Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Supporting Information

The evolution of Fe phases for fused iron catalysts during the reduction and Fischer-Tropsch synthesis

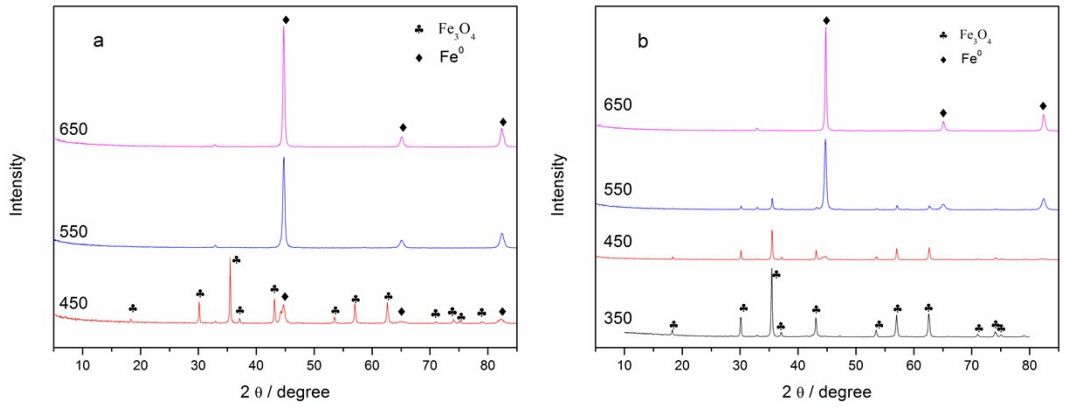

Figure. S1. X-ray diffraction (XRD) patterns of the fresh and reduced catalysts (Reduction condition: P=0.2MPa, (a) GHSV=6000h^{-1}, (b) GHSV=2000h^{-1})

