

Transesterification of soybean oil to biodiesel catalyzed by waste glass solid base catalyst

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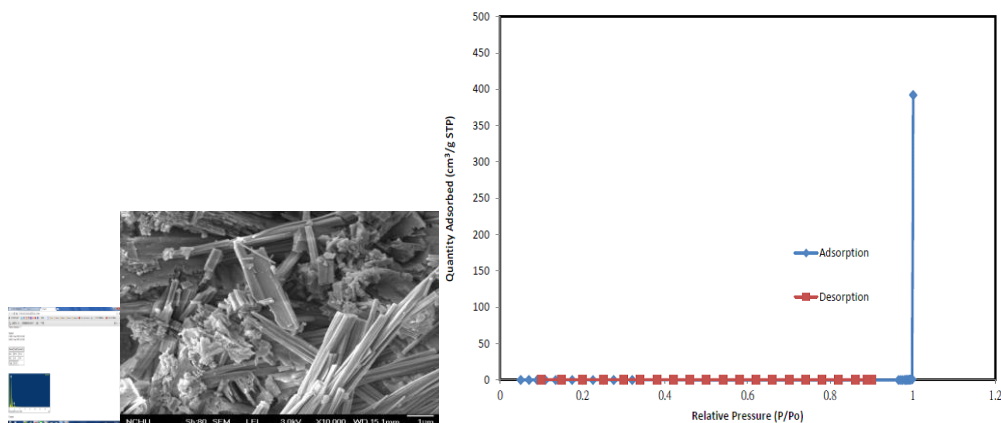
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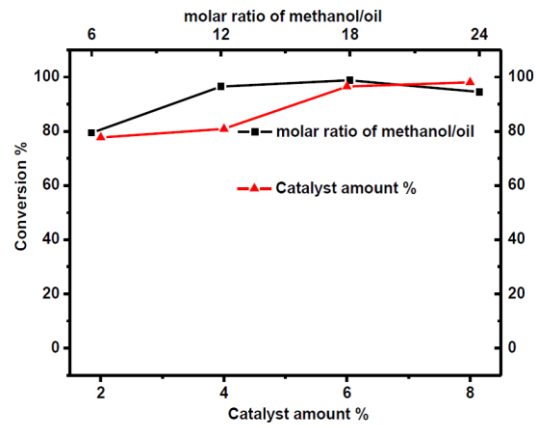
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This study uses waste glass as a low-cost material to prepare the solid base catalyst with lithium carbonate as an activating agent through a solid state reaction for the biodiesel production. The results show that a highly active solid catalyst could be obtained by mixing and well grinding waste glass with lithium carbonate calcined in air for 4 h. The prepared solid base catalyst is characterized by XRD, BET, SEM and FTIR for the physical and chemical properties. This study aims to discuss the transesterification with the proportion of waste glass and lithium carbonate and control the alcohol-oil ratio of catalysts with various proportions to achieve the highest biodiesel conversion rate, achieve the maximum economic benefit, and reduce the cost. A complete biodiesel technology chain, as the complex system engineering, covers several technical aspects, including the preparation of catalysts, transesterification, and reuse of used oil. Under the optimal reaction conditions of methanol/oil molar ratio 18:1, 6% (wt/wt oil) catalyst amount, and reaction temperature of 65 °C for 2 h, there is a 99.8% conversion to the biodiesel from soybean oil. The waste glass as the solid base catalyst demonstrates excellent catalytic activities and stable catalytic activities in transesterification.

Keywords : Waste glass, Lithium Carbonate, Biodiesel, Transesterification, Solid base catalyst.





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