

Abstract Submitted
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Self-Assembled Micro-Phase Separated Semi-Permeable Membranes. DALE HANDLIN, SCOTT TRENOR, CARL WILLIS, Kraton Polymers — Anionic polymerization of block copolymers affords superior microstructure control and thus morphology management through precise control of block structures. Numerous researchers have studied sulfonated styrenic block copolymers as semi-permeable membranes for various applications. Traditionally, the styrenic endblocks of triblock copolymers are sulfonated, as was first practiced by Kraton polymers in the late 1960's. Once endblock sulfonated polymers are hydrated, water plasticizes the endblocks which results in a significant degradation in the mechanical properties. We have recently designed new sulfonated block copolymer structures that have continuous ionic phases and retain their strength when fully hydrated. We have used known structure-property relationships to tailor the properties of the sulfonated polymer membranes via polymer structure, placement of sulfonic acid functionality, and membrane formation techniques. This ability to control membrane morphology allows us to decouple the degree of sulfonation from the amount of water swelling as well as the water swelling from the transport properties. The initial characterization and the ability to manipulate the mechanical and transport properties of these polymers will be discussed.

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