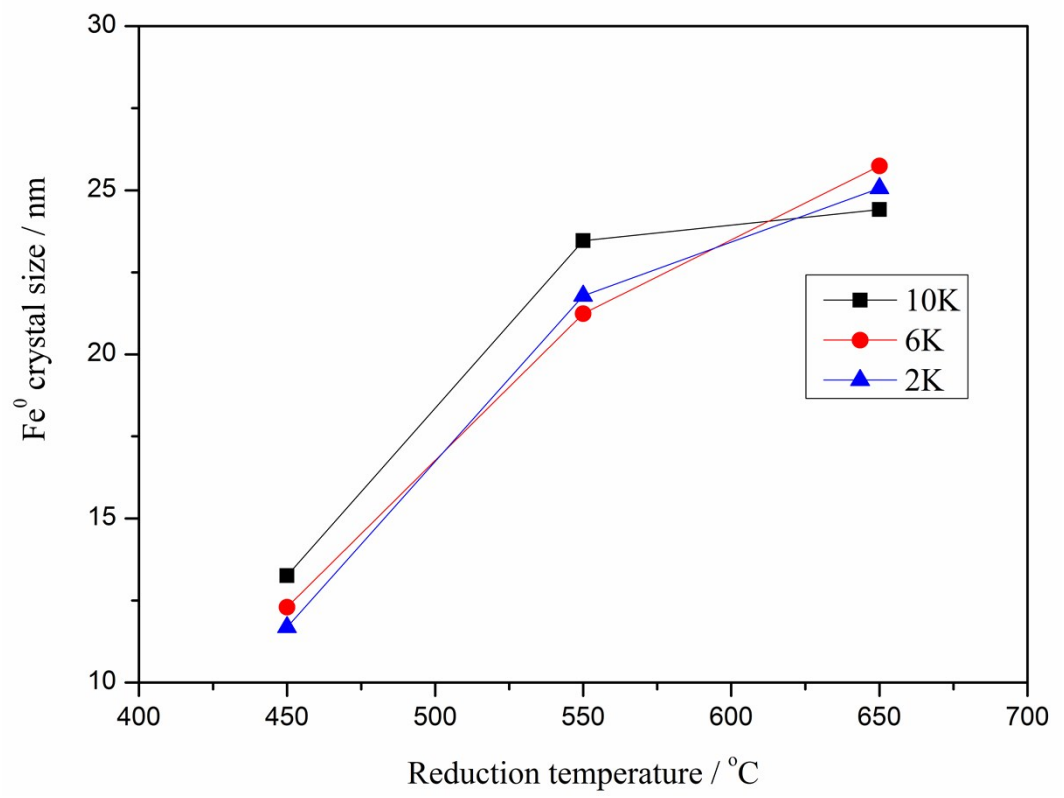

Figure. S2. Fe^0 crystalline size in the catalysts after reduction (Reduction condition: P=0.2MPa, 10K for GHSV=10000h^{-1}, 6K for GHSV=6000h^{-1}, 2K for GHSV=2000h^{-1},)

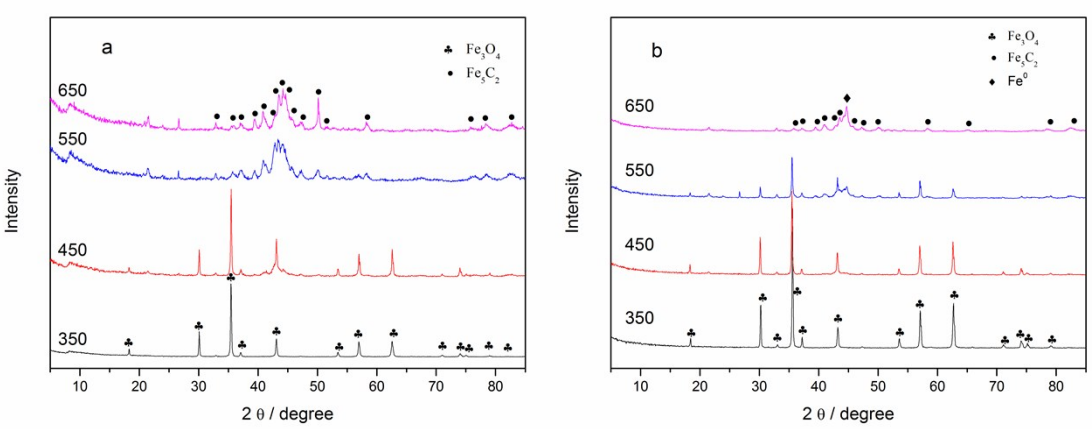

Figure. S3. X-ray diffraction (XRD) patterns of the catalysts after 48h FTS (Reduction condition: P=0.2MPa, (a) GHSV=6000h^{-1}, (b) GHSV=2000h^{-1})

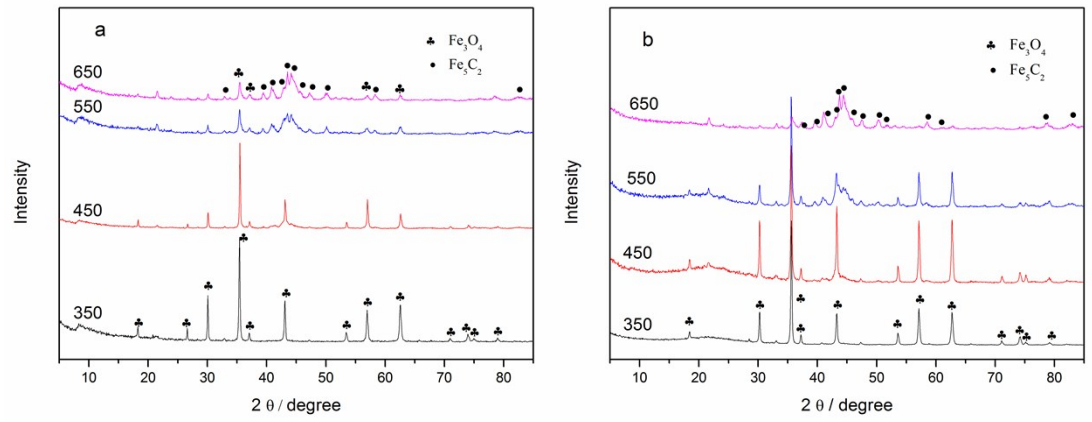

Figure. S4. X-ray diffraction (XRD) patterns of the catalysts after 500h FTS (Reduction condition: P=0.2MPa, (a) GHSV=6000h^{-1}, (b) GHSV=2000h^{-1})

