

## 2<sup>nd</sup> International Conference and Expo on **Separation Techniques**

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### Understanding and predicting industrial membranes performances in separation technology

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Nanofiltration (NF) membranes cover a range of salt and neutral molecule selectivities that lay between reverse osmosis and ultrafiltration membranes. This unique performance enabled a breakthrough in industry during the past decades. Their high water permeability along with good rejection makes them usable as a replacement for different treatment processes at a reasonable energy cost. However, there are some hindrances in the design of new NF processes and improvement of existing ones since NF applications are mostly associated with complex transport phenomena of which modeling is difficult. The understanding of transport phenomena through NF membranes by use of modeling and prediction may help to implement NF membrane technology more broadly and will enlarge the NF market beyond water filtration. Considering that NF is an industrial scale method for purification and concentration of oligosaccharides mixtures, we decided to study some industrial membranes performances against various saccharides. We studied independently each component of the solute/membrane/solvent system and their pair-interaction to achieve a deep theoretical knowledge. We then collected rejection data and analyzed membrane performances while varying parameters, such as temperature and concentration. Thanks to the characterization of the membranes and their performance, we were able to parameterize a model based on the extended Nernst-Planck equation for rejection results. Finally, the model was assessed against mixture separations. Going forward, the outcome of this study will enable more rigorous membrane selection for targeted industrial applications and to predict its performance.

#### Biography

Helene Marie has completed her PhD from Compiègne University of Technology, France and CEA Leti. She is a Lead Engineer at Dow Benelux B.V. in Corporate R&D and works closely with the Dow Water & Process Solution Business Unit.

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