

Towards an efficient membrane for fatty acid separation

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Oleochemicals are chemicals derived from animal fats and plant oils. The global use of animal fats and plant oils in 2014 was 196,4 million tonnes, from which 25% was used as renewable feedstock. The global market for oleochemicals was estimated 14 billion tonnes in 2013 and will rise another 6% in the next 5 years[1]. The applications for fatty acids as renewable feedstock are situated in a large range of industries, but are presently limited due to a challenging separation. Efficient separation in their individual components can increase the market potential and can open new markets.

Organic Solvent Nanofiltration or OSN is an emerging but high potential membrane technology where sufficiently stable nanofiltration membranes are used in non-aqueous media. In this field, chemically robust ceramic nanofiltration membranes have good opportunities. Moreover, the surface chemistry of these membranes can be tuned by grafting, offering a flexible tool to change the membrane-solute-solvent affinities, and thus the membrane selectivity.

In this work, the separation of fatty acids and/or derivatives is investigated in different solvents, using a variety of membranes with a range of surface chemistries. Included are also membranes containing transition metals, able to form complexes with the C-C double bonds of the fatty acids. This complexation allows promising opportunities for the separation between saturated and unsaturated fatty acids and cis –and trans isomers. The previously acquired knowledge on how different affinities determine the membrane performance in OSN, proves very helpful in the development of an efficient membrane for these challenging separations.

[1]M. Panchal en B. Agrawal, „Oleochemical Opportunities,” *Speciality Chemicals Magazine*, October 2013.