Electronic Supplementary Information

For

Combustion of lean methane over Co_3O_4 catalysts prepared with different cobalt precursors

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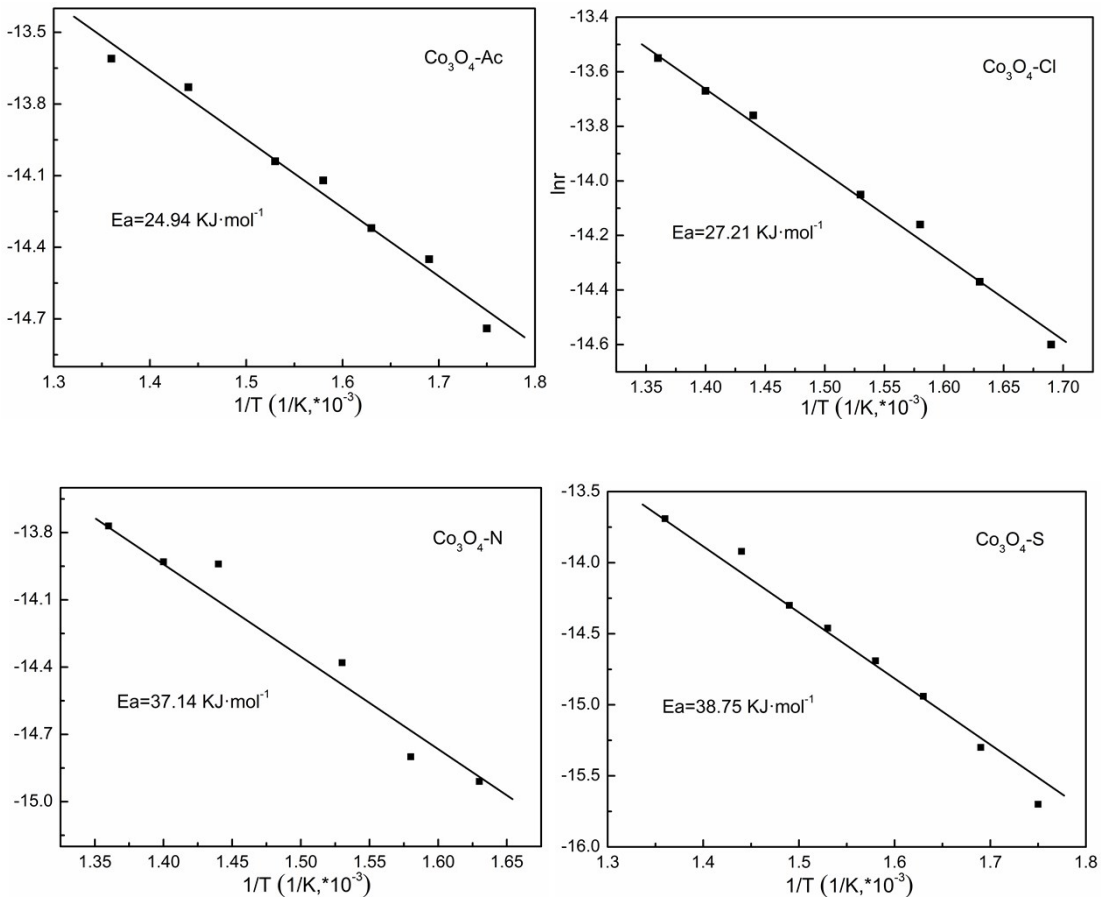

Fig. S1 Arrhenius plots of lnr versus 1/T for Co_3O_4 catalysts prepared with different cobalt precursors

The activation energy (Ea) can be obtained from the slope of the linear plot of lnr versus 1/T. The order of the activation energy for all the catalysts is as follows: Co_3O_4-Ac < Co_3O_4-Cl < Co_3O_4-N < Co_3O_4-S, which is in well agreement with the catalytic activity. Obviously, Co_3O_4-Ac catalyst possesses lower activation energy (Ea is 24.94 kJ·mol^{-1}) than the other catalysts, suggesting that the catalytic oxidation reaction on Co_3O_4-Ac could be more easily initiated, which could enhance the catalytic activity for methane combustion.

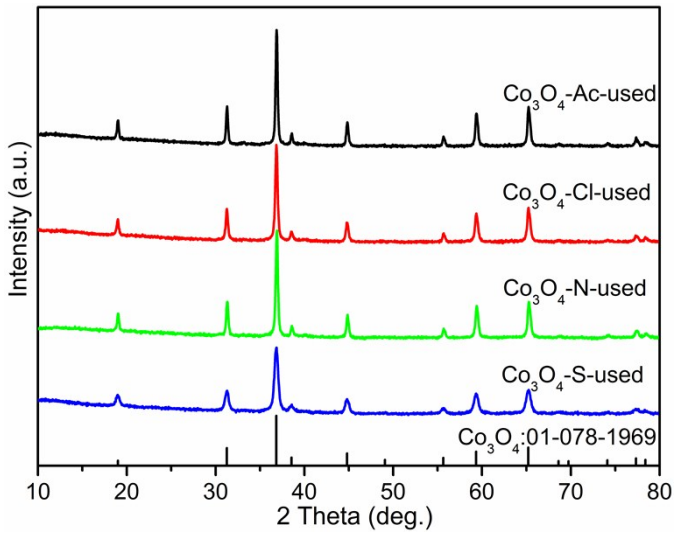

Fig. S2 XRD patterns of used catalysts (after four consecutive runs)

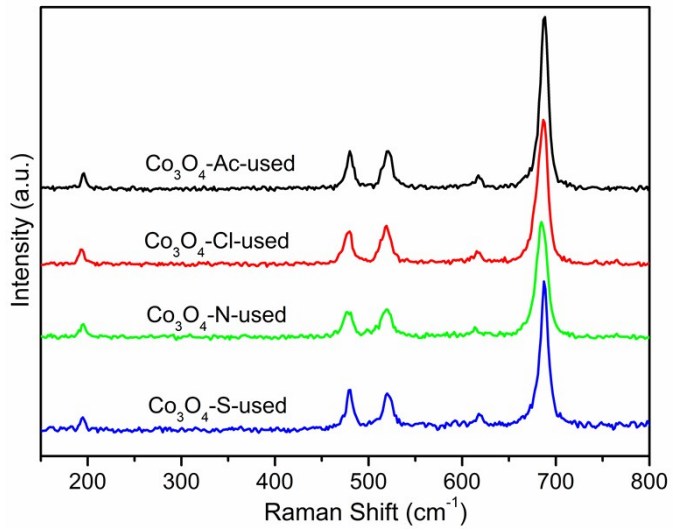

Fig. S3 Raman spectra of used catalysts (after four consecutive runs) in wavenumber range of 150-800 cm^{-1}