

## Electronic Supplementary Information

### **Preparation of CuHY catalyst via solid-state ion exchange method and its catalytic performance in isobutane/2-butene alkylation**

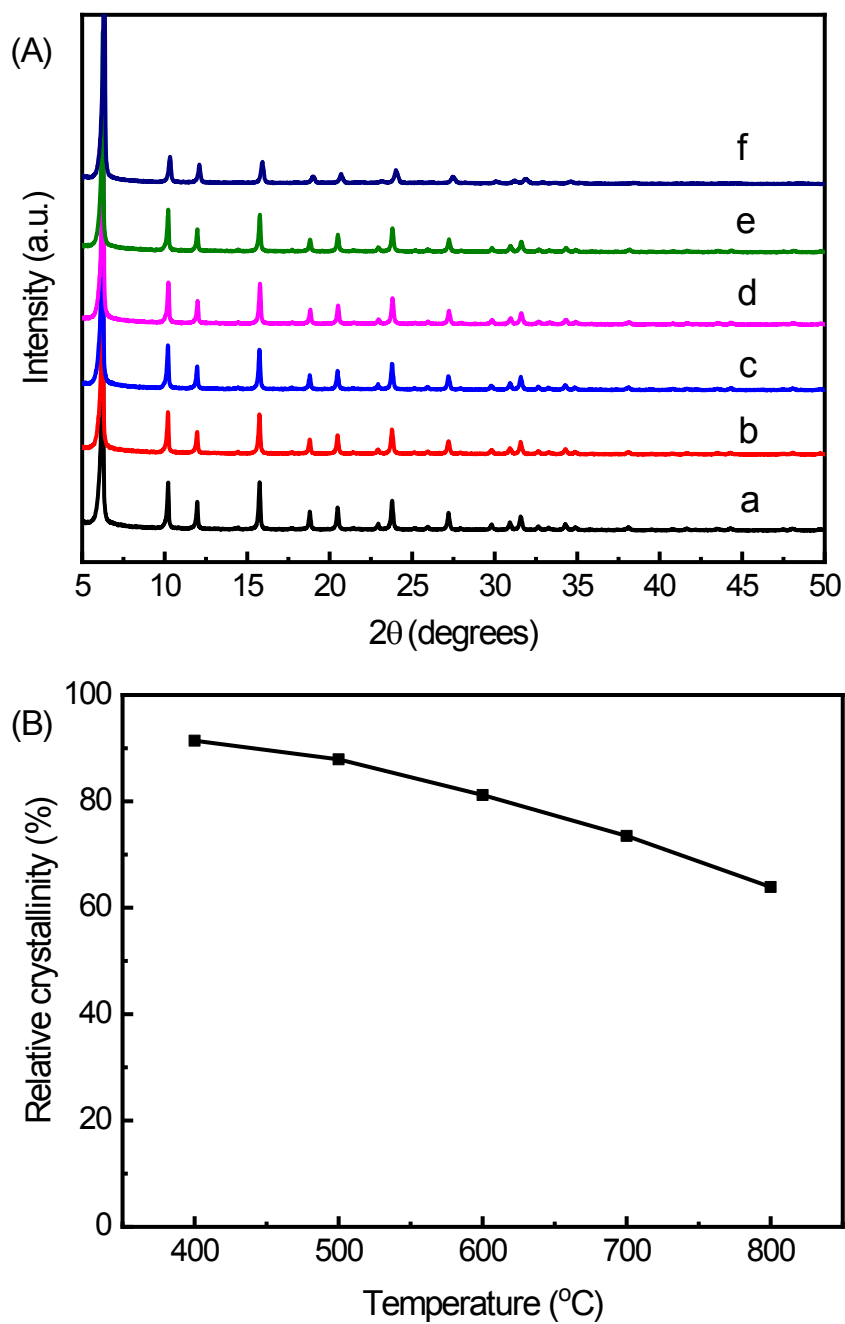
Xinyan Sun, Xiang Zhang, Tao Zheng, Haiyan Liu\*, Rui Zhang, Xianghai Meng, Chunming Xu, Zhichang

Liu\*

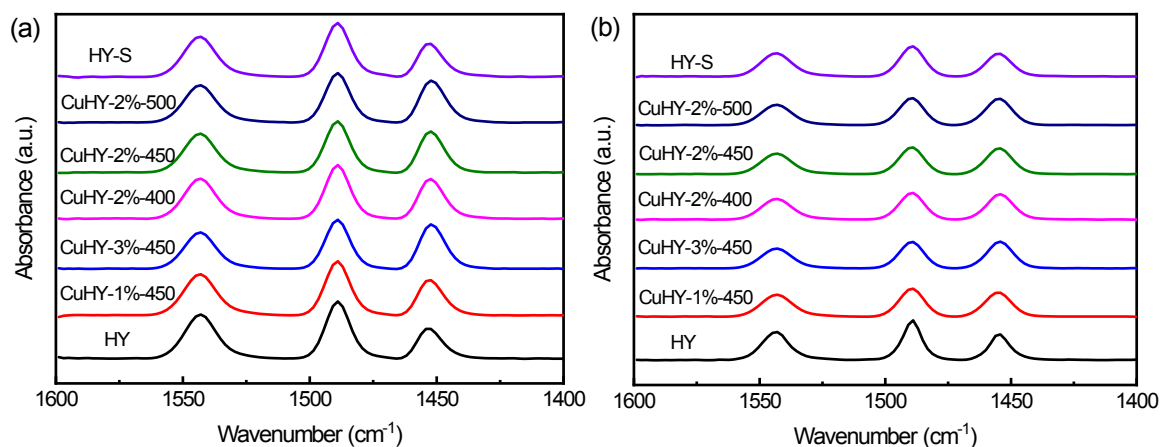
State Key Laboratory of Heavy Oil Processing, China University of Petroleum-Beijing, Beijing 102249, P.

