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# Ultra-thin, multi-layered polyamide membranes: synthesis and characterization

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## Abstract

Customization of thickness and roughness of thin film composite reverse osmosis (TFC-RO) membranes provides opportunities to optimize the membrane permeability and fouling resistance. We propose a novel strategy to synthesize ultrathin multi-layered polyamide (ML-PA) membranes with the versatile maneuverability of the salt rejecting layer thickness and roughness. We have employed advanced quartz crystal microbalance with dissipation (QCMD) techniques to study the deposition rate of the ultrathin PA nanolayers with a resolution of approximately 8, 15 and 25 nm per deposition cycle. At brackish water desalination condition, the ML-PA membrane exhibited ~60% flux increase and higher salt rejection compared with the home-made

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