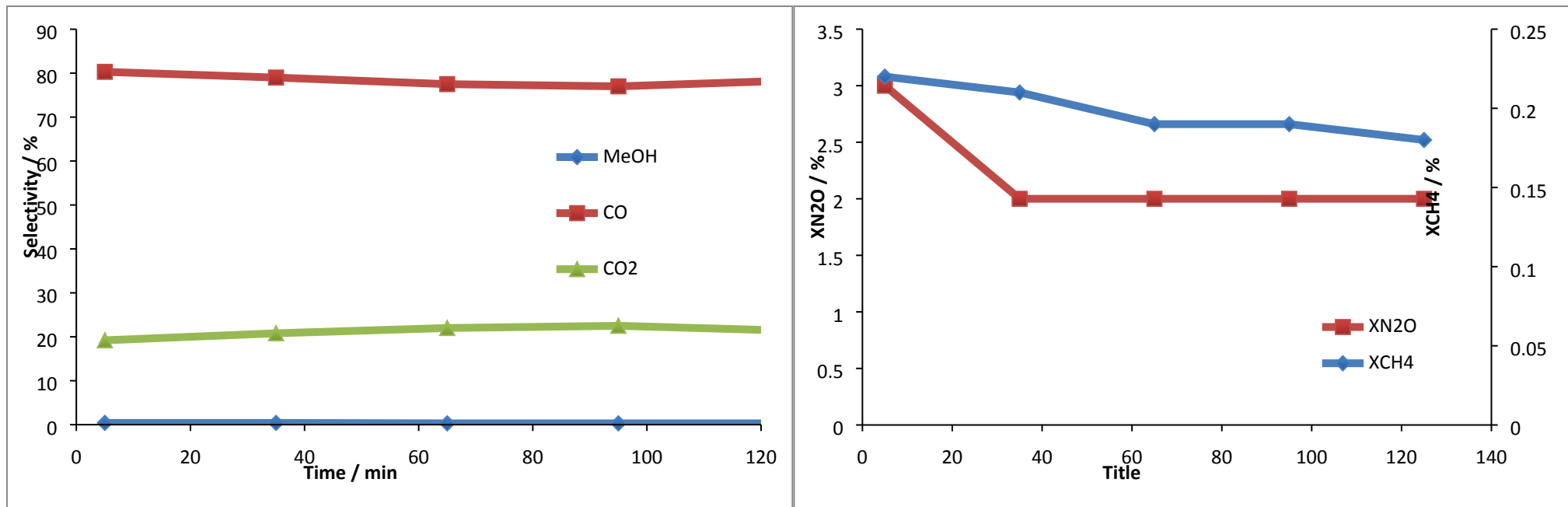


Fig. S3 Time online data for methane oxidation at 300 °C for Fe-SIL-1 (550 °C); (a) Product selectivity in the gas phase. (b) CH₄ and N₂O conversion

