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Production of high value added petroleum additives by esterification of carboxylic acids using solid acid catalyst zeolite Hβ

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Esterification of carboxylic acids like succinic acid (SA), levulinic acid (LA) and valeric acid (VA) with alcohols like methanol(MeOH), ethanol (EtOH) and 2-propanol (PrOH) to produce respective esters were examined using parent zeolite Hβ and desilicated Hβ (desi-Hβ) catalysts with enhanced acidity and the relationships between esters' production and catalytic performances were investigated. Acidity of the catalysts affects the catalytic activity which was evaluated by NH3-TPD measurement. Structure properties were verified by BET surface area measurement, XRD crystallinity determination, FTIR, DLS, SEM and TEM measurement. Due to reversibility and equilibrium nature of the reaction at room temperature, the challenge was to maximize the selectivity to Succinates, Levulinate and Valerates which are the high value added products for the commercial use and as petrochemical additives. The molar ratio of methanol to SA/LA/VA was varied from 12 to 6:1, and the results showed that a ratio of 8 is enough to obtain similar yields of methyl levulinate at 73-76°C and 24 h in a batch (94%) and Microwave reactor (92%) respectively. In view of this, the present study aims to assess the production of esters by esterification of carboxylic acid using electromagnetic field as an energy source. Effects of operating parameters such as reaction time, feed composition, and microwave input power and reaction temperature were systematically investigated for the solid catalyzed microwave irradiated (MWI) reactions.

Biography

Vaishali Rakesh Umrigar serves as an Assistant Professor of Chemical Engineering at Sarvajanik College of Engineering and Technology, India. She is active in research oriented learning and associated with the application of green syntheses. She has done MTech in Microwave Assisted Organic Syntheses in 2007 from Sardar Vallabhbhai National Institute of Technology (SVNIT), India. Her research interests are focused on organic syntheses, green chemistry, and reaction kinetics to achieve next gain for the development of the chemical processes.

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