Thin film nanofiltration membranes for the chemical industry: integrated asymmetric and interfacial polymerization approaches

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Abstract:

The extension of nanofiltration for application in the chemical, petrochemical and pharmaceutical industries is expected to provide more effective separation processes with lower carbon footprint and enable fractionations and purifications tasks not possible today. Key requirements are first high stability in the operation conditions, frequently in organic solvents and at temperatures above those tolerated by membranes most used in applications such as desalination. As important is the requirement of high selectivity with the capacity of distinguishing between molecules (or ions) or similar size, sometimes differing only by charge, shape, or chirality. The future of the membrane technology and how far it will be implemented in sustainable separations depend on that. Processability and scalability are essential. The presentation will focus on approaches recently explored in our lab (e. g. Chisca et al. *Science* 2022; Huang et al. *Nature Comm.* 2020 and others), which have been demonstrated for challenging separations such as oil fractionation, and chiral separation. The polymeric membranes are based on highly stable polymers like polytriazole and polyketones manufactured into crosslinked integral asymmetric membranes or interfacial polymerizatio membranes with tuned building blocks.

Keywords: nanofiltration, organic solvents, interfacial polymerization, thermal treatment