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## Hydrogenation of biodiesel with magnetic Platinum catalysts

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**Statement of the Problem:** Recent changes in Brazilian fuel legislation increased the amount of biodiesel blended to diesel. Although the benefits of using biodiesel, there still some issues to be addressed, such as its low oxidative stability. The addition of antioxidants in fuels is not a permanent solution, since it only slows down the deterioration of the fuel. A promising alternative to the use of antioxidants is the selective hydrogenation of biodiesel. The goal of this work is to study the activity and selectivity of Platinum supported on a magnetic/silica core-shell nanoparticle as a catalyst for selective hydrogenation of Soybean biodiesel.

**Methodology:** Pt@SiO<sub>2</sub>@Fe<sub>3</sub>O<sub>4</sub> and Pt/Pd@SiO<sub>2</sub>@Fe<sub>3</sub>O<sub>4</sub> were tested under different conditions in an autoclave reactor. Tests with BMI.BF<sub>4</sub> and BMI.NTf<sub>2</sub> as the reaction medium were also conducted. The ester content of the product was measured by the HPLC-UV method. The products were analyzed in order to determine the oxidative stability, viscosity, density and calorific characteristics. Results: Both catalysts showed no important selectivity on the hydrogenation of the methyl esters. Pt/Pd@SiO<sub>2</sub>@Fe<sub>3</sub>O<sub>4</sub> had higher activity whilst the Pt@SiO<sub>2</sub>@Fe<sub>3</sub>O<sub>4</sub> generated more selective products. The recycles of the catalysts were done, showing no changes in less than 3 reactions. In table 1 is shown the methyl esters contents for reactions with and without ionic solvents and the main results of the different analysis.

**Conclusions:** Both catalysts are active for hydrogenation, with good results for formation of methyl oleate. Reactions with ionic solvent BMI.BF<sub>4</sub> did not work and further analysis showed possible impregnation of the solvent on the catalyst. Reactions with BMI.NTf<sub>2</sub> was noticed a selectivity for methyl oleate but with very reduced activity, demanding more time to achieve the aimed product.

### Biography

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