

Layer by layer reverse osmosis membrane from UF tubular ceramic support

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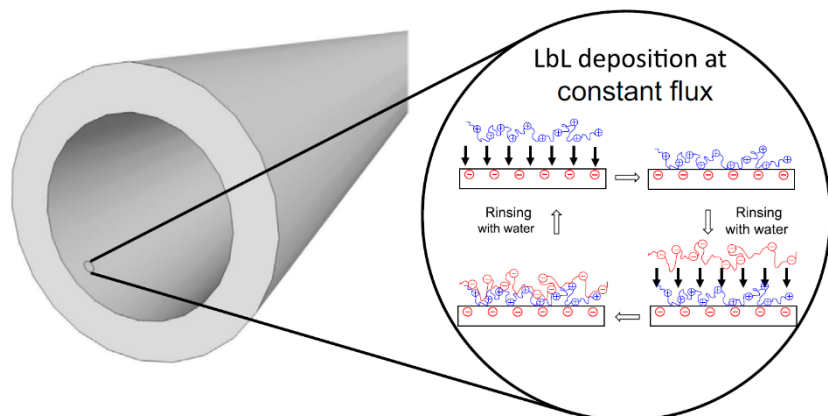
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Increased fresh water demand and limited resources are the most pressing factors for process wastewater treatment and reuse. An economic separation process is required to recycle valuable substances such as water.

State of the art spiral wound reverse osmosis modules show fouling behavior that makes a previous micro filtration necessary. A backwashable, tubular RO membrane would eliminate the need for further pretreatment.

This study aims to develop a polyelectrolyte multilayer coating on a tubular ceramic ultrafiltration membrane support for reverse osmosis. The coating is performed with a layer by layer technique that uses alternating adsorption of polycations and polyanions on the membrane surface.



For characterization, pure water permeability, the molecular weight cut off and salt retentions for divalent (MgSO_4) as well as monovalent (NaCl) ions were measured. Experiments show that a coating on both supports with polyelectrolytes is feasible. A full coverage of the pores with a polyelectrolyte multilayer was achieved after six layers. Depending on coating parameters retentions and molecular weight cut offs in the region of reverse osmosis and nanofiltration were observed.

Polyelectrolyte membranes coated on a tubular ceramic support can be tuned for reverse osmosis. Backwashability and better fouling behavior result in an increased separation performance with a minimized number of process steps.

Keywords: Polyelectrolyte multilayer, LbL, Reverse Osmosis