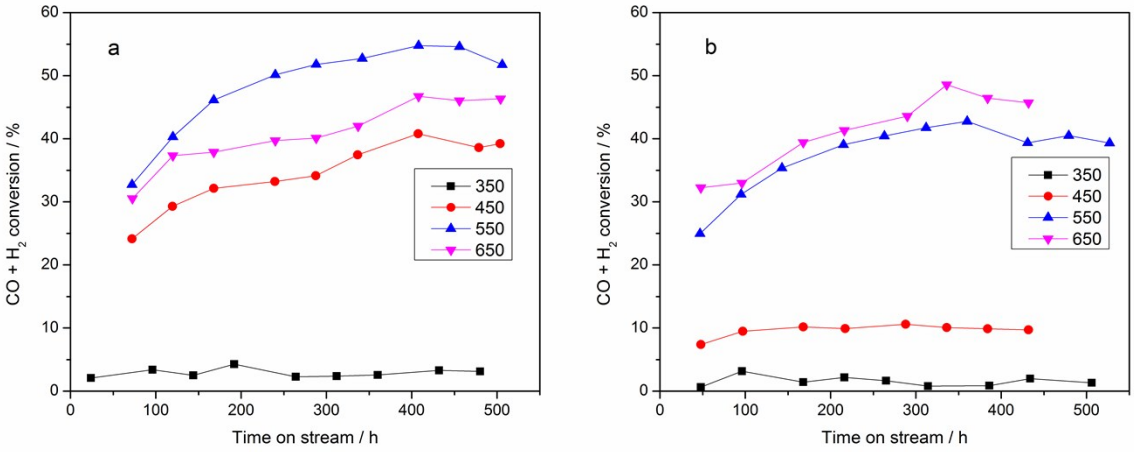

Fig. S5. CO+H_2 conversion versus time on stream for fused iron catalysts reduced under different temperature

(Reduction condition: P=0.2MPa, (a) GHSV=6000h^{-1}, (b) GHSV=2000h^{-1})

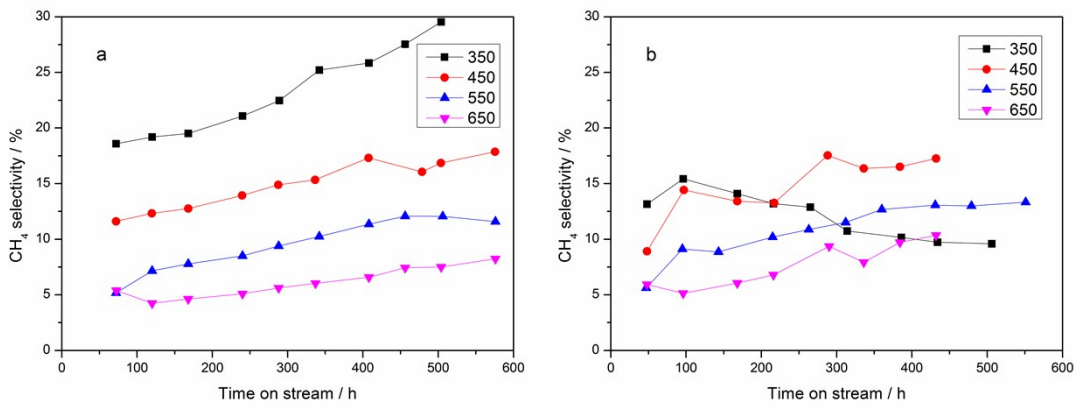

Fig. S6. CH_4 selectivity versus time on stream for fused iron catalysts reduced under different temperature

