Charge property modeling of nanofiltration hollow fiber membranes

Abstract

The development of models that predict membrane performance has contributed a better understanding of the basic principles and mechanisms of solute rejection and deposition. It also serves as fundamental properties that allow specific characterization determination. This work fabricates hollow fiber membranes using Polyethersulfone (PES). The membranes were fabricated in-house using phase inversion technique by modification with synthesized charged-surface modifying macromolecules (cSMM). The cSMM comprise with end-group component of Hydroxybenzene sulfonate or Hydroxybenzene carboxylate. The electrical properties of the membranes were modeled by utilizing the combination of irreversible thermodynamic model, Steric- Hindrance Pore (SHP) model and Teorell-Meyer-Sievers (TMS) model. The negatively-charged of the modified hollow fiber membranes was calculated based on sodium chloride rejection experimental performance. The analysis of the modeling results revealed that the modification of nanofiltration membrane using sulfonate induce negative 1.61 electrical properties compared to carboxylate that is negative 1.49 for both type modified PES membranes.