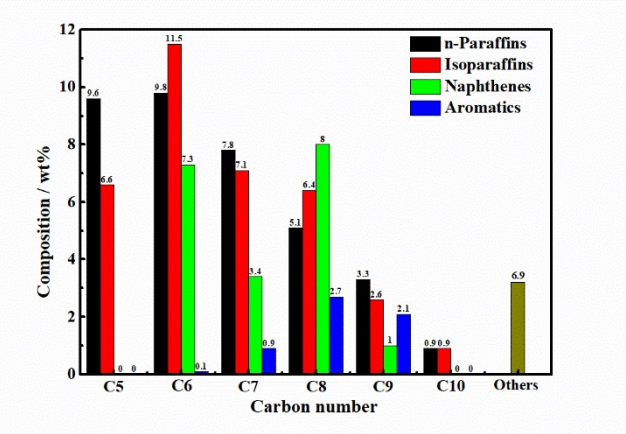

Figure S1 Composition of naphtha

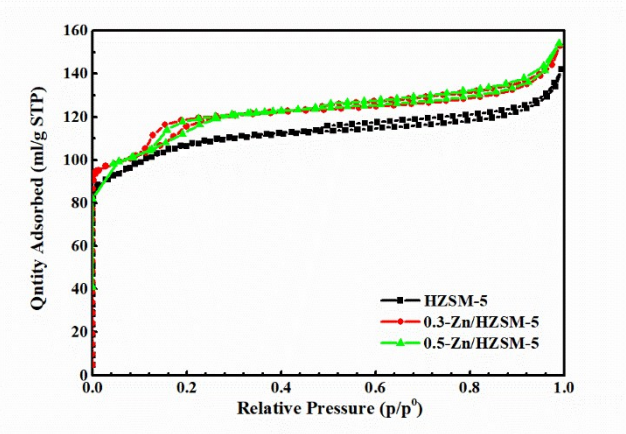

Figure S2 N_2 adsorption-desorption isotherms of HZSM-5 and Zn/HZSM-5 zeolites

There is a significant difference in the shapes of the isotherms of these samples. The HZSM-5 shows a typical type Ⅰ isotherm for microporous materials with a limited number of mesopore, while the Zn-modified zeolites present a mixture of type Ⅰ and type Ⅳ according to the IUPAC classification [1]. Steep uptake in the low-pressure region（p/p0<0.05）is the typical property of microporous compounds. The hysteresis loop appearing at the relative pressure p/p0 =0.5~1.0 is usually associated with capillary condensation taking place in mesopore structures. After Zn-modification, A new H2 hysteresis loop is observed above p/p0 = 0.1~0.3, indicating the presence of some new mesopore in the modified zeolites.

Table S1 Proton affinities of three components in feed

Compound	n-hexane	methanol	isobutene	trimethylbenzene
Proton affinity (kJ/mol)	665	754	802	836

[a] Taken from ref.1

[b] Taken from NIST Chemistry WebBook

References

(1) Haw JF, Phys Chem Chem Phys., 2002, 4, 5431–5441.