# Supporting Information for

## Efficient Conversion of Light Cycle Oil into High Octane Number Gasoline and Light Olefins over Mesoporous ZSM-5 catalyst

Li Xin, Xinxin Liu, Xiaobo Chen, Xiang Feng, Yibin Liu, Chaohe Yang*

State Key Laboratory of Heavy Oil Processing, China University of Petroleum,

Qingdao, 266580, China

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Corresponding author:

Prof. Chaohe Yang

E-mail: yangch@upc.edu.cn

Tel. & Fax: +86-532-86981718

Add.: No. 66, Changjiang West Road, Huangdao District, Qingdao, China.

**Table S1. Properties of the LCO**

| properties | LCO |
|---|---|
| distillation (ASTM D2887) | |
| 10/50/90 % (°C) | 273/304/321 |
| density at 15 °C ($kg/m^3$) | 945 |
| carbon residue (wt.%) | 0.37 |
| condensation point (°C) | 27 |
| viscosity at 15 °C ($mm^2 \cdot s^{-1}$) | 9.89 |
| flash point (°C) | 82 |
| cetane index (CI, ASTM D4737-04) | 17.1 |

**Table S2. Properties of the Hydrogenation Catalyst**

| property | value |
|---|---|
| shape | trefoil bar |
| diameter (mm) | 1.51-1.53 |
| length (mm) | 2-4 |
| chemical composition (wt.%) | |
| $MoO_3$ | 20.0-23.0 |
| NiO | 2.0-3.0 |
| pore volume ($cm^3/g$) | 0.33-0.36 |
| surface area ($m^2/g$) | 200-240 |
| packing density ($kg/m^3$) | 810-820 |

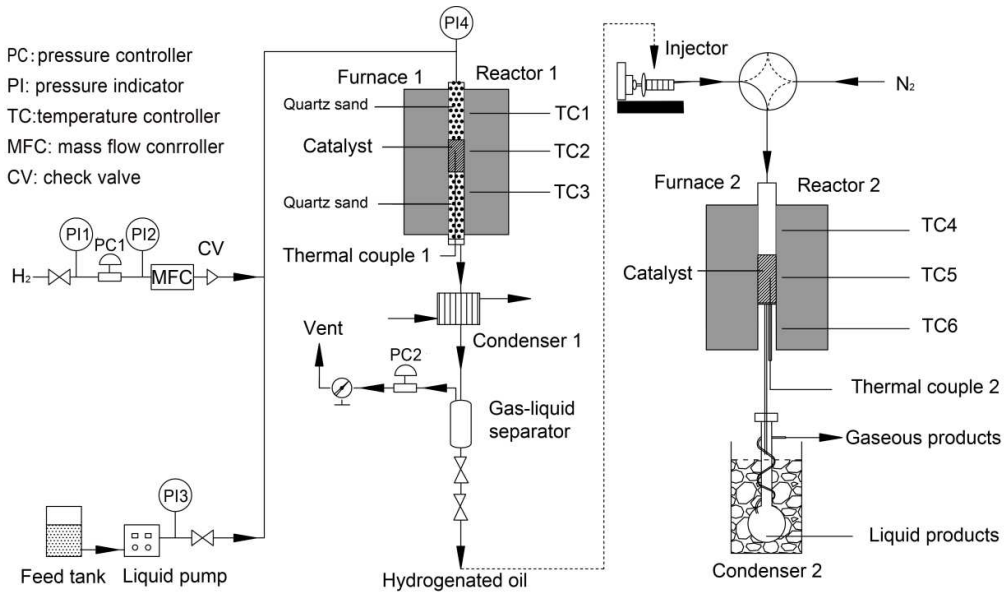



**Figure S1.** Diagram of the experimental process.

**Table S3. Ratio of light alkanes and light olefins in LPG of hydro-LCO conversion over the meso-ZSM-5 and ZSM-5 catalyst**

| catalyst | 520 ℃ | 540 ℃ | 560 ℃ | 580 ℃ |
|---|---|---|---|---|
| meso-ZSM-5 | 0.38 | 0.34 | 0.31 | 0.28 |
| ZSM-5 | 0.34 | 0.33 | 0.37 | 0.39 |

