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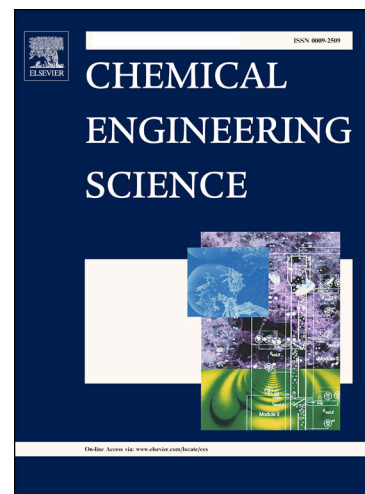
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Transesterification of Soybean and Castor Oil with methanol and butanol Using Heterogeneous Basic Catalysts to obtain Biodiesel

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Abstract

This paper focuses on the preparation and characterization of CaO, MgO and ZnO, both bulk and supported on γ -Al₂O₃ and their catalytic activity in the transesterification of soybean oil and castor oil with methanol and butanol in order to produce biodiesel. XRD, SEM, CO₂-adsorption followed by TGA and N₂ adsorption have been employed to characterize the prepared catalysts. In supported catalysts, the presence of γ -Al₂O₃ improves alcohol dissociation on the superficial basic sites. The first step of the reaction mechanism is then favored (hydrogen abstraction). In the transesterification of castor oil with butanol, MgO/ γ -Al₂O₃ and ZnO/ γ -Al₂O₃ catalysts showed high yields to FABE (Fatty Acid Butyl Ester) (97% and 85%, respectively). These last catalysts constitute an efficient alternative for obtaining second-generation biodiesel, taking into account that castor oil is a nonedible source and butanol is an alcohol that can be obtained from biomass.

Keywords: Biodiesel, Heterogeneous catalysts; Soybean oil; Castor oil; Transesterification; Mixed metal oxide

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