

## Polyelectrolyte-modified polyethersulfone ultrafiltration membranes for wastewater treatment applications

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### ABSTRACT

This work reports on the use of the layer-by-layer (LbL) technique to modify the surface of polyethersulfone hollow fibre (HF) ultrafiltration membranes for wastewater treatment. The polyelectrolytes employed are poly(ethylenimine), poly(diallyldimethylammonium chloride) and poly(styrene sulfonate) to obtain up to three layers. Sludge supernatant was used as feed for filtrations and the throughput across the polyelectrolyte-modified membrane was characterized by permeability measurement and the composition of the discharged permeates. Furthermore, the molecular weight cut off (MWCO) of the modified membranes was determined. To evaluate real separation performance of polyelectrolyte-modified membranes the total organic carbon (TOC) removal and the change in ultraviolet absorbance ( $UVA_{254}$ ) at 254 nm as a function of the number of deposited layers were determined for the sludge supernatant. Between 30% and 50% TOC rejection was observed for modified membranes as compared to only 15% for virgin membranes.

*Keywords:* Polyelectrolytes; Layer-by-layer; Ultrafiltration membrane

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