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# High selective production of 5-hydroxymethylfurfural from fructose by sulfonic acid functionalized SBA-15 catalyst

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## Abstract:

A mesoporous SBA-15 supported sulfonic acid catalyst (SBA-15-SO<sub>3</sub>H) 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<sub>3</sub>H 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<sub>3</sub>H catalyst in this work. Besides, X-ray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR) and scanning electron microscopy (SEM) measurements reveal that the

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