

Abstract Submitted
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Controlled Solution Self-Assembly of a Midblock-Sulfonated Pentablock Copolymer¹ KENNETH MINEART, North Carolina State University, MICHAEL GRADZIELSKI, Technische Universitt Berlin, RICHARD SPONTAK, North Carolina State University — The solution self-assembly of midblock-sulfonated block ionomers (SBIs) has been shown to translate to their bulk, solution-cast morphology, which can further impact their function in applications such as desalination, fuel cell, and photovoltaic membranes. Previous studies have identified that increasing the degree of sulfonation (DOS) in SBIs dispersed in a nonpolar solvent results in the growth of micellar aggregates due to increased interfacial energy. However, these works have not attempted to control the assembly at a given DOS by tuning the solvent environment. The current study probes the tunability of SBI aggregation behavior using a nonpolar/polar solvent mixture varying in composition. A combination of light scattering (SLS and DLS) and small angle X-ray scattering (SAXS) independently confirm that SBI micelles grow larger, both in core and corona, as the solvent environment becomes more nonpolar. The increases in both core and corona size will be explained using polymer thermodynamics and further supported through presentation of small angle neutron scattering (SANS) data. In addition, these results will be compared with SBI self-assembly in a single solvent, which is expected to distribute between the micelle cores and bulk solvent environment.

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