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On the influence of gallium in the mix oxides catalysts obtained from hydrotalcites with different M^{+2}/M^{+3} ratios for transesterification reactions

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Different aspects of the inclusion of gallium hydrotalcite were exploited in this work to produce heterogeneous catalysts for ethyl biodiesel synthesis with soybean oil. The synthesis of porous mixed metal oxide (PMO), derived from layered double hydroxides (LDH) hydrotalcite type with the general formula $Mg_6Al_2(CO_3)(OH)_{16} \cdot 4H_2O$ the ratios of M^{+2} / M^{+3} equal to 3: 1; 4: 1 and 5: 1 by the method of co-precipitation and containing Ga^{3+} in replacement of Al^{3+} in 50 and 100% ratios was performed in order to study their structural and catalytic properties of soybean oil transesterification with ethanol. The reactions were processed at 120°C (12h) in the molar ratio of oil / ethanol 1:20 with 20% (w/w) of catalyst in relation to the oil. HDL's respective samples PMO's were characterized by BET; TG; CO₂ adsorption; Zeta potential; XRD and FTIR-ATR. The catalytic activity was determined by GC-FID. Catalysts with higher ratio M^{+2} / M^{+3} were more effective in biodiesel conversion and the highest yield was 84.8% for the system 4: 1 (MgAl). Catalysts containing 50% Ga yielded 76.3% conversion, where as complete substitution of Al by Ga gave only 11.9% conversion.

Biography

Mancini M is a Master's student from São Paulo State University. He works in Bioenergy and Bioprocess line research in laboratory Sucrochemistry and Analytical Chemistry at IBILCE-UNESP with basic heterogeneous catalysts doped with metals for the conversion of soybean oil to ethyl biodiesel.

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