

Towards the development of reactive membranes for water reclamation: From antimicrobial to catalytic functionalities

Wastewater reclamation to generate fresh water for consumption and hygiene is of importance for adequate health and sanitation. Nowadays, in many countries there is limited access to potable water. To aid in solving this issue, we are working on the fabrication of a forward osmosis (FO) membrane with antimicrobial and catalytic properties as a feasible solution to water purification. Although several membranes for water reclamation have been proposed in the literature, there is a lack of knowledge on the feasibility of developing catalytic membranes that can degrade contaminants during the same process. Also, one of the major problems associated with the membrane-based processes is (a) fouling, due to organic molecules, and (b) biofilm formation made of microorganisms. Typically, these membranes are composed of a polymeric support, e.g. polysulfone (PSF) and additives, which provide the porous layer selective to water, and an active layer, in this case made of a conductive material. The electroconductive layer allows the membranes to prevent fouling via electrostatic repulsions or electrochemical reactions, while also can act as a template for further modifications. Specifically, we are focusing on the chemical attachment of silver nanoparticles over these electroconductive membranes, in order to prevent bacterial growth without affecting the membrane performance. To evaluate the viability of these membranes, we test them under the FO mode using fresh water and real samples (e.g. wastewater).

Forward Osmosis Mode

