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## **Influence of lanthanides (La, Ce, Yb and Lu) in the catalytic properties of hydrotalcites and their oxides to ethyl biodiesel production**

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Heterogeneous catalytic processes for biodiesel production are challenging, however with advantages as recycling of the catalyst, no soap formation and the possibility of replacing methanol with ethanol. The hydrotalcites (HT)  $[M1-x2+Mx3+(OH)2]_x(Ax/nn-)_{x-}$  are double layer hydroxides with magnesium and aluminum and one of its oxide's characteristics is to gather on its surface acid and basic Lewis elements, that can act in a combined way with both alcohol activation used in the transesterification, and with the activation of carbonyl's glycerides and be an interesting system with catalytic potential, consisting mainly of abundant and non-toxic elements and with a simple preparation methodology. Thus, the aim of this paper is to study the effect that the lanthanide elements (Ln) cause in the structure of the HT when used as dopants in order to produce ethyl biodiesel by transesterification. Hydrotalcites were synthesized following the procedures of coprecipitation with molar ratio  $M2+/M3+ = 3$  containing the trivalent ions La, Ce, Yb, and Lu replacing the Al in the molar proportions 1%, 2% and 5%. The oxides resulting from calcination were characterized by XRD, Specific surface area (BET), temperature programmed desorption (TPD-CO<sub>2</sub>), thermogravimetric analysis (TGA), and infrared (ATR-FTIR). The catalytic test was performed with 5% (w/w) catalyst/oil. The reaction was conducted with molar ratio of soybean oil/ethanol 1:20 (120°C, 12 h). The doped Ln provided changes in the solid structures and their basic sites. Doped with 1% and 2% resulted in catalytic transesterification activity above 100% over the HT reference.

### **Biography**

Jéssika de Souza Rossi is a Chemist and is currently graduate student with Master Degree in Chemistry from São Paulo State University (UNESP), São José do Rio Preto, Brazil. She is having experience in bioenergy and bioprocess and her current research is focused on synthesis and characterization of solid catalysts for production of ethyl biodiesel.

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