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Lei Wang[1,+], Libo Zhang[2,+], Hongyi Li[3], Yubo Ma[1,*], Ronghui zhang[4,*]

1. Department of Chemistry and Chemical Engineering, Chongqing chemical industry vocational college, Chongqing, 401220, China;

2. University of Chinese Academy of Sciences, Beijing 100049, China.

3. Xinjiang Quality of Products Supervision & Inspection Institute of Technology, Urumqi 830011, China.

4. Guangdong Key Laboratory of Intelligent Transportation System, School of Engineering, Sun Yat-sen University, Guangzhou 510275, China.

* Corresponding authors:

Yubo Ma, **E-mail:** mayubo_cas@126.com ,

Ronghui Zhang, **E-mail:** zrh1981819@126.com .

† These authors contributed equally to this work.

Abstract:

A mesoporous SBA-15 supported sulfonic acid catalyst (SBA-15-SO_3H) was successfully prepared and used for the selective conversion of fructose to 5-hydroxymethylfurfural (HMF). Up to 96 % of HMF selectivity with 100 % fructose conversion was obtained under mild conditions (120 °C, 60 min, DMSO as solvent). Solvent effect, reaction time, reaction temperature and fructose-to-catalysts mass ratio have been investigated. The SBA-15-SO_3H solid acid catalyst can be separated from the reaction mixture after reaction and reused by simple centrifugalization, and 100% fructose conversion with 95% HMF yield could be retained. Further, reaction activation energy of 56.4 KJ/mol has been fitted with kinetic analysis, which means that the dehydration of fructose into HMF is relative easier over SBA-15-SO_3H catalyst in this work. Besides, X-ray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR) and scanning electron microscopy (SEM) measurements reveal that the