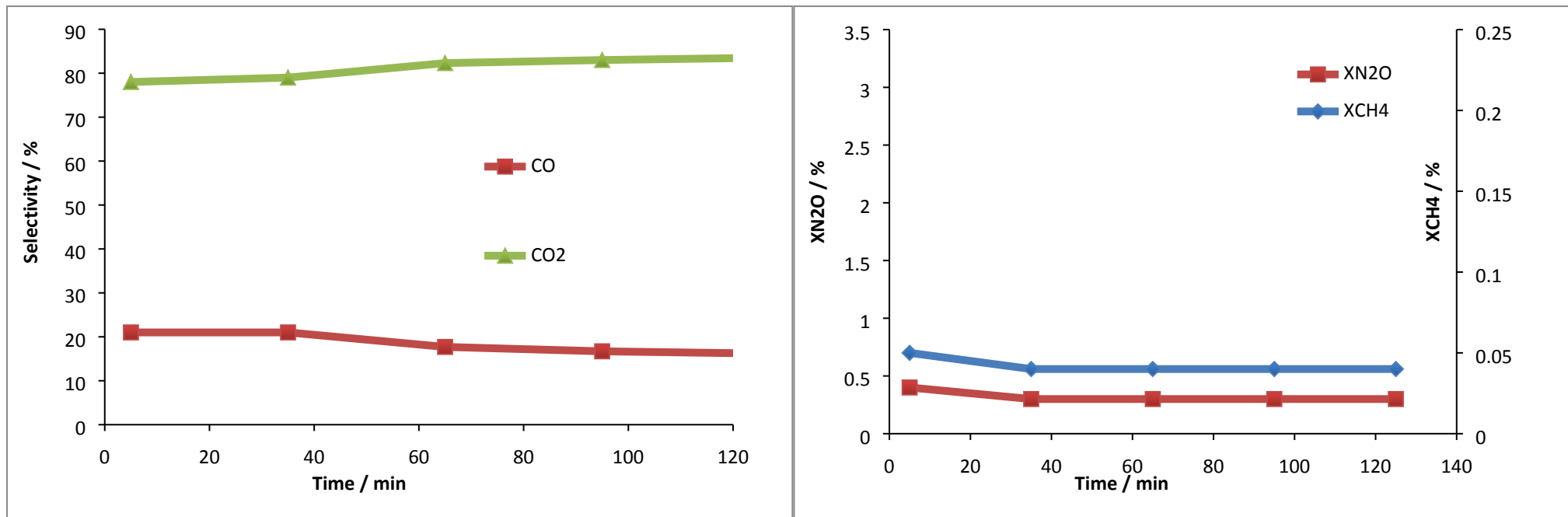


Fig. S4 Time online data for methane oxidation at 300 °C for Fe-TS-1 (550 °C); (a) Product selectivity in the gas phase. (b) CH₄ and N₂O conversion

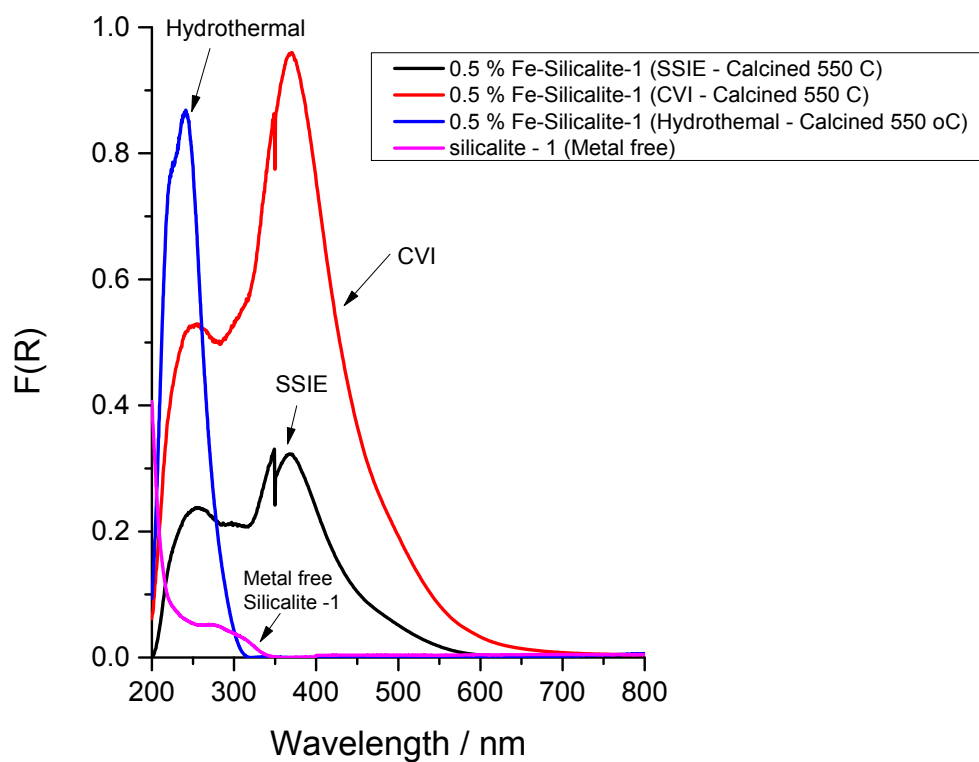


Fig. S5. UV/Vis spectra of Fe-SIL-1 materials prepared via different Fe loading methods.

