

Electronic Supplementary Information

Propane dehydrogenation over the Ce-containing ZSM-5 supported platinum-tin catalysts: Ce concentration effect and reaction performance analysis

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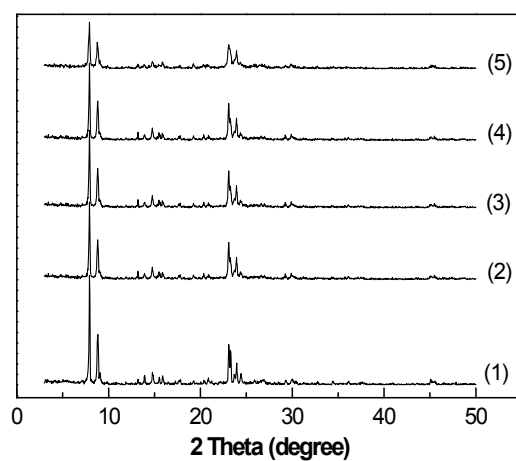


Fig. S1 XRD patterns of different samples:

- (1) Ce(0%)-ZSM-5; (2) Ce(0.35%)-ZSM-5; (3) Ce(0.76%)-ZSM-5;
(4) Ce(1.15%)-ZSM-5; (5) Ce(1.58%)-ZSM-5

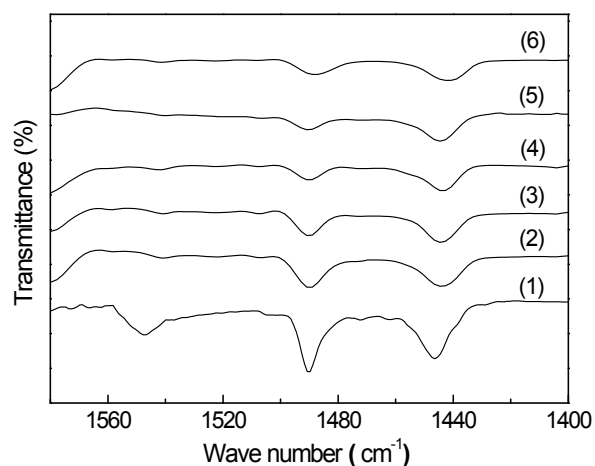


Fig. S2 IR spectra of pyridine adsorbed for different samples: (1) Ce(0%)-ZSM-5; (2) PtSnNa/Ce(0%)ZSM-5; (3) PtSnNa/Ce(0.35%)ZSM-5; (4) PtSnNa/Ce(0.76%)ZSM-5; (5) PtSnNa/Ce(1.15%)ZSM-5; (6) PtSnNa/Ce(1.58%)ZSM-5.

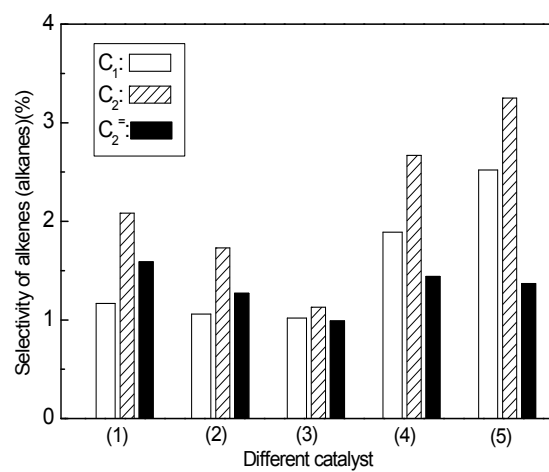


Fig. S3 Selectivities to alkenes (alkanes) of the different catalysts after reaction for 10 h: (1) PtSnNa/Ce(0%)ZSM-5; (2) PtSnNa/Ce(0.35%)ZSM-5; (3) PtSnNa/Ce(0.76 %)ZSM-5; (4) PtSnNa/Ce(1.15 %)ZSM-5; (5) PtSnNa/Ce(1.58 %)ZSM-5. Reaction conditions: 590 °C, $n(\text{H}_2)/n(\text{C}_3\text{H}_8)=0.25$, $m(\text{cat})=2.0$ g, $\text{WHSV}=3.0\text{h}^{-1}$.