(Reduction condition: P=0.2MPa, (a) GHSV=6000h^{-1}, (b) GHSV=2000h^{-1})

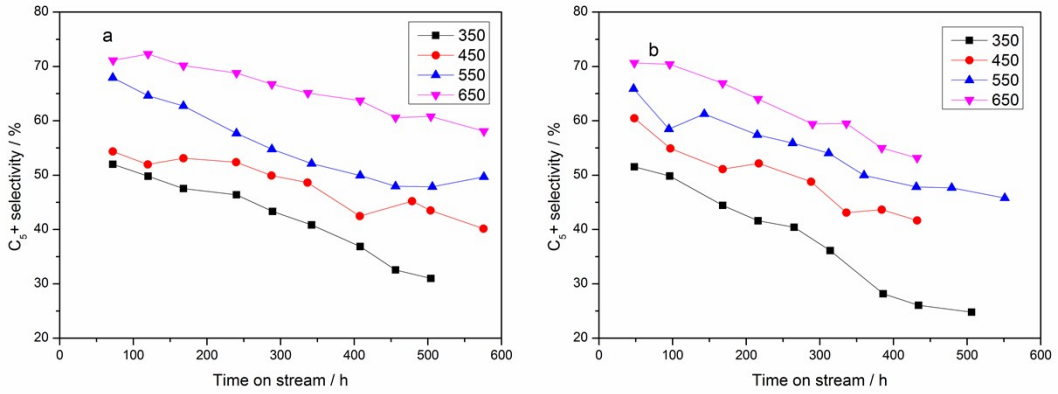

Fig. S7. C_5+ selectivity versus time on stream for fused iron catalysts reduced under different temperature

(Reduction condition: P=0.2MPa, (a) GHSV=6000h-1, (b) GHSV=2000h-1)

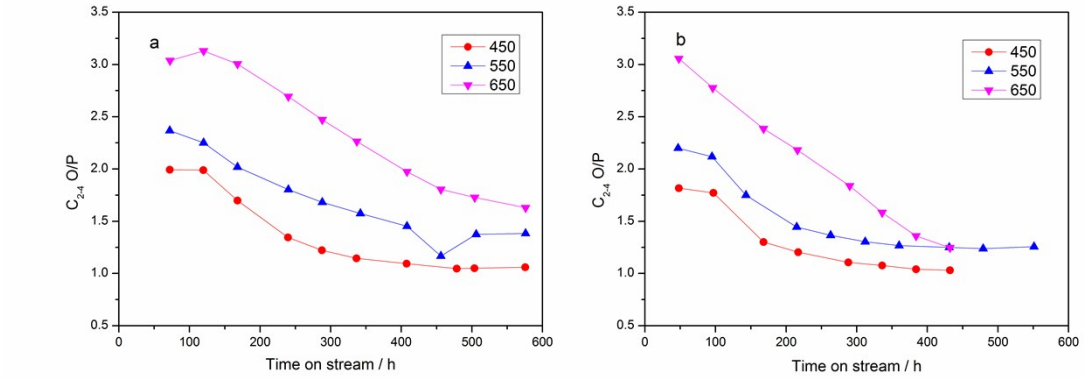

Fig. S8. C_{2-4} olefin to paraffin ratio versus time on stream for fused iron catalysts reduced under different temperature

(Reduction condition: P=0.2MPa, (a) GHSV=6000h^{-1}, (b) GHSV=2000h^{-1})