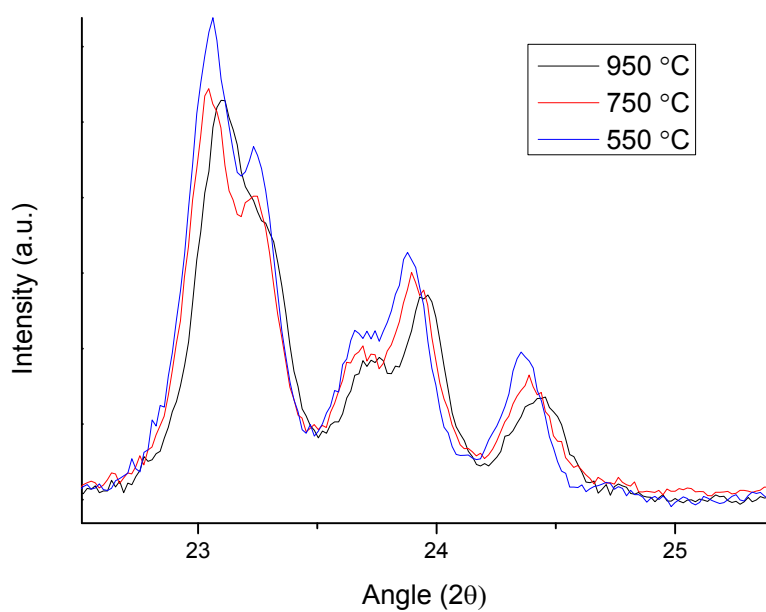
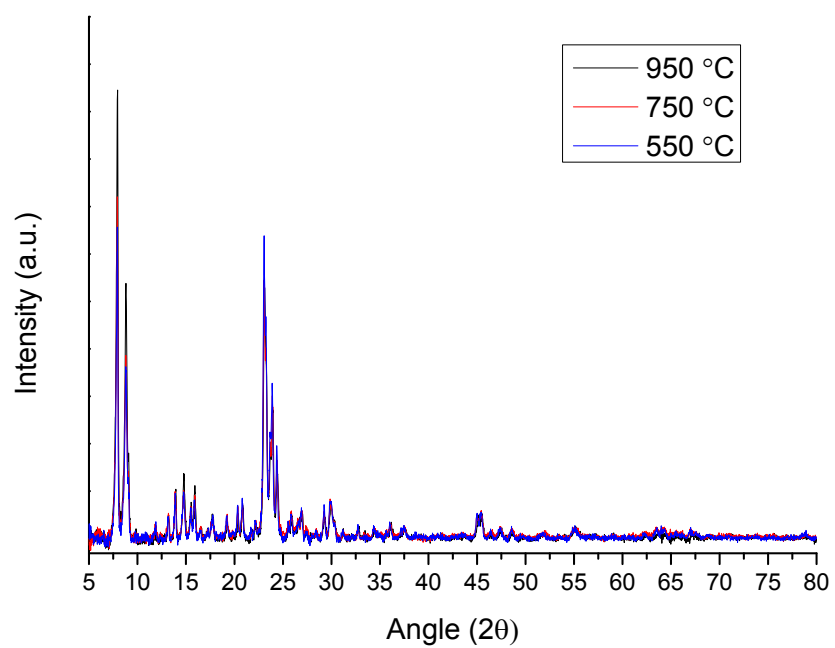


