

# Transport phenomena in thin film composite membranes with an interlayer (TFNi)

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## **Abstract:**

Thin film composite membranes with an interlayered structure (TFNi) are an emerging type of membranes show promising separation performance in reverse osmosis and nanofiltration processes. These membranes feature an interlayer between their polyamide rejection layer and porous substrate. The structure and properties of the interlayer have profound impact on the water permeance, water-solute and solute-solute selectivity, and membrane fouling propensity. For example, under the right conditions, the inclusion of a suitable interlayer could result in up to an order of magnitude enhancement in water permeance while simultaneously maintaining or even improving membrane selectivity. In contrast, a poorly designed interlayered membrane structure could result in both impaired water permeance and selectivity. This presentation highlights the fundamental transport mechanisms involved in TFNi membranes. The implications of these mechanisms on membrane water permeance, selectivity, and fouling propensity are addressed. The presentation is expected to aid better understanding and design of TFNi membranes.

**Keywords:** Thin film nanocomposite with interlayer (TFNi), Water permeance, Solute selectivity, Fouling