Performance and stability improvement of multilayered membranes for salts and micropollutants removal

The world’s water need will increase in the coming decades and is considered to be one of the greatest challenges. This stretch on the water supply is due to an increasing water need for drinking, irrigation and industrial applications. With agriculture, livestock and energy consuming more than 80% of all water for human use, demand for fresh water is expected to increase with population growth, further stressing traditional resources. Large quantities of saline wastewater could potentially be reused, but (partial) salinity and micropollutant removal is needed.

Negatively charged nanofiltration (NF) membranes have a high potential to purify wastewater because of their size- and charge-based separation mechanism and their low operating pressure. Here, such membranes are produced by the layer-by-layer (LbL) technique. LbL membranes are produced by applying thin cationic and anionic polyelectrolyte (PE) coatings onto a negatively charged porous membrane (Figure 1).

![Figure 1: layer-by-layer deposition process](image)

The NF membrane properties are influenced by the chemistry, type and combination of different PE coatings. This project results in the production and characterization of NF membranes in terms of morphology, performance and stability using artificial and industrial waste water streams.

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