Fig.S6. XRD spectra for the 2 % Fe-ZSM-5 calcined at 550/750/950 °C

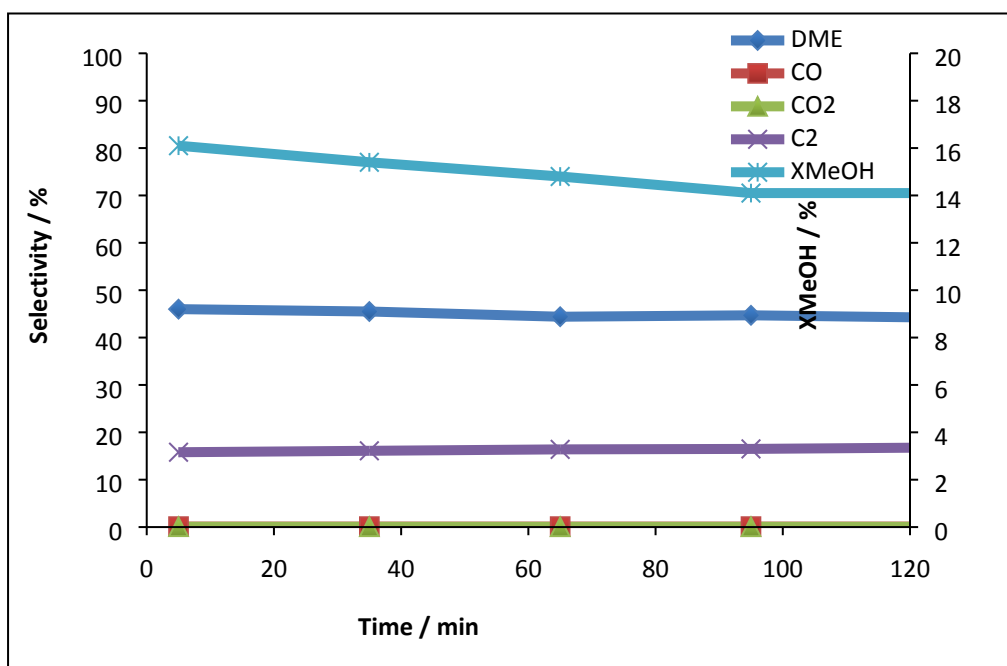


Fig. S7 Time online data for MeOH control experiment at 300 °C for H-ZSM-5

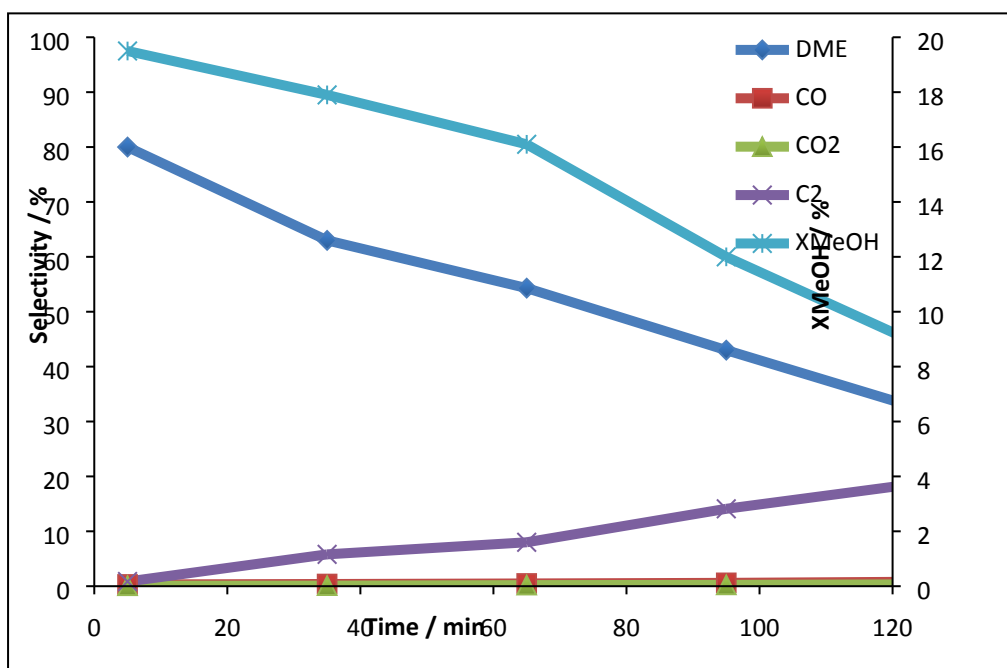


Fig. S8 Time online data for MeOH control experiment at 300 °C for Fe-ZSM-5 calcined 550 °C

