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**Investigations into the microstructure and performance of ion-modified polysulfone membranes** MATTHEW GREEN, JOHN FELMLY, Arizona State University — Access to clean water is one of the grand challenges facing society today and in the future. Membrane-based water purification techniques are the current state of the art, but face limitations including thermodynamically unfavorable transport, high material and operation costs, the perm-selectivity tradeoff, and an insufficient number of materials capable of selectively removing fertilizer and pesticide compounds. Polysulfones have been implemented in a variety of membrane-based technologies for water purification and desalination. Introducing charged moieties into the polymer repeat unit introduces added functionality, develops new morphological features, improves thermomechanical performance, and enables tailored a selectivity toward small molecules or salts. This work reviews recent developments in the preparation of polysulfones that can undergo post-polymerization modification reactions to introduce pendant cations, anions, or zwitterions. The synthesis and subsequent characterization will be discussed briefly. Then, the processing of the polymers into thin film and hollow fiber membranes will be discussed as well as their performance for desalinating solutions with varying saline concentrations and solutions containing common fertilizer and pesticide compounds.

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