Contribution ID: **819** Type: **Poster (+) Presentation**

Block Copolymer Ultrafiltration Membranes: Stochastic Microstructure Delineation and Flow Simulation

Wednesday, 2 June 2021 10:00 (1 hour)

Block copolymer ultrafiltration membranes have a wide range of applications from drug delivery to water purification and virus filtration. Although optimizing flow is critical to the performance of such ultrafiltration membranes, little success has been reported on their numerical flow characterization. The main challenges have been reported as i) hierarchical pore structure delineation and ii) lack of an image- based micro-scale modeling approach that is computationally efficient and that can capture such wide pore size distribution. In this study, we address the challenge of pore structure delineation using an array of SEM images with different resolutions. Segmenting the SEM images using continuous max-flow and min-cut algorithm, they are used to collectively determine the pore size distribution and pore density profile of the membrane. To compute permeability, a novel stochastic pore network model (SPNM) is proposed and absolute permeability of two block copolymer membranes is then computed and compared with the experimental measurements.

Time Block Preference

Time Block B (14:00-17:00 CET)

References

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Student Poster Award

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