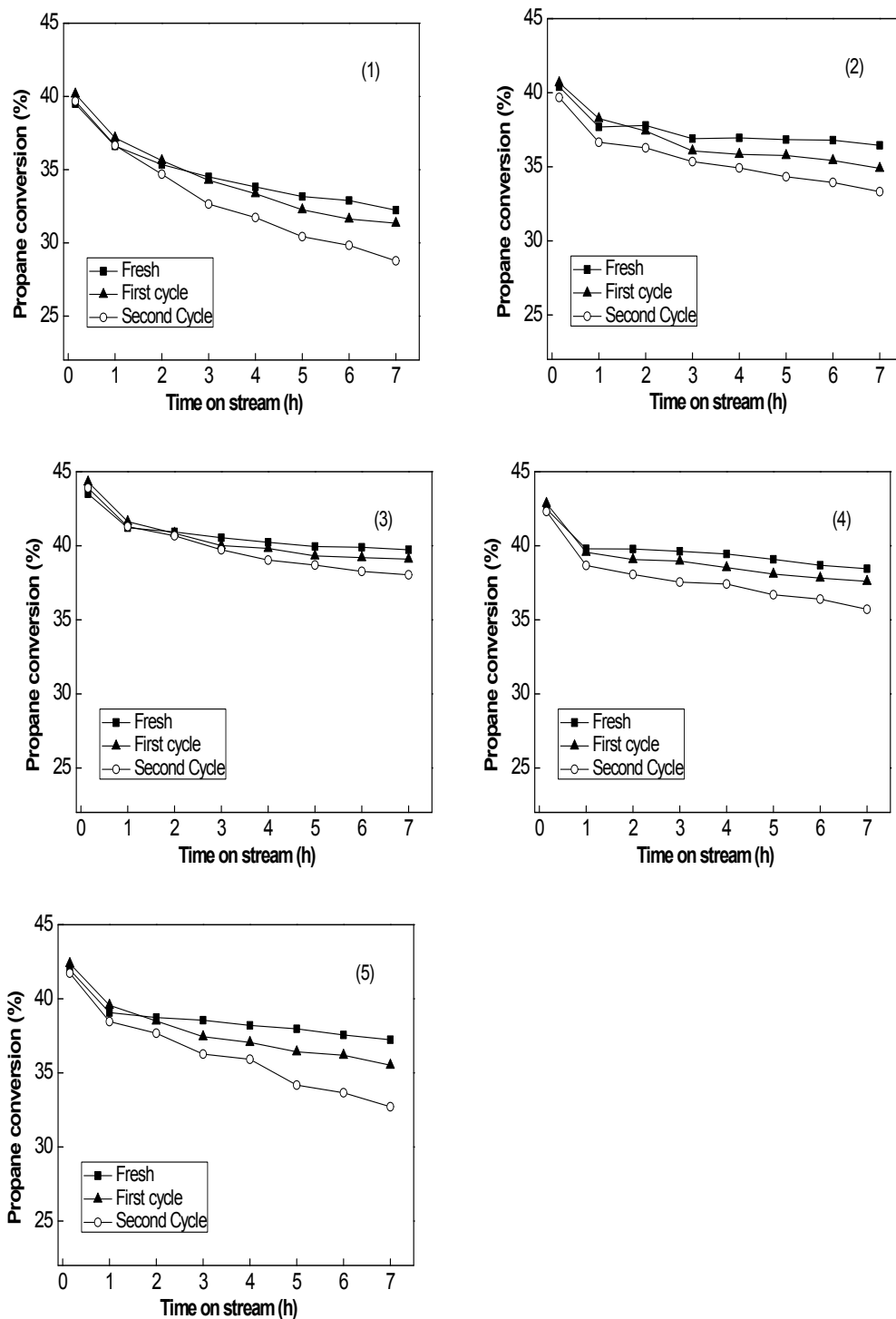


Fig. S4 The performance comparison of the different catalysts in the dehydrogenation of propane at 590 °C: (1) PtSnNa/Ce(0%)ZSM-5; (2)PtSnNa/Ce(0.35%)ZSM-5; (3)PtSnNa/Ce(0.76%)ZSM-5;(4)PtSnNa/Ce(1.15%)ZSM-5; (5) PtSnNa/Ce(1.58%)ZSM-5.

Regeneration conditions: catalyst regeneration was performed by oxidative treatment using pure air (40ml/min) for 2h at 500 °C. Then, the catalyst was reduced in flowing pure hydrogen (40ml/min) for 4h at 500 °C.