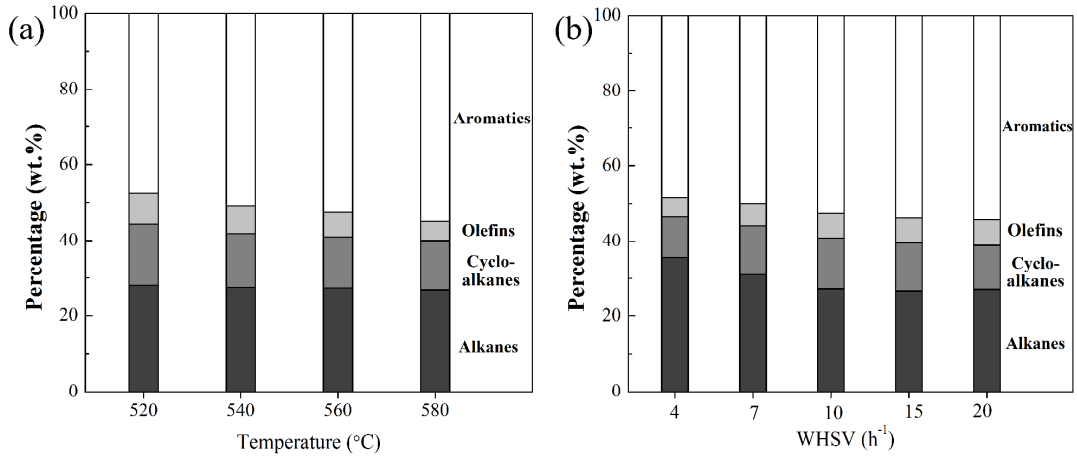
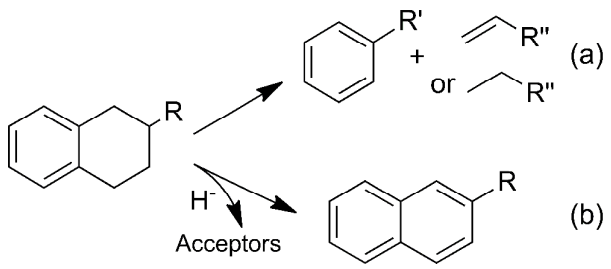



**Figure S2.** Compositions of gasoline of hydro-LCO conversion over the meso-ZSM-5 catalyst as a function of reaction temperature (a), and WHSV (b).




**Scheme S1.** Reaction pathways of tetralins in catalytic cracking process.

**Definition of tetralins conversion and its ring opening selectivity:**

$$\text{Tetralins conversion (wt.\%)} = 100 - \frac{\text{Mass of tetralins in unconverted hydro-LCO}}{\text{Mass of tetralins in hydro-LCO feed}} \times 100$$

$$\text{Tetralins ring opening selectivity (wt.\%)} = 100 - \frac{\text{Mass of PAHs formed}}{\text{Mass of converted tetralins}} \times 100$$

