

A Novel SBA-15/H-ZSM-5 Composite Catalyst for Conversion of Furfuryl Alcohol to Ethyl Levulinate †

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† Presented at International e-Conference on Green Chemistry and Engineering towards Sustainable Development – An Industrial Perspective (16-18 June 2021), Surat, Gujarat, India

Received: 5.06.2021; Revised: 10.06.2021; Accepted: 12.06.2021; Published: 15.06.2021

Abstract: A novel SBA-15/H-ZSM-5 composite catalyst was prepared, and its activity was tested for the efficient conversion of furfuryl alcohol (FOL) to ethyl levulinate (EL) in liquid phase alcoholysis of furfuryl alcohol as the model compound. The activity of this catalyst is compared with various treated zeolite materials (H-ZSM-5, de-silicated H-ZSM-5, meso-HZSM-5) wherein, SBA-15/H-ZSM-5 was found to be the most selective and robust catalyst. The effects of various operating parameters were optimized using the Taguchi method in an autoclave reactor, and the kinetics of the reaction was studied under optimized conditions. A high yield of ethyl levulinate (88%) was achieved under optimized reaction conditions, i.e., temperature 130°C, reaction time 5 (h), catalyst dosage 0.5 g, and FOL concentration 0.5 M. The catalyst recovered through calcination was reused four times and found to be good with 48% yield of EL.

Keywords: furfuryl alcohol; ethyl levullinate; SBA-15/H-ZSM-5; Taguchi methods.

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Funding

Self-supported.

Acknowledgments

This research has no acknowledgment.

Conflicts of Interest

The authors declare no conflict of interest.