



Ben-Gurion University of the Negev
Blaustein Institutes for Desert Research

The Swiss Institute for Dryland Environmental and Energy Research
Alexandre Yersin Department of Solar Energy and Environmental Physics

Title:

Exploring charge balanced polyampholyte hydrogels as a non-fouling coating for polymeric membranes

Speaker:

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Abstract:

A major challenge in wastewater treatment using membrane technology is to prevent the attachment of microorganisms, biomolecules and natural organic matter to the membrane surface. Previous researches have shown that zwitterion polymers exhibit excellent non-fouling properties for a variety of applications. Polyampholytes, net-electric charge copolymers of mixed charged subunits, is a special zwitterionic system with comparable non-fouling properties. These polymers offer an easy alternative for studying a broad spectrum of acid-base combinations by simply changing one of the monomers. The overall objective of our research is to investigate the non-fouling properties of polyampholyte hydrogels using monomers with different chemistries.

In this study, a new polyampholyte hydrogel having a similar structure as sulfobetaine, a well-known non-fouling zwitterion polymer, was studied for the modification of UF polyethersulfone (PES) membranes. The membranes were modified by radical graft polymerization using the UV-photoinitiation method. The physicochemical (ζ -potential and hydrophilicity) and morphological properties of membranes coated with the new polyampholyte hydrogel were investigated. Then, the fouling propensity of the modified membranes was evaluated using bovine serum albumin, humic acid, sodium alginate as model foulants and extracellular polymeric substances extracted from real wastewater. The findings of this study confirm that the new polyampholyte hydrogel has low-fouling properties and suggests that it can be applied for modification of UF membrane for reducing their fouling propensity. Further research will focus on polyampholytes with other acid/base compositions.

Tuesday, December 13, 2016, 11:00
Lecture room, Physics Building (ground floor)