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Production of renewable transportation biofuels by thermal/catalytic cracking of Triglycerides and their Methyl Esters

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Growth of the world energy consumption, energy sources depletion and global warming that related to the fossil fuel consumption, increase the attentions to the production of renewable fuels. Conversion of vegetable oil and fats (natural triglycerides) to biofuel is one of the options to produce renewable fuels for the transportation sector but the yield and quality of the products are among the important factors in the process. This lecture presents some of the results obtained from the study of deoxygenation, and ketonization processes using thermal/catalytic cracking of sunflower oil and its methyl esters for the production of transportation biofuels. Sunflower oil was converted to methyl ester in the presence of KOH through transesterification reaction and was used as a feed for the cracking process. Thermal cracking of sunflower oil and its methyl esters were compared to determine the benefits of transesterification process as a pretreatment step for the triglycerides. To reduce the oxygen content of the liquid products and property improvement of the fuel after catalytic cracking using HZSM-5, deoxygenation over- Al_2O_3 , and ketonization over MnO_2 / Al_2O_3 catalysts were examined. Results show that decarboxylation and ketonization of the liquid products with catalysts reduces the acidity and improve other properties of the fuel to the standard level.

Biography

Sadrameli is a professor of Chemical Engineering at TMU, Tehran, Iran. He received his BSc in Chemical Engineering from Sharif University of Technology, Tehran in 1980, MSc and PhD from Leeds University, UK in 1984 and 1989 respectively. His research interests focus on industrial heat recovery, thermal energy storage systems using PCMs, and thermo-chemical conversion of biomass for the production of biofuels. His current projects involve encapsulation of PCM materials for thermal energy storage applications and production of transportation biofuels and valuable chemicals from thermal and catalytic cracking of triglycerides and pyrolysis of oil seeds.

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