Abstract:
It is projected that by 2030 more than half of the human population will face water shortages. To date, the most promising technology capable of increasing access to fresh water sources and improving water quality uses membrane-based systems such as reverse osmosis (RO). Although effective at purifying contaminated waters, membrane-based treatment facilities are both capital- and energy intensive. However, one way to lower operating costs is to develop innovative membrane materials with improved performances. The ideal RO membrane would cost less but process water faster and more efficiently (i.e. improved performance) than existing ones. Since, membrane performance is strongly influenced by the physical and chemical properties of the material, developing the ideal RO membrane is contingent upon how membrane chemical and physical properties correlate to membrane performance. Yet, little quantitative understanding exists about how the properties and structure of RO membrane materials determine performance.

This seminar discusses approaches to develop a bench-top method for measuring membrane charge, a key membrane property that strongly influences membrane performance. This method, together with other characterization procedures, will investigate how filler materials, in the form of nanoparticles, affect the physicochemical properties of RO membranes and how they correlate to membrane performance. Using the information learned from these studies, modified membrane composites containing nanoparticles as filler materials are being prepared targeting increased water permeability and the impact of these modifications on membrane performance will be studied.

Metal Organic Frameworks:
Potential tools for water remediation

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0001 Michael Hooker Research Center
12:20 – 1:10 p.m.