H_2 adsorption

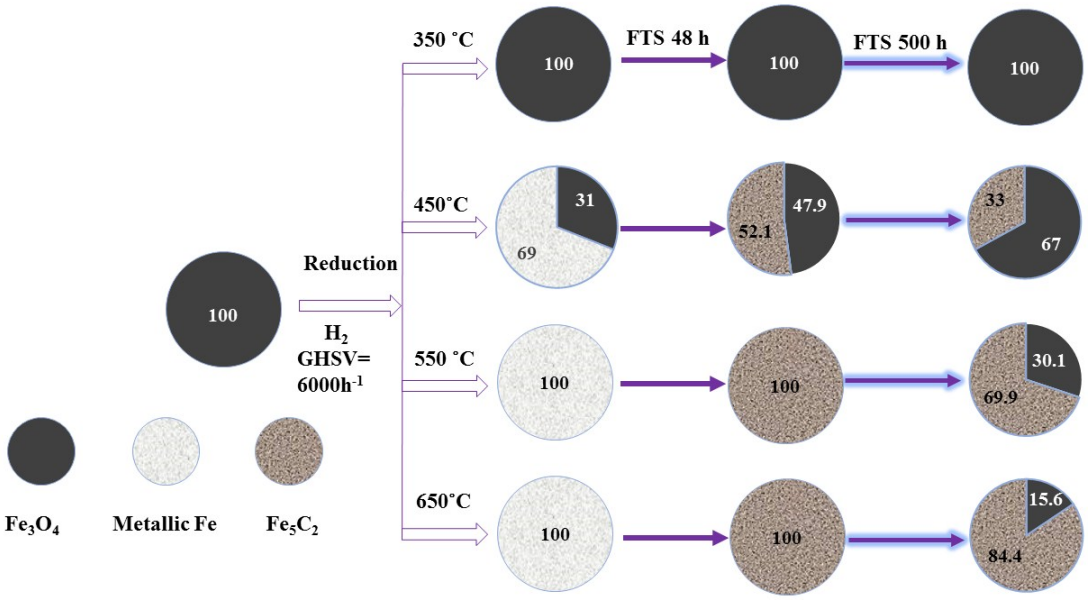

Fig.S9. Evolution of different iron phases over fused iron catalyst reduced at 6000 GHSV during reduction and reaction (The content of individual phase is calculated by XRD)

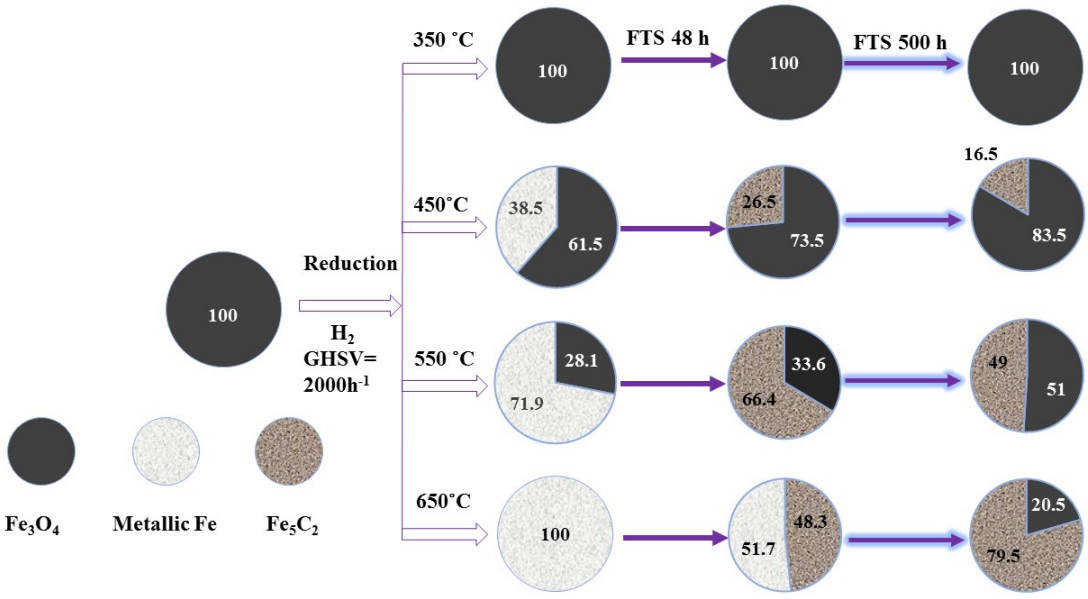

Fig.S10. Evolution of different iron phases over fused iron catalyst reduced at 2000 GHSV during reduction and reaction (The content of individual phase is calculated by XRD)