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Biodiesel production from sunflower oil using ZSM5 supported catalysts

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ZSM5 zeolite was impregnated with different KOH loadings (15 wt.%, 25 wt.% and 35 wt.%) to prepare catalysts used in the biodiesel production via transesterification of refined sunflower oil. The catalysts were calcined at 500°C for 3 hr before characterization by N₂ adsorption-desorption, XRD and XRF techniques. All the catalytic reactions were performed in a batch reactor at 60°C and under atmospheric pressure. It was found that KOH/ZSM5 with 35 wt.% loading showed the best catalytic performance. Optimization of the reaction conditions in the presence of KOH/ZSM5 (35 wt.%) was done by modifying the catalyst to oil ratio and the reaction time. A high methyl ester yield (> 95%) was obtained after a reaction time of 24 hours, a catalyst to oil ratio of 18 wt.% catalyst and a methanol to oil molar ratio of 12:1. Characterization of the spent catalyst was done using XRF, DSC and FTIR techniques in order to study its aging characteristics after three consecutive cycles. The results showed no significant leaching of KOH species into the reaction medium leading to a stable catalyst that can be successfully adopted in large scale industries for biodiesel production.

Biography

Jane Estephane obtained her PhD degree, double diploma prepared in Claude Bernard University and in Turin University. She joined EURECAT group in France in 2008 as Area Sales Manager. She was responsible for selling catalyst related services to one of the Supermajor oil groups worldwide. Currently, she is an Assistant Professor in the Department of Chemical Engineering at the University of Balamand.

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