Analysis of water transport in Pressure Retarded Osmosis Membranes

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Pressure retarded osmosis (PRO), that is the one of osmosis technologies, is able to produce renewable energy by utilizing the differences of concentration between a low salinity feed solution and a high salinity draw solution. In the PRO, water transport across the membrane is considered by the two terms. First is the external concentration polarization, that becomes significant for high-performance membranes, limiting transport phenomena. Second is the internal concentration polarization, effecting on reducing the osmotic pressure. The commercialized membranes used on this study are made of a selective polyamide layer on top of a polysulfone support layer. The high porous support layer decreases internal concentration polarization, resulting that the transport properties of the active layer can be improved. We examined the influence of the support layer structure in thin-film composite membrane on the water transport in the PRO.