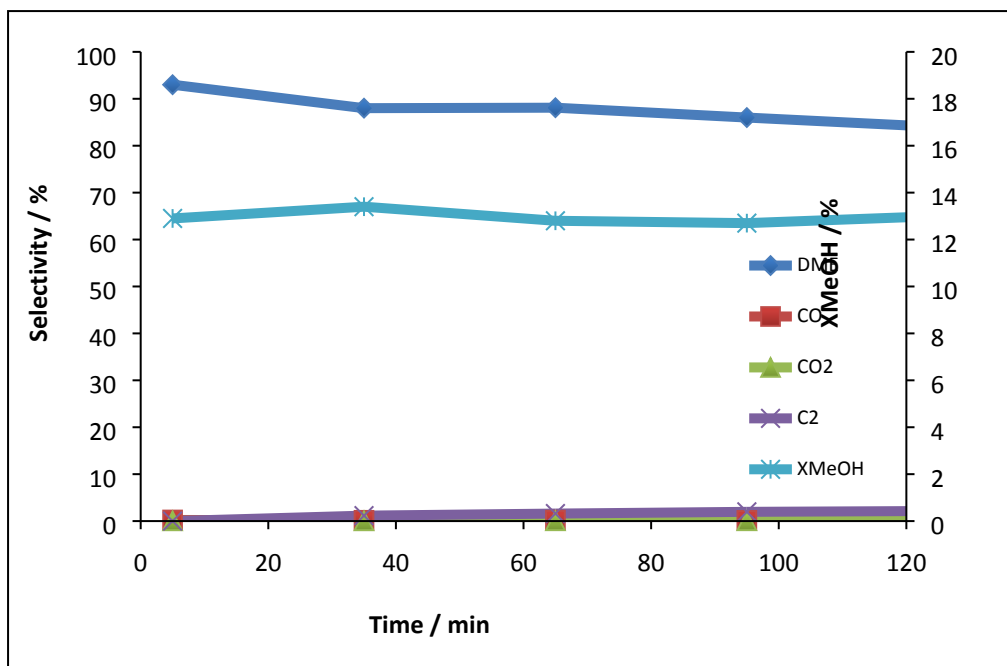


Fig. S9 Time online data for MeOH control experiment at 300 °C for c) 2% Fe-ZSM5 calcined 950 °C

