Journal of Industrial and Engineering Chemistry 91 (2020) 54–68

Contents lists available at ScienceDirect

Journal of Industrial and Engineering Chemistry

journal homepage: www.elsevier.com/locate/jiec

A review on influence of reactor technologies and kinetic studies for biodiesel application

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ARTICLE INFO

Article history:
Received 12 June 2020
Received in revised form 31 July 2020
Accepted 23 August 2020
Available online 29 August 2020

Keywords:
Transesterification
Biodiesel
Reactor
Kinetic study
Catalyst

ABSTRACT

The increase in demand for energy has caused a clear contradiction between the supply and consumption of these resources, which has triggered countries to divert their attention towards biodiesel. Biodiesel yield and sustainability of the biodiesel production process are highly influenced by the catalyst. Homogeneous catalyst is the conventional method to produce biodiesel, but it requires larger water consumption to purify the final product while on the contrary heterogeneous catalyst does not require expensive utility separation cost and it can be separated from simple filtration method. Thus, this paper comprehensively reviews the conventional and advanced biodiesel reactor technologies, particularly link to the kinetic studies of different types of catalysts. The effects of the operating conditions on the reactor technology with different catalysts are discussed to observe a better oil conversion. Merits and limitations of different catalysts for biodiesel production are then compared. The kinetic studies are reviewed to compare the rate of reaction and activation energy between various types of catalysts. As the catalyst and reactor type selection affect the transesterification reaction, it is necessary to search for the correct combination of catalyst and reactor to increase the efficiency of biodiesel production at a lower cost.

Contents

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https://doi.org/10.1016/j.jiec.2020.08.024
1226-086X/