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The role of green solvents in purification of fuels

During the past decade, a growing trend of global energy consumption can be observed. This is particularly true for the transportation sector, which mainly relies on the fossil fuels. As a result, increased emissions of combustion products (SO_x, NO_x, CO_2) that adversely influence the environment and are responsible for the global warming and climate changes can be detected. One way for reduction of harmful emissions is to produce fuel with ultra-low sulfur and nitrogen content. Commercial processes for desulfurization and denitrification require high temperatures and pressures, as well as large amounts of hydrogen, making purification step an expensive and relatively environmentally unfriendly process. To reduce the emission of the greenhouse gasses, fossil fuels should be replaced with renewable, sustainable alternative fuels that must be ecologically and technologically acceptable, economically competitive and easily available. Biodiesel is one of such fuels. Requirements for the development of new technologies for the production of biodiesel from the so-called advanced raw materials – waste cooking oil and waste animal fats as well as from the microalgae come out of the increased world demand for energy. Among alternative methods for lowering sulfur and nitrogen content of FCC gasoline and diesel fuel, as well as for pretreatment of raw materials for biodiesel production and purification of raw biodiesel, liquid-liquid extraction with ionic liquids and deep eutectic solvents can be highlighted. The selection of the appropriate solvent involves the experimental determination of liquid-liquid equilibria and derivation of a mathematical model, which would allow for the evaluation of the extraction efficiency. Short review of the application of green solvents in the processes of separation of impurities from fossil fuels and biodiesel will be presented.

Biography

Aleksandra Sander received the MEng and PhD degrees in chemical engineering in 1999 and 2003, respectively, from the Faculty of Chemical Engineering and Technology (FCET) University of Zagreb, Croatia. She is working at the Department of Mechanical and Thermal Process Engineering at FCET since 1994 and she was elected full professor in 2011. She published around 50 papers (journal articles and conference papers). She took part in 35 international and national conferences. She participated in the execution of several national science projects supported by the Croatian Ministry of Science and Technology and the Croatian Science Foundation. She was leader of the research project supported by Croatian Academy of Sciences and Arts. Her research interest includes thermal separation processes like drying, crystallization and liquid-liquid extraction.

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