R. China

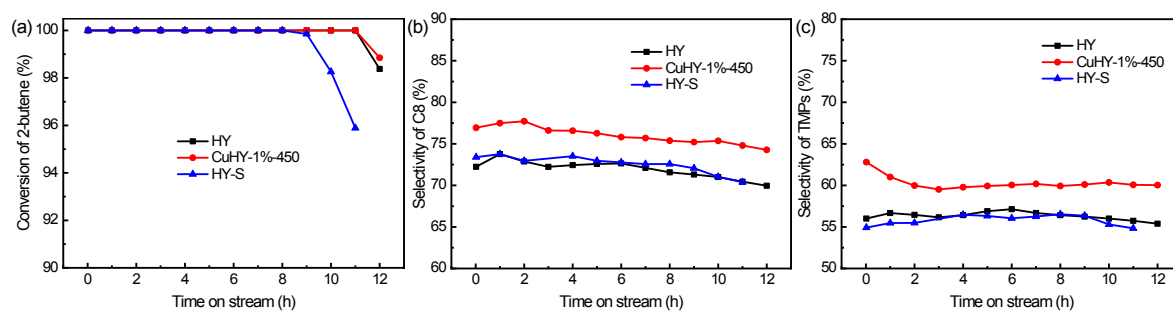
\* Corresponding authors: [klc@cup.edu.cn](mailto:klc@cup.edu.cn) (Haiyan Liu); [lzch@cup.edu.cn](mailto:lzch@cup.edu.cn) (Zhichang Liu)



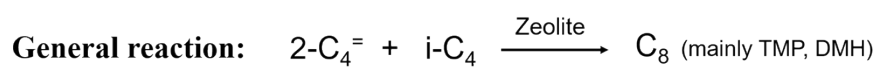
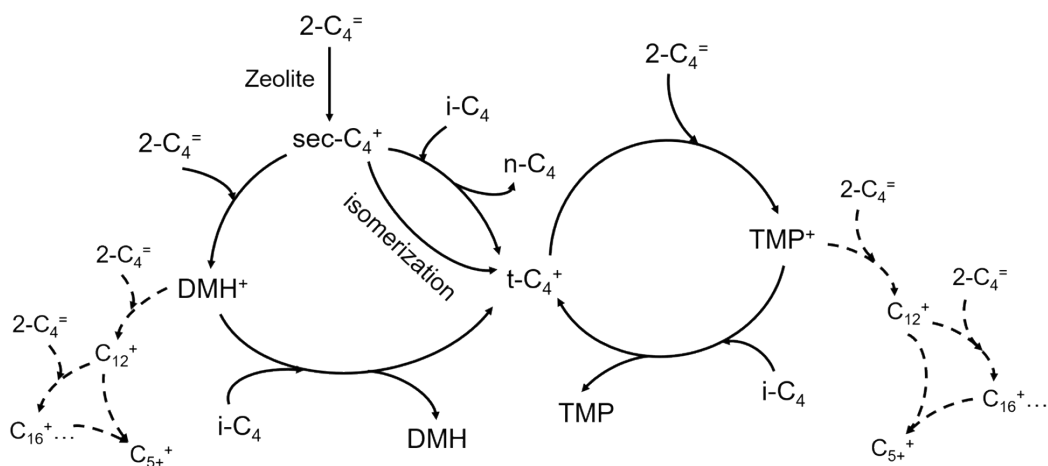
**Fig. S1** (A) XRD patterns of HY zeolite (a) and HY+2%CuCl after being heated to 400 °C (b), 500 °C (c), 600 °C (d), 700 °C (e) and 800 °C (f). (B) The relative crystallinity of HY+2%CuCl after being heated to different temperatures.



**Fig. S2** Py-IR spectra for the samples at 200 °C (a) and 350 °C (b)



**Fig. S3** Alkylation performance of HY, CuHY-1%-450 and HY-S. Conversion of 2-butene (a), selectivity of C<sub>8</sub> (b), selectivity of TMPs (c)



**Scheme S1** The general reaction and rationale of the transformation for isobutane/2-butene alkylation over zeolite

**Table S1** The elemental content in CuHY-2%-450 before and after alkylation estimated by ICP-OES

Samples	Al (wt%)	Cu (wt%)	Cu/Al (molar ratio)
Fresh CuHY-2%-450	11.12	1.46	0.056
Spent CuHY-2%-450	10.93	1.42	0.055