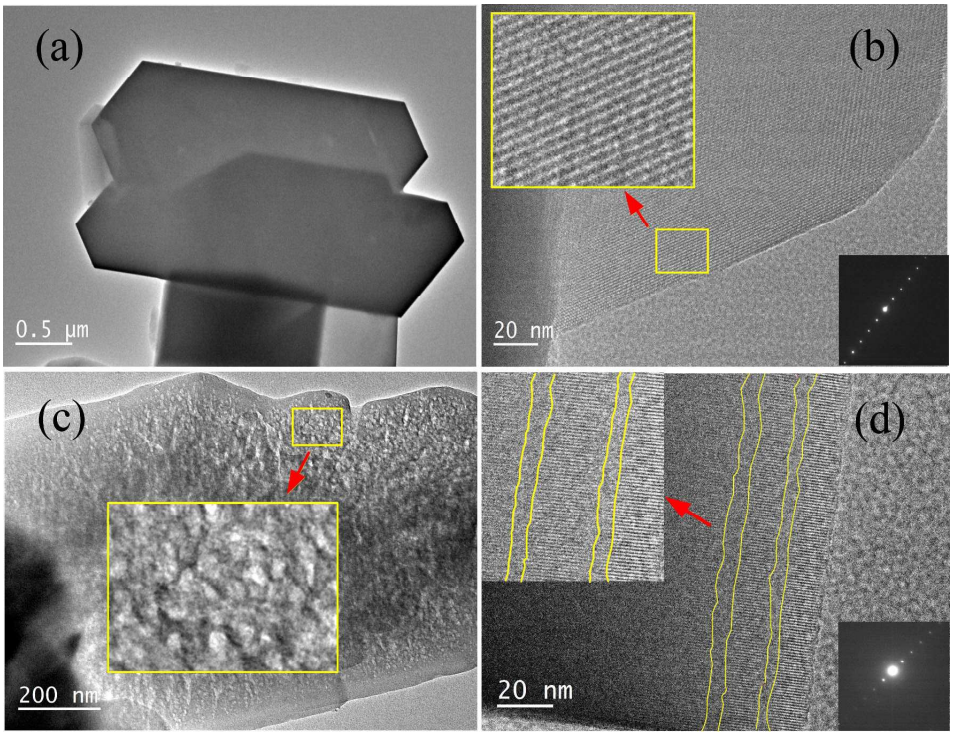



**Figure S3.** TEM images of parent ZSM-5 (a) and (b), and meso-ZSM-5 (c) and (d) zeolites; (b) and (d) with electron diffraction patterns.

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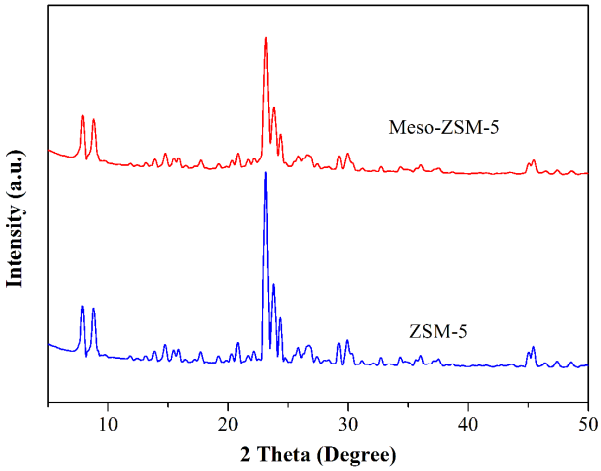


**Figure S4.** XRD patterns of the parent ZSM-5 and meso-ZSM-5 zeolites.

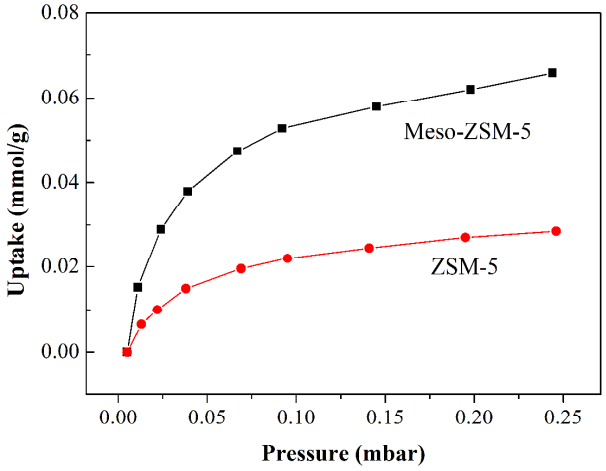


**Figure S5.** Adsorption isotherms of tetralin at 298 K by IGA on ZSM-5 and meso-ZSM-5 zeolites.