# Layer-by-layer nanofiltration membranes for ions and micropollutants removal

Tao He

[a] Shanghai Advanced Research Institute, Chinese Academy of Sciences, Shanghai 201210, China
*Email: het@sari.ac.cn

**Abstract:**

Water-based assembly of Layer-by-Layer (LBL) nanofiltration membranes has emerged as a new type of green, high-performance separation material, sometimes outperforming conventional interfacial polymerization membranes. However, the understanding of how to create highly selective LBL nanofiltration membranes is still in its infancy. The interaction of the LBL coating layer with the substrate is largely unknown. It remains unclear how the assembly of polycations and polyanions impacts the separation properties of nanofiltration membranes. The reaction of the LBL coating to external hydraulic pressure and chemicals requires further investigation. This presentation will outline our recent discoveries regarding the unique behavior of LBL nanofiltration membranes when used for the extraction of lithium ions from brine and micropollutant removal from surface water. New mechanisms and hypotheses will be proposed, and perspectives for future development will be discussed.

**Keywords**: Nanofiltration; Layer-by-Layer assembly; Lithium ion separation; micropollutant.

**Speakers bio with photo**

Professor He has been awarded more than 30 scientific research projects by CAS, NSFC, MOST, as well as from Fortune 500 companies. He has authored over 100 papers. He was the recipient of the Newton Advanced Fellowship from the Royal Society and currently serves as Co-Editor-in-Chief of *Desalination* (2023) and Executive Editor of *Desalination and Water Treatment* (DWT, 2024).

His research focuses on development of novel membranes and processes for resource recovery, micropollutant removal, and green energy, with specific interests in nanofiltration, forward osmosis, isotope separation, and membrane distillation.

**Please return the filled document via replay email or sento to [MSA.AMC2024@gmail.com](mailto:MSA.AMC2024@gmail.com).**