

Innovative Membrane Applications in Water Treatment

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The surface modification of membranes by coating represents an interesting and advanced approach to prepare tailored membranes. The most common methods for the preparation of coated membranes, such as solution coating and polymerization reaction, will be reported and discussed. The coatings are mainly applied for enhancing either the hydrophilicity or hydrophobicity of membranes depending on the field of application. Specific case studies, based on the research carried at ITM-CNR, will be considered. The first case study is about the hydrophobisation of membrane surface, which is particularly relevant for the preparation of composite (hydrophilic/hydrophobic) membranes, specifically designed for Membrane Distillation for desalination [1]. A coating made of perfluoropolyether (PFPE) on commercial hydrophilic membranes have been successfully applied. In the second case, an innovative hydrophilic coating has been applied on commercial ultra-filtration membrane, with the objective of making a membrane less prone to fouling and at the same time, more permeable to water [2]. This type of coating was successfully applied in treating textile wastewater by Membrane Bio-Reactor.

[1] C. Ursino, E. Di Nicolò, B. Gabriele, A. Criscuoli, A. Figoli, *Development of a novel perfluoropolyether (PFPE) hydrophobic/hydrophilic coated membranes for water treatment, Journal of Membrane Science, 581 (2019) 58-71*

[2] S. A. Deowan, F. Galiano, J. Hoinkis, D. Johnson, S.A. Altinkaya B. Gabriele, N. Hilal, E. Drioli, A. Figoli, *Novel low-fouling membrane bioreactor (MBR) for industrial wastewater treatment, Journal of Membrane Science, 510 (2016) 524-532*