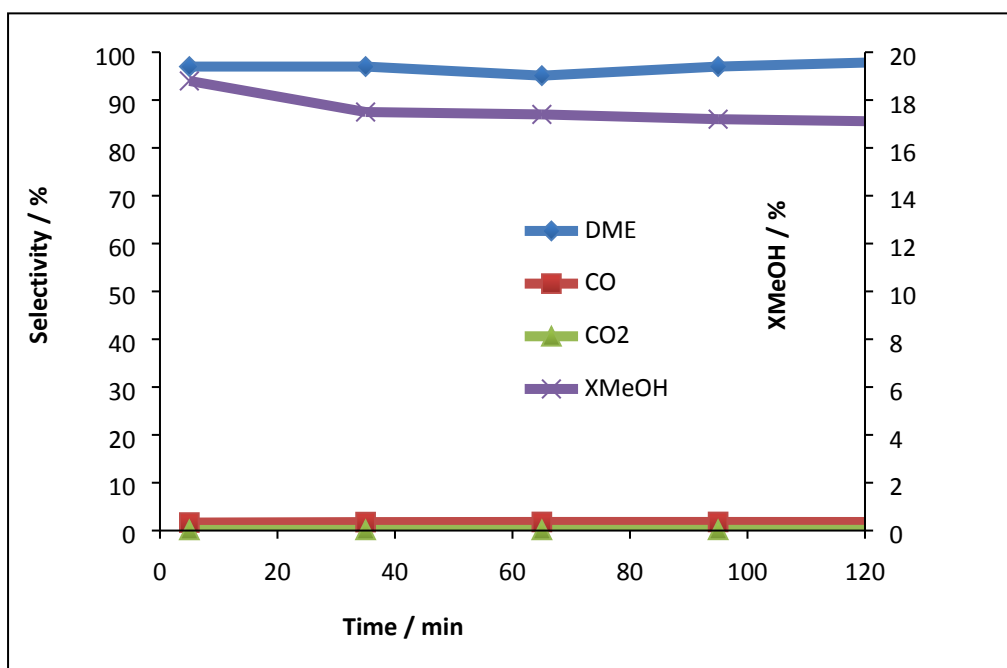


Fig. S10 Time online data for MeOH control experiment at 300 °C for 2% Fe-TS1 calcined 550 °C

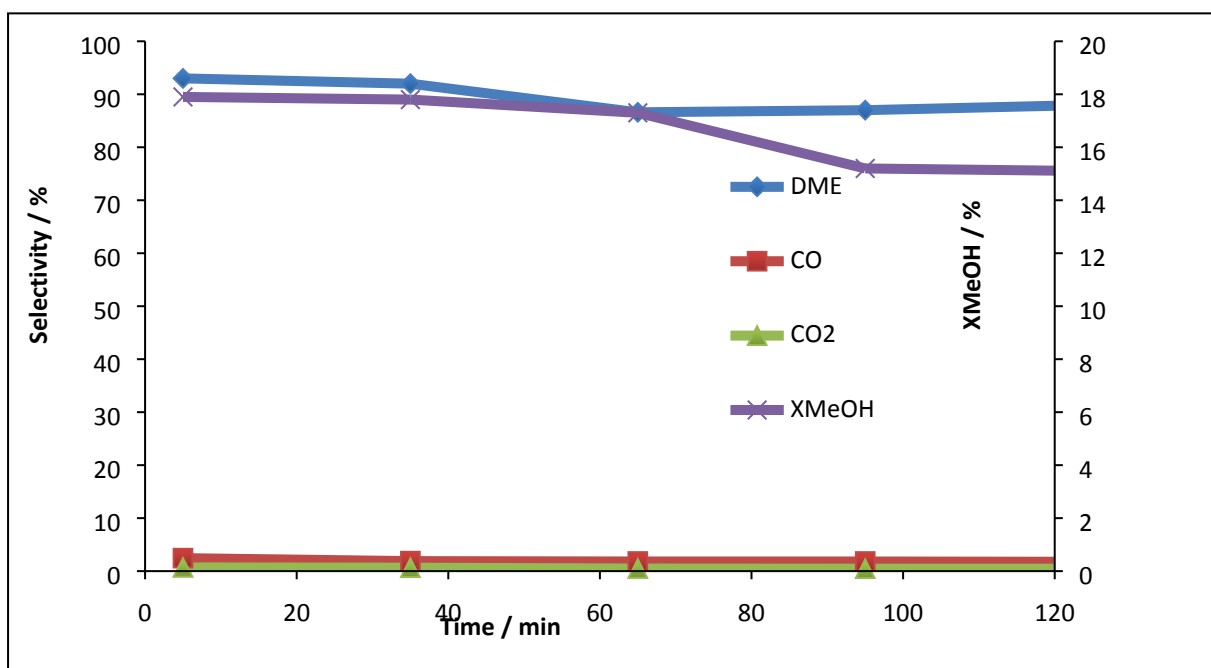


Fig. S11. Time online data for methanol control experiment at 300 °C for 0.5% Fe-SIL-1 steamed 875 °C.